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The Appraisal of Real Estate

14th Edition

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The Appraisal Institute advances global standards, methodologies, and practices through the professional development of property economics worldwide.

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Foreword

As a professional who entered the appraisal world 35 years ago, when the seventh edition was the Appraisal Institute's premier text, it is a true highlight of my year as president to have the fourteenth edition of *The Appraisal of Real Estate* arrive on the scene in 2013. Today, while real estate markets–and real estate professionals–work themselves out of the economic downturn of the previous five years, both appraisers and users of their services can be assured that this volume builds on time-tested foundational knowledge and contains the most up-to-date information and learning on valuation available anywhere. In 2008, when the previous edition of this textbook was published, the global economy was on the verge of a startling decline and the ensuing economic distress that has affected most economic sectors, especially real estate. Five years later, the valuation community recognizes that "business as usual" is no longer possible without a renewed respect for market fundamentals. This new edition of *The Appraisal of Real Estate*, the profession's flagship text, reflects this recommitment to the essential principles of appraisal and the sound application of recognized valuation methodology.

Longtime readers of *The Appraisal of Real Estate* will notice that certain topics in the text have been reorganized. The new edition of the text has been restructured to mirror the organization of the valuation process, moving from the identification of the problem through to the report of defined value. This new core of chapters is bookended by introductory chapters covering real estate and its appraisal and concluding chapters on appraisal practice specialties such as review, consulting, and valuation for financial reporting.

Diving deeper, readers of the textbook will find significantly more discussion of scope of work (in its own chapter for the first time), data standards and related issues, appraisal review, consulting, and intangible assets. Also, the new edition of the textbook includes expanded coverage of topics introduced in the last edition such as green building, the use of statistics, and valuation for financial reporting, which have all developed into relevant areas of inquiry in appraisal practice and continuing education with a growing body of literature.

The fundamentals of statistical analysis are covered in the section of the text devoted to data analysis in recognition of the central role that descriptive statistics and statistical analyses play in market analysis, highest and best use analysis, and the application of the traditional approaches to value. In other words, statistical applications are not just for specialists anymore. And readers who want direction for further study of more advanced applications can find a detailed supplementary discussion of regression analysis and model building in a new appendix.

In the data analysis section of the text, readers will find a clearer, more rigorous discussion of market analysis and a more concise discussion of highest and best use analysis. The revised highest and best use chapter strips away some of the unnecessary verbiage that had previously clouded this central concept in the valuation process.

Since the publication of the last edition of *The Appraisal of Real Estate*, professional standards have evolved. Most notably, the International Valuation Standards underwent a radical revision that resulted in the streamlined 2011 edition of that document. Because professional valuation standards are–and will always be–dynamic documents subject to periodic revision, this edition of the text reduces its reliance on specific editions of professional standards and focuses instead on examining the time-tested concepts that all standards share.

The new edition of the textbook builds on past editions and does not attempt to reinvent the wheel. The poor performance of many real estate markets in the recent recession was a wake-up call, not a death knell, for the profession. The capabilities of new information technology and automated valuation applications have not eliminated the market's need for the judgment of competent and ethical valuation professionals. History confirms that the applicability of certain valuation techniques may rise and fall as real estate markets move through their lifecycle, but the fundamental principles of valuation that have always been the core of this book remain unchanged.

The development of this edition of *The Appraisal of Real Estate* would not have been possible without the contributions of dozens of volunteers, who are identified in the Acknowledgments. Their conscientious efforts to improve the textbook over the course of an arduous 18-month development process are a testament to the commitment of the profession's thought leaders to move the body of knowledge forward and to ensure that *The Appraisal of Real Estate* retains its central role in the canon of professional literature.

Richard L. Borges II, MAI, SRA
2013 President
Appraisal Institute

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The development of the fourteenth edition of *The Appraisal of Real Estate* would not have been possible without contributions from a long list of valuation professionals active in the Appraisal Institute's education, publications, and other endeavors. The Appraisal Institute would like to acknowledge the generous assistance of the following content reviewers and consultants: Gregory J. Accetta, MAI, Sandra K. Adomatis, SRA, Jim Amorin, MAI, SRA, Marius Andreasen, MAI, Randall Bell, PhD, MAI, Richard L. Borges II, MAI, SRA, E. Nelson Bowes, MAI, Peter D. Bowes, MAI, Michael Y. Cannon, MAI, SRA, John S. Cirincione, SRA, Judson H. Clendaniel, MAI, Stephanie Coleman, MAI, SRA, Stephen T. Crosson, MAI, SRA, Douglas S. DeFoor, MAI, Ron D. DeVries, MAI, SRA, Gary S. DeWeese, MAI, Robert E. Dietrich, MAI, Larry O. Dybvig, MAI, Don M. Emerson, Jr., MAI, SRA, Stephen F. Fanning, MAI, Kenneth G. Foltz, MAI, SRA, W. West Foster, MAI, Mark R. Freitag, SRA, Justin R. Glasser, Elizabeth Green, Frank E. Harrison, MAI, SRA, Louis Hecht, Jr., Thomas O. Jackson, PhD, MAI, Jeffrey A. Johnson, MAI, Kerry M. Jorgensen, MAI, William E. King, Cheryl A. Kunzler, SRA, David C. Lennhoff, MAI, SRA, Micheal R. Lohmeier, MAI, SRA, George R. Mann, MAI, SRA, Richard Marchitelli, MAI, Michael S. MaRous, MAI, SRA, Maureen Mastroieni, MAI, Patrick M. O'Connor, John W. O'Neill, PhD, MAI, Richard L. Parli, MAI, Nathan Pomerantz, MAI, Stephen D. Roach, MAI, Richard J. Roddewig, MAI, Scott M. Schafer, MAI, John A. Schwartz, MAI, Leslie P. Sellers, MAI, SRA, Tony Sevelka, MAI, SRA, Barrett A. Slade, PhD, MAI, James K. Tellatin, MAI, John R. Underwood, MAI, SRA, and Janice F. Young, MAI, SRA.

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Introduction to Appraisal

A real estate developer visits a plot of vacant land near a suburban highway interchange and makes some back-of-the-napkin calculations about the feasibility of building and leasing a new speculative office building on the site in the next two years. A residential real estate broker with the listing for a three-bedroom, two-bathroom house in an active urban market researches the prices paid recently for sales of homes of similar size with similar physical characteristics before suggesting a listing price to the seller. Another broker looks through the multiple listing service before showing a young couple half a dozen homes for sale in nearby suburban neighborhoods that are within the couple's price range. What do these situations have in common? They all involve people making decisions about real estate and its value.

A county tax assessor runs data for hundreds of properties through a battery of statistical models while preparing for the three-year reassessment of commercial real estate in the municipality. A loan officer at a branch of a regional bank looks over a loan application and several supporting documents as part of the due diligence in making a recommendation on construction financing for the expansion of a local manufacturing company's office-warehouse. An attorney represents the owner of farmland adjacent to a county road in a dispute with the county department of transportation over the amount of just compensation for land taken as part of a road-widening project.

Clearly, all the individuals in these scenarios are making decisions about real estate based on their perceptions of the value of a particular property or a group of properties in a specific market. However, none of these key participants in the real estate marketplace is performing an *appraisal*.

What Is an Appraisal?

In simplest terms, an appraisal is "the act or process of developing an opinion of value" of an asset.[1] The asset in question could be anything, from fine art to machinery and equipment, or even a specific type of business. The focus of this book, however, is the appraisal of real property, i.e., rights in real estate.

The value developed in an appraisal is some measure of the relative worth of the asset, usually expressed in terms of money. In other words, the appraisal quantifies to a certain level of precision what buyers and sellers would consider the relative worth of, in this case, some interest in a parcel of land and any improvements to that land.

Implicit in the traditional definition of *appraisal* is the idea that an appraisal is someone's opinion, rather than an undeniable fact. Another useful way of describing and thinking about what an appraisal is would be to look more closely at the people who develop those opinions of value. While anyone can have an opinion of value, appraisers are professionals with training and expertise in the accepted valuation methods and techniques who have an ethical obligation to remain disinterested and unbiased while performing an appraisal. That professional expertise gives the value opinion of an appraiser credibility in the marketplace that the opinions of other market participants do not carry. And the credibility of an appraiser's unbiased opinion of value, the relevant evidence an appraiser gathers, and the logical analysis of that data make the appraiser's opinion valuable to clients.

In the United States, licensed and certified real estate appraisers meet educational, experience, and testing requirements set by states and can perform appraisals in the jurisdiction covered by their licenses or certifications.[2] Outside the United States, appraisers are commonly known as *valuers*. Unsurprisingly, the professional qualifications of valuers vary from country to country, often depending on the nature of the economic system and the history and development of the valuation profession within a particular country.[3]

Professional standards, such as the Uniform Standards of Professional Appraisal Practice (USPAP) and the International Valuation

1. *Uniform Standards of Professional Appraisal Practice* (Washington, D.C.: The Appraisal Foundation, 2012), Definitions, U-1.
2. The federal government mandated that all states establish licensing or certification programs to regulate appraisals for federally related transactions. Some states established laws requiring licensing or certification only for appraisals performed for these purposes, while other states require licensing or certification for appraisals performed for any (or almost any) purpose. In general, the courts do not require an appraiser to be licensed or certified. However, possession of a state-issued license or certification has become a basic indication of appraiser competency.
3. For discussion of licensing criteria in specific countries, see Howard C. Gelbtuch with Eunice H. Park, *Real Estate Valuation in Global Markets*, 2nd ed. (Chicago: Appraisal Institute, 2011).

Standards, highlight the ethical codes that valuation professionals must follow. For example, USPAP defines an appraiser as "one who is expected to perform valuation services competently and in a manner that is independent, impartial, and objective." By that definition, any potential client of an appraiser should be able to expect a certain level of professionalism from anyone representing himself or herself as an appraiser. Similarly, the International Valuation Standards outlines the expected independence of valuers as follows:

> The process of valuation requires the valuer to make impartial judgements as to the reliance to be given to different factual data and assumptions in arriving at a conclusion. For a valuation to be credible, it is important that those judgements can be seen to have been made in an environment that promotes transparency and minimises the influence of any subjective factors on the process.[4]

Full-time professional real property appraisers have extensive training and experience and are committed to the profession. Professional appraisers are bound to strict compliance with regulatory requirements, and many are members of appraisal organizations such as the Appraisal Institute that encourage participation in professional activities and educational development. Members agree to peer review of their ethical conduct and work performance, which reflects their strong commitment to professionalism.

Continuing education is the cornerstone of professional development. By pursuing continuing education, appraisers demonstrate their commitment to maintaining their skills at a level far above the bare minimum required to satisfy state licensing requirements. Individuals who complete a rigorous educational program and earn recognized professional designations find that their employment and business prospects are considerably enhanced. A commitment to professionalism helps regulate the industry and ensures quality appraisal work.

According to professional standards, appraisal practice includes, but is not limited to, appraisal, appraisal review, and other services requiring valuation or valuation-related expertise. Appraisers engage in appraisal practice–i.e., "acting as an appraiser"–while a variety of other professionals may provide valuation services, according to the definitions in the professional standards. A wide range of activities, from measuring the size of a building to developing a detailed market study, qualify as appraisal practice but do not fit the definitions of the three types of valuation services.

What Is Real Property?

Precisely what does a real estate appraiser value? In simplest terms, the real property rights, not the real estate itself. In real estate appraisal, an important distinction is made between the terms *real estate* and *real property*. Although these concepts are different, some state laws and court decisions treat them synonymously for legal purposes.

4. *International Valuation Standards 2011* (London: International Valuation Standards Council, 2011), 14.

Real estate is the physical land and appurtenances affixed to the land—e.g., structures. Real estate is immobile and tangible. The legal definition of real estate includes the following tangible components:

- land
- all things that are a natural part of land, such as trees and minerals
- all things that are attached to land by people, such as buildings and site improvements

In addition, all permanent building attachments (for example, plumbing, electrical wiring, and heating systems) as well as built-in items (such as cabinets and elevators) are usually considered part of the real estate. Real estate includes all attachments, both above and below the ground.

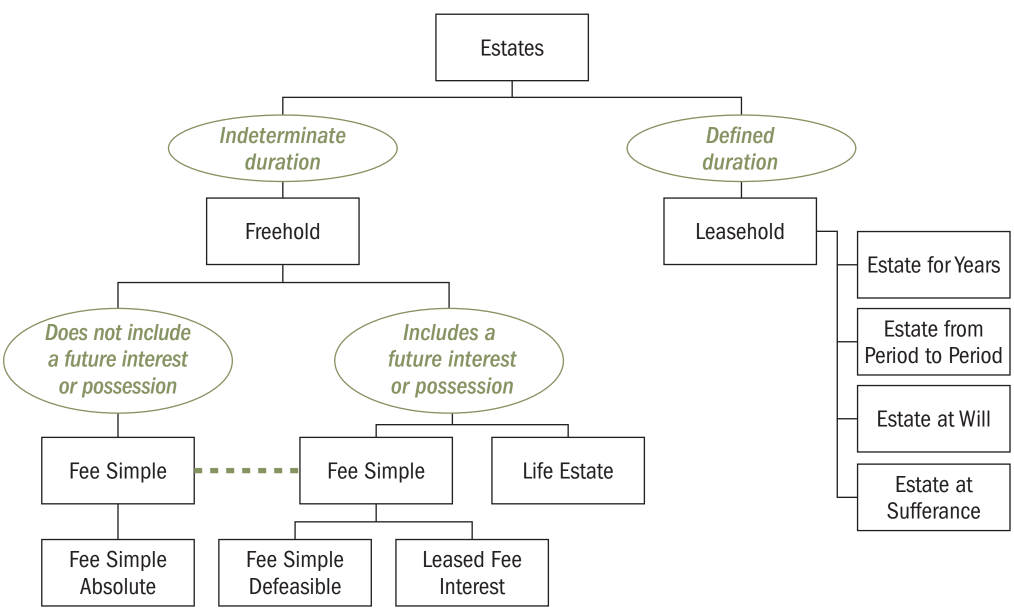
The distinction between *real estate* and *real property* is fundamental to appraisal:

real estate
An identified parcel or tract of land, including improvements, if any.

real property
The interests, benefits, and rights inherent in the ownership of real estate.

Real property includes the interests, benefits, and rights inherent in the ownership of physical real estate. In an appraisal, a particular set of real property interests—not the real estate—is what is valued. Real estate in and of itself has no value; the rights, or interests, in real estate are what have value.

Figure 1.1 Estates in Land



A right or interest in real estate is also broadly referred to as an *estate*. More specifically, an estate in land describes the degree, nature, or extent of interest that a person has in the real property. To qualify as an estate in land, the legal interest (or interests) must allow possession–now or in the future–and specify duration. Estates are distinguished by their duration and fall into two categories: freehold and leasehold estates.

The Bundle of Rights

The total range of private ownership interests in real property is called the *bundle of rights*. Imagine a bundle of sticks in which each "stick" represents a distinct and separate right or interest. The bundle of rights contains all the interests in real property, including the right to use the real estate, sell it, lease it, enter it, and give it away, and each "stick" can be separated from the bundle and traded in the market. The US Constitution guarantees the private enjoyment of these rights, subject to certain limitations and restrictions, which are discussed in Chapter 7.

The most complete form of ownership is the fee simple interest–i.e., absolute ownership unencumbered by any other interest or estate, subject only to the limitations imposed by the governmental powers of taxation, eminent domain, police power, and escheat. An appraiser may be asked to appraise something less than the fee simple interest–i.e., a partial interest or a fractional interest.

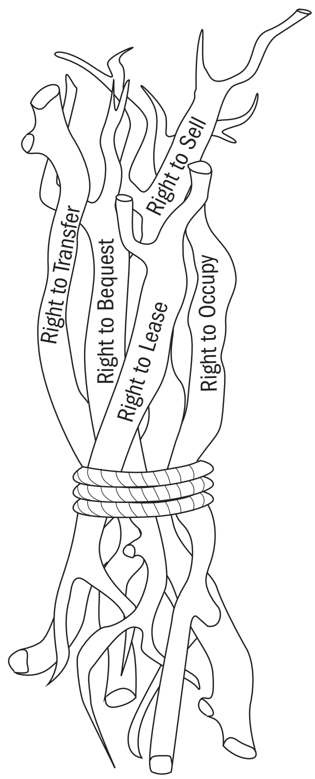
Because each stick in the bundle of rights represents a separate right or interest inherent in the ownership, these individual rights can be separated from the bundle by sale, lease, mortgage, donation, or another means of transfer. The complete bundle of rights includes, but is not limited to, the following:

- the right to sell an interest
- the right to lease an interest
- the right to occupy the property
- the right to mortgage an interest
- the right to give an interest away

Ownership of the fee simple interest is equivalent to ownership of the complete bundle of sticks, while one or more of the sticks (or a portion of individual sticks) can represent a partial interest in a specific property (see Figure 1.2). Each individual right in the bundle may have potential value. If any or all are removed from the fee simple interest, one or more partial interests are created.

Sometimes described as an *absolute* property right, a fee simple interest is not, in fact, absolute because it is subject to the four powers of government (i.e., taxation,

Figure 1.2 The Bundle of Rights



eminent domain, police power, and escheat). Nevertheless, an owner of a fee simple interest in real estate has broad rights.

If there are leases in place, even at market rates and terms, the interest is a leased fee. The value may be the same as the fee simple, but the interest is correctly identified as a leased fee.

taxation
The right of government to raise revenue through assessments on valuable goods, products, and rights.

eminent domain
The right of government to take private property for public use upon the payment of just compensation. The Fifth Amendment of the US Constitution, also known as the *takings clause*, guarantees payment of just compensation upon appropriation of private property.

police power
The inherent power of government to regulate property in order to protect public health, safety, and general welfare.

escheat
The right of government that gives the state titular ownership of a property when its owner dies without a will or any ascertainable heirs.

Public Restrictions on Ownership

Private ownership of real property rights is guaranteed by the US Constitution but is subject to certain restrictions, known as the four powers of government:

- taxation
- eminent domain
- police power
- escheat

Taxation is the right of government to raise revenue through assessments on goods, products, and rights. The US Constitution effectively precludes the federal government from taxing real property directly, although the income and proceeds from sale of real property may be subject to federal income taxation. The right to tax property is reserved for state and local governments.

Eminent domain is the right of government to take private property for public use upon the payment of just compensation. This right can be exercised by a government agency or by an entity acting under governmental authority such as a housing authority, school district, park district, or right of way agency. Condemnation is the act or process of enforcing the right of eminent domain.

Police power is the right of government through which property is regulated to protect public safety, health, morals, and general welfare. Examples of police power include zoning ordinances, use restrictions, building codes, air and land traffic regulations, health codes, and environmental regulations.

Escheat is the right of government that gives the state or a local government (e.g., township or county) titular ownership of a property when its owner dies without a will or any statutory heirs.

Private Restrictions on Ownership

Private restrictions on property ownership can limit the use or development of a property and might limit the manner in which ownership can be conveyed. The purchaser of a property may be obligated to use the property subject to a private restriction such as right of way or a party-wall agreement. Deed restrictions and subdivision covenants and restrictions are relatively easy to discover. They can be found in deeds recorded at the county courthouse or in information provided by a property owner. Restrictions such as easements and rights of way may be more difficult to uncover. They may be found in title reports or through a diligent search of public records. Sometimes the owner, client, broker, or neighbors can provide this information. Other restrictions such as an unrecorded agreement relative to water rights may be nearly impossible to discover.

Personal Property and Intangible Assets

Appraisers not only recognize the distinction between real estate and real property, they must also be able to identify any separate interests in real property, personal property, and intangible assets involved in an appraisal assignment. (Table 1.1 illustrates the differences between the various interests.) The identification of the precise property interests that will be valued in the assignment is part of the first step in the valuation process (see Chapter 4). An appraisal might involve any or all of these types of property, so appraisers must be able to identify which types of property are being valued to ensure that they have the professional competency to complete the assignment.

Sometimes a valuation assignment is to value just the real property, and at other times the assignment may involve other forms of property either instead of or in addition to the real property. Appraisers must know whether an item is personal property or an intangible asset to determine whether an interest in that item will be included in the indication of value. Personal property that is related to real property and is to be included

Table 1.1 Distinctions Between Real Property, Personal Property, and Intangible Assets

Real Property	**Characteristics**	Items that have been installed or attached to the land or building in a permanent manner. All real estate improvements were once personal property; when attached to the land, they become real estate.
	Examples	· Land · Buildings · Fixtures—e.g., plumbing, lighting, heating, and air-conditioning in a residential property
Personal Property	**Characteristics**	Movable items of property that are not permanently affixed to, or part of, the real estate. Personal property is not endowed with the rights of real property ownership.
	Examples	· Furniture and furnishings not built into the structure such as refrigerators and freestanding shelves · Items such as bookshelves and window treatments installed by a tenant that, under specific lease terms, may be removed at the termination of the lease
Intangible Assets	**Characteristics**	Those assets that are not tangible real property, tangible personal property, or financial assets. An intangible is something that is not material, not corporeal, not substantially real.
	Examples	· Franchises and licenses · Goodwill · Skilled workforce

in the opinion of value must be identified in the appraisal process and described in the appraisal report. The valuation of intangible assets is a specialized assignment requiring additional competency (see Chapter 35).

Why Appraisals Are Needed

Appraisals are requested for as many different reasons as there are clients. All the scenarios outlined at the beginning of the chapter involve significant financial decisions that might require an appraisal and therefore an appraiser. Appraisals are often required by law, such as in many lending situations. Traditionally, appraisals for mortgage lending have been the bulk of work for appraisers of residential property, and changes in governmental regulations on mortgage lending can have a significant effect on the amount of work those appraisers have. As another example, a condemning authority typically must prepare an appraisal for a property that is taken through the exercise of the governmental power of eminent domain as support for the amount of just compensation payable to the property owner. Indeed, in most situations in which the value of real property is contested in court, appraisals serve as primary evidence and appraisers are commonly summoned to testify as expert witnesses on matters relating to the value of real property.

When an appraisal is not required by law, it may be desired by a client because the appraiser's opinion is objective and unbiased and the information about the value of real property will be useful in some financial decision. For example, a property owner might order an appraisal to set an offering price for the property that buyers would consider current and that would likely be accepted by the market without a significant marketing period.

Table 1.2 does not reflect all possible uses for appraisals, but it does provide a broad sampling of professional appraisal activities.

The Purpose of an Appraisal

The purpose of an appraisal is to develop an opinion of some type of value. Just as appraisers must be aware of the differences between types of property, they must also be able to identify which type of value is appropriate for the client's needs.

Like the interest to be appraised, the type of value sought must be identified and defined at the outset of an appraisal assignment. The most common appraisal assignments involve developing an opinion of market value, but many other types of value might be the focus of an appraisal such as

- use value
- investment value
- assessed value
- business value
- fair value

Table 1.2 Typical Uses of Appraisals

Transfer of Ownership
- To help prospective buyers set offering prices
- To help prospective sellers determine acceptable selling prices
- To establish a basis for real property exchanges
- To establish a basis for reorganizing or merging the ownership of multiple properties
- To determine the terms of a sale price for a proposed transaction

Financing and Credit
- To develop an opinion of the value of the real property offered as collateral for a proposed mortgage loan
- To provide an investor with a sound basis for deciding whether to purchase real estate mortgages, bonds, or other types of securities
- To establish a basis for a decision to insure or underwrite a loan on real property

Litigation

Eminent domain proceedings
- To develop an opinion of the market value of a property as a whole—i.e., before a taking
- To develop an opinion of the market value of the remainder after a taking
- To estimate the damages to a property created by a taking

Property divisions
- To develop an opinion of the market value of a property in contract disputes
- To develop an opinion of the market value of real estate as part of a portfolio
- To develop an opinion of the market value of partnership interests

Real estate litigation
- To estimate damages created by violations of environmental laws
- To estimate damages created by environmental accidents
- To estimate damages due to construction defects or defects in title
- To determine professional liability (of a broker, attorney, or appraiser)
- To help settle bankruptcy cases and the dissolution of business partnerships and marriages
- To identify fraud or misrepresentation

Tax matters
- To develop an opinion of assessed value or another type of value
- To separate assets into depreciable (or capital recapture) items such as buildings and nondepreciable items such as land, and to estimate applicable depreciation (or capital recapture) rates
- To develop an opinion of the value of the real estate component of an estate plan that represents the foundation for future capital gains and inheritance taxes
- To determine gift or inheritance taxes
- To develop an opinion of value of conservation easements

Investment Counseling, Decision Making, and Accounting
- To develop an opinion of fair value for financial reporting
- To set rent schedules and lease provisions
- To determine the feasibility of a construction or renovation program
- To help corporations or third parties purchase homes for transferred employees
- To serve the needs of insurers, adjusters, and policyholders
- To facilitate corporate mergers, the issuance of stock, or the revision of book value
- To develop an opinion of liquidation value for forced sale or auction proceedings
- To counsel clients by considering their investment goals, alternatives, resources, constraints, and the timing of their activities
- To advise zoning boards, courts, and planners, among others, on the probable effects of proposed actions
- To assist in arbitrating valuation issues
- To analyze supply and demand trends in a market
- To identify the current status of real estate markets
- To value fixed assets and assist in asset value allocations

The type and definition of value appropriate for a particular assignment will often be clear to experienced appraisers. Technical distinctions among the types and definitions of value listed above are discussed in Chapter 6.

Land, Real Estate, and Ownership of Real Property

According to an old saying, "Under all is the land." Land provides the foundation for the social and economic activities of people. It is both a tangible physical commodity and a source of wealth. Because land is essential to life and society, it is the subject of many disciplines, including law, economics, finance, sociology, and geography. Within the vast domain of the law, issues relating to the ownership and the use of land are considered. In economics, land is regarded as one of the four agents of production, along with labor, capital, and entrepreneurial coordination, and land provides the natural elements that contribute to a nation's wealth. Finance applies the principles of economics within a market economy that furnishes capital for the exchange of property, and it helps market participants act knowledgeably and prudently. From a sociological perspective, land is a resource to be shared by all people, and that land is also a commodity that can be owned, traded, and used by individuals, corporations, partnerships, and other entities. Geography focuses on describing the physical elements of land and the activities of the people who use it.

> Land is investigated and analyzed in a variety of disciplines—government, the law, economics, geography, environmental studies, engineering, and land planning.

Lawyers, economists, sociologists, and geographers have a common understanding of the attributes of land:

- Each parcel of land is unique in its location and composition.

- Land is physically immobile.
- Land is durable.
- The supply of land is finite.
- Land is often useful to people.

Real estate appraisers recognize the attributes that form the basis for real property value. Contrasted with the physical character of land, value is an economic concept. Appraisers recognize the concepts of land used in other disciplines but are most concerned with how the market measures value. Markets reflect the attitudes and actions of people in response to social and economic forces and the constraints of law and legal encumbrances.

Concepts of Land

Although land and improvements on and to land can be viewed in a physical sense, there are other concepts of land that are less obvious. These concepts help to characterize the importance of land and provide the foundation for land value systems.

Geographic and Environmental

The study of land includes consideration of its diverse physical characteristics and how these characteristics combine in a particular area. Each land parcel is unique, and a fixed location is a prominent characteristic of all real estate. The utility of land and the highest and best use to which land can be put are significantly affected by the physical and locational characteristics of the land and other related considerations, broadly referred to as *geography*.

Land is affected by a number of processes. Ongoing physical processes modify the land's surface, biological processes determine the distribution of life forms, and socioeconomic processes affect human habitation and activity on the land. Together, these processes influence the characteristics of land use.

Land can be used for many purposes such as

- agriculture
- commerce
- industry
- residence
- recreation

And land use decisions may be influenced by many factors including

- climate
- topography
- the distribution and density of natural resources, population centers, and industry
- trends in economics, population, technology, and culture

The influence of each of these factors on a particular parcel of land varies.

Geographic considerations are particularly significant to appraisers. The importance of physical characteristics such as topography, soils, water, and vegetation is obvious, but the distribution of population, facilities, and services and the movement of people and goods are important as well. The geographic concept of land, which emphasizes natural resources, the location of industry, and actual and potential markets, provides much of the background knowledge required in real estate appraisal.

Legal

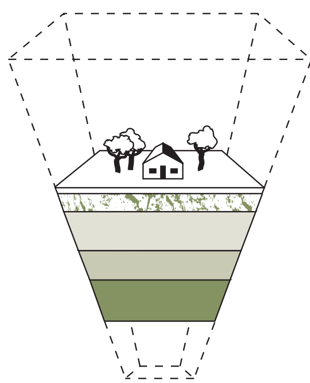
Land use reflects the needs and values of organized society. In countries where the ownership and marketability of land are not free, government often dictates the use of land. In free market economies, land use is regulated within a framework of laws. To understand how the various forces affecting land operate, the basic role of law must be recognized.

The cultural, political, governmental, and economic attitudes of a society are reflected in its laws. The law does not focus on the physical characteristics of land but on the rights and obligations associated with various interests in land. In the United States, the right of individuals to own and use land for material gain is maintained, while the right of all people to use the land is protected. In other words, the law recognizes the possible conflict between private ownership and public use.

"Whose is the land, his it is, to the sky and the depths." This ancient maxim is the basis of the following legal definition:

> Land . . . includes not only the ground, or soil, but everything that is attached to the earth, whether by course of nature, as are trees and herbage, or by the hand of man, as are houses and other buildings. It includes not only the surface of the earth but everything under it and over it. Thus in legal theory, the surface of the earth is just part of an inverted pyramid having its tip, or apex, at the center of the earth, extending outward through the surface of the earth at the boundary lines of the tract, and continuing on upward to the heavens.[1]

Figure 2.1 Land "to the Sky and the Depths"



This definition suggests that land ownership includes complete possession of land from the center of the earth to the ends of the universe. In practice, however, the extent of rights available to private ownership is legally limited due to governmental controls.

The US Congress has declared that the federal government has complete and exclusive sovereignty over the nation's airspace and that every citizen has "a public right to freedom of transit in air commerce through the navigable air space of the United States."[2] Many states restrict ownership and use of subsurface

1. Raymond J. Werner and Robert Kratovil, *Real Estate Law*, 10th ed. (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1993), 4.
2. The Air Commerce Act of 1926 (formerly 49 USC 171 et seq.), the Civil Aeronautics Act of 1938 (formerly 49 USC 401 et seq.), and the Federal Aviation Act of 1958 (see 49 USC 401).

areas such as underground aquifers and oil and gas reserves. Because land ownership can be limited, ownership rights are the subject of law. The value of these rights is the focus of real property appraisal.

The laws that govern the use and development of land in the United States give landowners great freedom in deciding how to use their land. However, this freedom is not without restrictions. The basic concept of private ownership calls for unrestricted use so long as that use does not unreasonably harm the rights of others. In the past, the test of harm focused on owners of adjacent properties. The concept of harm has been expanded to encompass broader social and geographic concerns. The definition of *reasonable use* has been argued in many court cases.

Legal matters of particular concern to appraisers include the following:

- easements
- access regulations
- water and mineral rights
- zoning and other use restrictions
- the recording and conveyance of titles

Also, appraisers must be familiar with local and state laws, which have primary jurisdiction over land.

Economic

Land is a physical entity with inherent ownership rights that can be legally limited for the good of society. Land is also a major source of wealth, which, in economic terms, can be measured in money or exchange value. Land and its products have economic value only when they are converted into goods or services that are useful, desirable, paid for by consumers, and limited in supply. (A product with unlimited supply will have a low value.) The economic concept of land as a source of wealth and an object of value is central to appraisal theory.

The economic concept of land reflects a long history of thought on the sources and bases of value, which is referred to as *value theory*.[3] Value theory contributes to the value definitions used in appraisals and appraisal literature, and it is an important part of the philosophy on which professional appraisal practice is founded.

Social

Modern society has become increasingly concerned with how land is used and how rights are distributed. The supply of land is fixed, so increased demand for land exerts pressure for land to be used more intensively. Conflicts often arise between groups that hold different views on proper land use. Some believe that land is a resource to be shared by all. Some want to preserve the land's scenic beauty and important ecological functions. Others view land primarily as a marketable

3. Paul F. Wendt, *Real Estate Appraisal: Review and Outlook* (Athens, Ga.: University of Georgia Press, 1974), 17.

commodity; they believe society is best served by private, unrestricted ownership. For example, the developer of a proposed shopping center or a business park may view a particular parcel of land as developable in a desirable and affordable location serving a definable market area. On the other hand, local residents may argue that, as the site of a significant Civil War battle, the parcel deserves government protection (if taxpayers could be persuaded to support such a public investment in historical preservation). These conflicting views do not alter the constitutional rights of ownership or market concepts of land. Rather, they reflect controversies that arise between the property rights of the individual and those of society. As a resource, land may be protected for the good of society. As a marketable commodity, the ownership, use, and disposal of land are regulated so that individual rights are not violated.[4]

In 1876 the US Supreme Court established the government's right to regulate "the manner in which [a citizen] shall own his own property when such regulation becomes necessary for the public good." The court quoted the words of England's Lord Chief Justice Hale: "When private property is 'affected with a public interest,' it ceases to be *juris privati* only."[5]

Throughout American history, land ownership has been recognized as a foundation of the country's democratic institutions. John Adams wrote, "If the multitude is possessed of real estate, the multitude will take care of the liberty, virtue, and interest of the multitude in all acts of government."[6]

All laws and operations of government are intended to serve the public. Thus, in the public interest, society may impose building restrictions, zoning and building ordinances, development and subdivision regulations, and other land use controls. These controls affect what may be developed, where development may occur, and what activities may be permitted subsequent to development. In recent decades, the US Government has increased its efforts to regulate the air and water emissions from manufacturing processes and to reduce pollution caused by dirt, chemicals, and noise. Protective controls over land use extend to wetlands, beaches, and navigable waters and to the preservation of the habitats of endangered species.[7]

As the nature and extent of land use controls change, so do the nature and extent of private land ownership. Such changes affect markets and ultimately real estate values. Consequently, real estate appraisers must be familiar with the regulations and restrictions that apply to land use and understand how these regulations affect a specific property.

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4. See also Charles E. Roe, "Land Use: The Second Battle of Gettysburg," *The Appraisal Journal* (October 2000): 441-449.
5. 94 U.S. 113 (1896). Quoted in "Land as a Commodity Affected with a Public Interest" by Richard F. Babcock and Duane A. Feurer in Richard N. L. Andrews, *Land in America* (Lexington, Mass.: D.C. Heath and Company, 1979), 110.
6. Ibid., 31.
7. For more information on the government's control of land use, see J. D. Eaton, *Real Estate Valuation in Litigation*, 2nd ed. (Chicago, Appraisal Institute, 1995).

Forms of Real Property Ownership

One major distinction in real property ownership is the difference between private ownership and public ownership. Public ownership of real property takes many forms. Streets and roads, municipal utility systems, and other public facilities such as city halls, prisons, and public works facilities are usually owned by governmental bodies for the benefit of all citizens in a jurisdiction. School districts own land on which school buildings, athletic fields, and other facilities are maintained. Library districts create public libraries. Park, recreation, and conservation districts acquire land for recreation, conservation, and preservation.

Most public ownership is created in response to public necessity or public demand. For example, in one community it might be necessary to acquire land for a school using the power of eminent domain. In another community, there might be sufficient demand by residents to acquire land for the development of soccer fields using money generated by real estate taxes. Rather than being concerned with the economic issues that are of importance to private owners of real property, a governmental entity often is more concerned with how publicly owned real property, which is usually not subject to real estate taxation, can be used in the best interests of the public.

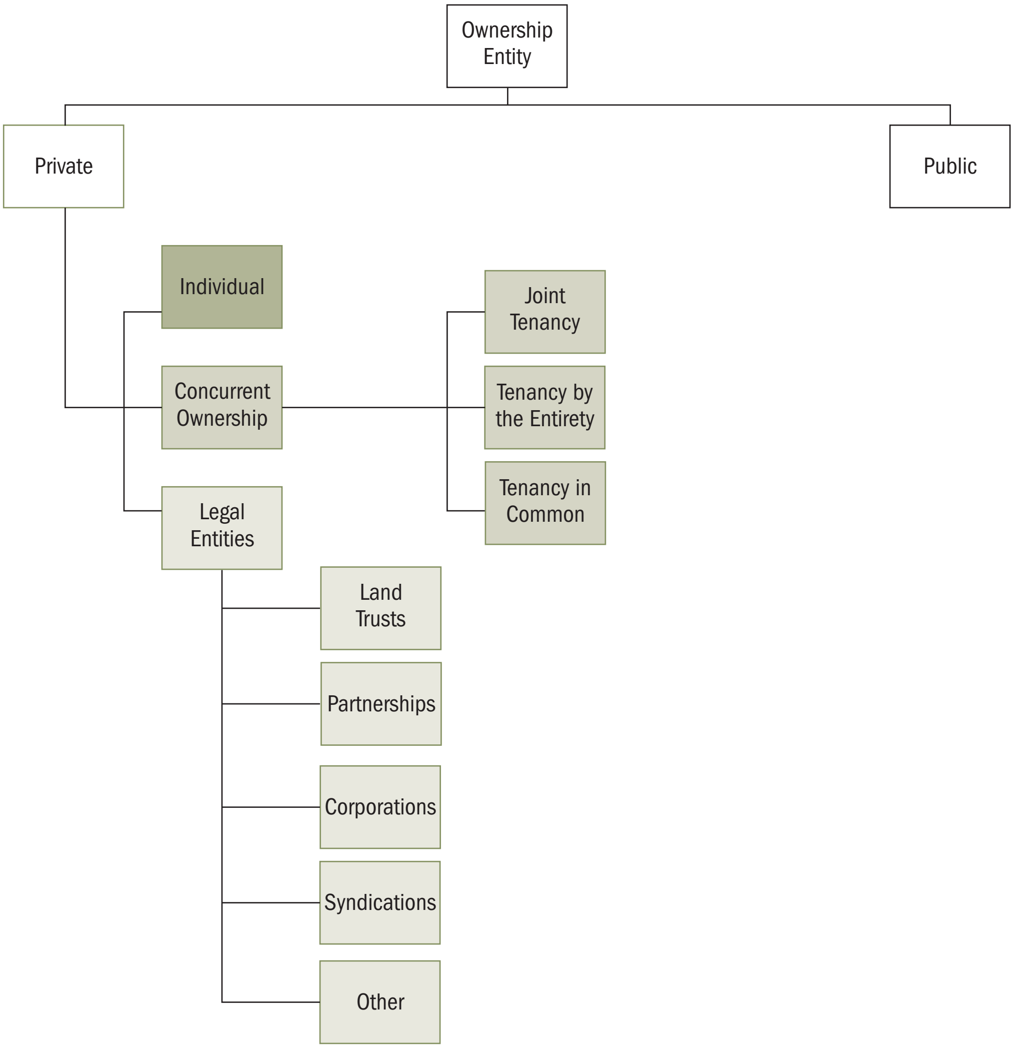
Police power also regulates land use, and often its application can reflect the difference in a property viewed from the perspective of public versus private ownership. For example, a large municipal park might be an ideal location for industrial development, but the zoning imposed through the application of police power will ensure that the park continues to be used for recreational purposes. Also, government regulations will dictate how property acquired by a governmental entity through the process of escheat will best benefit the general public.

Although many appraisal assignments involve the valuation of publicly owned real property, most involve the valuation of private ownership interests. As discussed in this chapter, ownership of property can take many forms. The form of ownership is usually selected based on the needs of the owner or owners. For example, a single-unit residence might be owned by a husband and wife in joint tenancy with the right of survivorship. A more appropriate type of ownership for a chain of food stores, however, might be as a beneficial interest in a land trust or a limited liability corporation. Figure 2.2 illustrates the relationship of various types of real property ownership.

Professional appraisal standards require the appraiser to identify which interest is to be valued in an assignment, but the interest valued need not reflect what currently exists. For example, an appraiser can value a fee simple interest even though the property is leased. The interest appraised depends on the intended use of the appraisal and what interest the client needs to know the value of.

Chapter 7 covers the forms of ownership in more technical detail.

Figure 2.2 Ownership Forms



The Nature of Value

The History of Value Theory

The development of modern value theory began in the eighteenth and nineteenth centuries when economic thinkers of the classical school first identified the four agents of production–labor, capital, coordination, and land–and examined the relationships between the basic factors that create value and supply and demand, i.e., utility, scarcity, desire, and effective purchasing power. Classical theory was largely based on the contributions of the physiocrats, whose ideas were put forth in reaction to the mercantilist doctrines that dominated earlier economic thought.

Mercantilism focused on wealth as a means of enhancing a nation's power. National wealth was equated with an influx of bullion into the national treasury. Mercantilists sought to maintain a favorable balance of trade by selling goods to accumulate gold, the chief medium of exchange. Between the fifteenth and eighteenth centuries, economic activity in western Europe was associated with overseas exploration, colonization, and commerce. Mercantilist doctrine promoted strong, central economic controls to maintain monopolies in foreign trade and ensure the economic dependency of colonies.

Physiocratic thinkers of the mid-eighteenth century objected to the commercial and national emphasis of mercantilism. They stressed other considerations in formulating a theory of value. Agricultural productivity, not gold, was identified as the source of wealth, and land was cited as the fundamental productive agent. The physiocrats also identified the importance of factors such as utility and scarcity in determining value.[1]

The Classical School

The classical school expanded and refined the tenets of physiocratic thought, formulating a value theory that attributed value to the cost of production. The Scottish economic thinker Adam Smith (1721-1790) suggested that capital, in addition to land and labor, constituted a primary agent of production. Smith acknowledged the role of coordination in production but did not study its function as a primary agent. He believed that value was created when the agents of production were brought together to produce a useful item.

In *The Wealth of Nations* (1776), the first systematic treatment of economics, Smith considered value as an objective phenomenon. By virtue of its existence, an item was assumed to possess utility. Scarcity also added exchange value to goods. The "natural price" of an object generally reflected how much the item cost to produce. In contemporary appraisal practice, the classical theory of value has influenced the cost approach.

Later economic thinkers who are regarded as members of the classical school offered theoretical refinements on the cost of production theory of value, but none contested its basic premises. David Ricardo (1772-1823) in *On the Principles of Political Economy and Taxation* (1817) developed a theory of rent based on the concept of marginal land and the law of diminishing returns. Land residual returns were referred to as rent. Ricardo's theory has contributed significantly to the concept of highest and best use and the land residual technique used in the income capitalization approach to value.

John Stuart Mill (1806-1873) reworked Adam Smith's ideas in *The Principles of Political Economy* (1848), which became the leading economic text of its time. Mill defined the relationship between interest and value in use, which he referred to as "capital value"; the role of risk in determining interest; and the inequities of "unearned increments" accruing to land. Confident in his analysis of the cost of production theory, Mill asserted, "Happily, nothing in the laws of value remains for the present or any future writer to clear up; the theory of the subject is complete."

Challenges to Classical Value Theory

In the second half of the nineteenth century, two serious challenges to classical value theory were put forward. One was the labor theory of value, an extreme position advocated by Karl Marx (1818-1883). Marx claimed that all value is the direct result of labor and that increased wages to labor would lower capitalistic profits. Marx envisioned an

1. Francois Quesnay (1694-1774) and Anne Robert Turgot (1727-1781) put forth an individualistic, agrarian-based concept of economic behavior without centralized state control. They popularized the phrase *laissez-faire*, "to let people do as they choose," which underscores their individualistic approach. See Eric Roll, *A History of Economic Thought*, 3rd ed. (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1964), 134.

inevitable struggle between the social classes that would eventually result in a violent political upheaval.

The other challenge was presented by the marginal utility, or Austrian, school, which was critical of both the classical and Marxian theories. The central concept of marginal utility links value to the utility of and demand for the marginal, or additional, unit of an item. Thus, if one more unit than is needed or demanded appears in a given market, the market becomes diluted and the cost of production becomes irrelevant. Value is regarded as a function of demand, with utility as its fundamental precept.[2] Marginal utility is the theoretical basis for the concept of contribution.

The Neoclassical Synthesis

These formidable challenges to the classical theory of value inspired economists to reconsider the issue. In the late nineteenth and early twentieth centuries, the neoclassical school successfully merged the supply-cost considerations of the classicists with the demand-price theory of marginal utility. Alfred Marshall (1842-1924) is credited with this synthesis, which forms the basis for contemporary value theory.[3]

Marshall compared supply and demand to the blades of a pair of scissors because neither concept could ever be separated from the determination of value. He stressed the importance of time in working out an adjustment between the two principles. Marshall maintained that market forces tend toward an equilibrium where prices and production costs meet. Utility-demand considerations operate in the limited span of a given market. In the short term, supply is relatively fixed and value is a function of demand. Cost-supply considerations, however, extend over a broader period, during which production flows and patterns are subject to change. Marshall believed that a perfect economic market would eventually result, and that price, cost, and value would all be equal.[4]

Marshall was the first major economist to consider the techniques of valuation, specifically the valuation of real estate. In this regard, his writings and the writings of those who built upon his work are the source of the distinction between value theory and valuation theory–i.e., the method of estimating, measuring, or forecasting a defined value. Marshall anticipated and developed many of the concepts employed in contemporary appraisal practice. These concepts include the determination of site value through capitalization of income, the impact of depreciation on buildings and land, and the influence of different building types and land uses on land value.

2. Eugen von Boehm-Bawerk (1835-1882) defined value as "the significance a good acquires by contributing utility toward the well-being of an individual." William Stanley Jevons (1835-1882), a founder of modern statistics and a principal proponent of marginal utility, wrote, "Labor once spent has no influence on the future value of any article: it is gone and lost forever." W. Stanley Jevons, *The Theory of Political Economy*, 5th ed. (New York: Augustus M. Kelley, 1965).

3. In 1890, Marshall published *Principles of Economics*, which succeeded Mill's *Principles of Political Economy* as the authoritative text on economic thought. In this book, Marshall advocated a dynamic theory of value to explain real world events. See Alfred Marshall, *Principles of Economics*, 8th ed. (London: MacMillan and Company, 1920); reprint (Philadelphia: Porcupine Press, 1982), 288-290, 664-669.

4. See Robert L. Heilbroner, *The Worldly Philosophers*, rev. ed. (New York: Simon and Schuster, 1964), 178-179, and Paul F. Wendt, *Real Estate Appraisal: Review and Outlook* (Athens: University of Georgia Press, 1974), 18-19.

Marshall is also credited with identifying the three traditional approaches to value: market (sales) comparison, reproduction or replacement cost, and capitalization of income. Irving Fisher (1867-1947), an influential American economist associated with the neoclassical school, fully developed the income theory of value, which is the basis for the income capitalization approach used by modern appraisers.[5]

Modern Appraisal Theory

The writings of Marshall, Fisher, and other economists of the late nineteenth and early twentieth centuries were read by scholars and business professionals interested in economic thought. At the same time, the field of real estate appraisal was emerging and a few practitioners were gaining experience estimating market value and other kinds of value for properties of various types. In the 1920s and 1930s, several events helped to establish appraisal as a young, but viable, profession.

One motivating force was the introduction of land economics as an academic discipline. Land economics developed from the interrelationship of several disciplines and attracted scholars and students who contributed significantly to real estate and appraisal literature over the next 40 years.[6]

A significant event in appraisal history was the publication of *Real Estate Appraising* by Arthur J. Mertzke in 1927, which adapted Alfred Marshall's ideas to develop a tangible link between value theory and valuation theory. Mertzke translated economic theory into a working appraisal theory, helped establish a clear emphasis on the three approaches to value, and explained the use of capitalization rates as indexes of security. The preeminence of the three approaches to value in the appraisal process was underscored in publications by K. Lee Hyder, Harry Grant Atkinson, and George L. Schmutz.[7] Their works set forth systematic procedures for applying the sales comparison, cost, and income capitalization approaches. Schmutz presented a model in which appraisal activity leads to a conclusion of value, which was later incorporated into *The Appraisal of Real Estate*, first published by the American Institute of Real Estate Appraisers in 1951.

Appraisal theory and the language used to describe that theory have continued to evolve. Today's education requirements are stringent and appraisers make use of many analytical methods and techniques. Applying these methods and techniques to an expanding database presents new challenges and raises questions as to how applicable the valuation model is to actual appraisal assignments, how well it analyzes the

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5. Paul F. Wendt, *Real Estate Appraisal: Review and Outlook* (Athens: University of Georgia Press, 1974), 18-19.
6. This influential group included Richard T. Ely (1854-1943), the founder of land economics as an academic subject, Frederick Morrison Babcock (1898-1983), Ernest McKinley Fisher (1893-1981), and Arthur J. Mertzke (1890-1970). Ely, Babcock, and Fisher contributed to the Land Economics series published by the National Association of Real Estate Boards (now the National Association of Realtors), which was the first major publication effort designed to provide real estate professionals with current technical information. The first texts in this series were Fisher's *Principles of Real Estate* (1923), Ely and Moorehouse's *Elements of Land Economics* (1924), and Babcock's *The Appraisal of Real Estate* (1924).
7. K. Lee Hyder, "The Appraisal Process," *The Appraisal Journal* (January 1936); Harry Grant Atkinson, "The Process of Appraising Single-Family Homes," *The Appraisal Journal* (April 1936); and George L. Schmutz, *The Appraisal Process* (North Hollywood, Calif.: the author, 1941).

forces that affect value, and how accurately it interprets the actions and motivations of market participants.

Agents of Production

The production of goods, services, and income depends on the combined effects of four essential economic ingredients, which are referred to as the *four agents of production*:

1. Land
2. Labor
3. Capital
4. Entrepreneurial coordination

In a real estate context, the four agents of production are combined to create real estate, and the sum of the costs to develop a property is one of the basic measures of real property value available to appraisers. In other words, a finished real estate product is created by combining land, labor, capital, and entrepreneurial coordination, and a well-supported opinion of value can be derived through systematic analysis of each of these components, their interrelationships, and their relationship to the property as a whole.

Land

The first thing an entrepreneur generally considers in developing a property is the cost of acquiring the land. The cost of a vacant site or parcel of raw land is the cost of acquisition. The appraiser anticipates that improvements will be added and the property will be marketed to tenants or end users.

Labor

The labor component is the physical and intellectual contribution of workers to the production process. Along with land, labor is considered a *primary factor of production* because neither is the result of the economic process but instead exists by virtue of natural, rather than economic, processes.

Capital

Real estate development requires physical capital such as equipment (machinery and tools), buildings (and all building components), and infrastructure (that is, capital goods) that can produce other goods. The category of capital goods represents *produced* goods that can be used as factor inputs for further production. As such, capital exists as a result of the economic process.

Entrepreneurial Coordination

No prudent developer will undertake to construct and market a property without anticipating receipt of a profit in addition to the return of the equity investment. The purchaser who continues an existing land use is not

entrepreneurial coordination
The ability of an entrepreneur to combine land, labor, and capital in the development of real property; a component of real estate value that represents the investment of time and expertise in the development of a property.

creating value, only maintaining value through proper management of the property. A developer, on the other hand, invests not only equity in a development but also time and expertise. Accordingly, an entrepreneur expects a reward–known as *entrepreneurial incentive* and measured in the marketplace as entrepreneurial profit–for creating and marketing a real estate product through the coordination of land, labor, and capital. More precisely, entrepreneurial incentive is a forecast of the amount the developer expects to receive. This forecast is developed before construction is complete. Entrepreneurial profit is the actual amount received after the property is complete. The fourth agent of production, entrepreneurial coordination, accounts for that investment of time and expertise. (Entrepreneurial incentive and entrepreneurial profit are discussed in greater detail in Chapter 27.)

Factors of Value

The economic concept of value is not inherent in the commodity, good, or service to which it is ascribed. Rather, it is created in the minds of the individuals who make up the market. The relationships that create value are complex, and values change when the factors that influence value change.

Typically, four interdependent economic factors create value:

- utility
- scarcity
- desire
- effective purchasing power

All four factors must be present for a property to have value. The four factors interact in the marketplace to influence the relationship of supply and demand.

Utility

Utility is the ability of a product to satisfy a human want, need, or desire. All properties must have utility to tenants, owner-investors, or owner-occupants. In general, residential properties satisfy the need for shelter, and commercial properties house business activities. Both may have design features that enhance their attractiveness. These features are called *amenities.* The value of amenities is related to their desirability and utility to an owner-occupant or tenant-occupant. The value of ownership may be measured from the prices paid for residences. The value to a tenant can be measured as the rent paid for the occupancy. The benefits derived from income-producing properties can usually be measured in terms of cash flow. The influence of utility on value depends on the characteristics of the property. The utility, or usefulness, of a property may relate to its size, design, location, and other specific characteristics. Time/distance relationships clearly affect the value of property. These different forms of utility can significantly influence property value.

The benefits of real property ownership are derived from the bundle of rights that an owner possesses. Restrictions on ownership rights may inhibit the flow of benefits and, therefore, lower the property's value. Similarly, a property can only achieve its highest value if it can legally perform its most useful function. Environmental regulations, zoning regulations, deed restrictions, and other limitations on the rights of ownership can enhance or detract from a property's utility and value.

Scarcity

Scarcity is the present or anticipated supply of an item relative to the demand for it. In general, if demand is constant, the scarcity of a commodity makes it more valuable. Land, for example, is still generally abundant, but useful, desirable land is relatively scarce and, therefore, has greater value. No object, including real property, can have value unless scarcity is coupled with utility. Air, which has a high level of utility, has no definable economic value because it is abundant, but to a scuba diver who is 100 feet underwater with a tank that is almost empty, it is extremely valuable. The question again becomes one of supply and demand.

Desire

Desire is the wish of a purchaser or user for an item to satisfy human needs (e.g., shelter, clothing, food, companionship) or individual wants beyond the essentials required to support life. Desire could include a business need such as the need for a place to sell or manufacture products. This type of desire supports commercial real estate development.

Effective Purchasing Power

Effective purchasing power is the ability of an individual or group to participate in a market–that is, to acquire goods and services with cash or its equivalent. A valid opinion of the value of a property includes an accurate assessment of the market's ability to pay for the property.

Supply and Demand

The complex interaction of the four factors that create value is reflected in the basic economic principle of supply and demand. The utility of a commodity, its scarcity or abundance, the intensity of the human desire to acquire it, and the effective power to purchase it all affect the supply of and demand for the commodity in any given situation.

Demand for a commodity is created by its utility and affordability. Demand is also influenced by desire and the forces that create and stimulate desire. Although human longing for things may be unlimited, desire is restrained by effective purchasing power. Thus, the inability to buy expensive things affects demand.

Similarly, the supply of a commodity can be influenced by its utility and limited by its scarcity. The availability of a commodity is affected by its desirability. Land is a limited commodity, and the land in an area that is suitable for a specific use will be in especially short supply if the perceived need for it is great. Sluggish purchasing power keeps the pressure on supply in check. If purchasing power expands, the supply of a relatively fixed commodity will dwindle and create a market-driven demand to increase the supply for which there is latent or pent-up demand.

Distinctions Among Price, Cost, and Value

Contemporary appraisers make careful distinctions among the related terms *price*, *cost*, and *value*. The term *price* refers to the amount a particular purchaser agrees to pay and a particular seller agrees to accept under the circumstances surrounding their transaction. A price, once finalized, refers to a transaction price and implies an exchange. The exchange can be temporary–as in a lease–or permanent–as in a sale. But in all cases, price is a fact. Price is the buyer's expression of the property's utility and scarcity combined with the buyer's desire and purchasing power.

Some people use *cost* and *value* synonymously, but appraisal practice requires more precise definitions. The term *cost* is used by appraisers in relation to production, not exchange. Cost may be either an accomplished fact or an estimate.

Costs may be identified with the project phase to which they pertain–i.e., either actual construction cost or overall development cost. The construction cost of components or an entire building normally includes the direct costs of labor and materials, as well as indirect costs such as administrative fees, professional fees, and financing costs. Development cost is the cost to create a property, including the land, and bring it to an efficient operating state. Development cost includes acquisition costs, actual expenditures, and the profit required to compensate the developer or entrepreneur for the time and risk involved in creating the project.

Real estate-related expenditures for labor and capital are directly linked to the price of goods and services in competitive markets. For example, the costs of roofing materials, masonry, architectural plans, and rented scaffolding are determined by the interaction of supply and demand in specific areas. Thus, they are subject to the influence of social, economic, governmental, and environmental forces.

Value can have many meanings in real estate appraisal. The applicable definition depends on the context and usage.[8] In the marketplace, value is commonly perceived as the anticipation of benefits to be obtained in the future. Because value changes over time, an appraisal reflects value at a particular point in time. Because value

The terms *price*, *cost*, and *value* are used and defined carefully by appraisers.

8. See Halbert C. Smith, "Value Concepts as a Source of Disparity Among Appraisals," *The Appraisal Journal* (April 1977): 203–208, and Jared Shlaes, "Value: More than Ever, In Your Eye," *The Appraisal Journal* (January 1993): 71–78.

is an economic concept, the monetary worth of property, goods, or services to buyers and sellers is an expression of value. To avoid confusion, appraisers do not use the word *value* alone. Instead they refer to *market value*, *fair value*, *use value*, *investment value*, *assessed value*, and other specific kinds of value. Market value is the focus of most real property appraisal assignments.

The principles of anticipation, change, supply and demand, competition, and substitution are fundamental to understanding the dynamics of value.

Anticipation and Change

The human actions that collectively shape market operations reflect the pursuit of economic goals. The fundamental principles of anticipation and change must be addressed to effectively analyze the many dynamic and interactive factors that influence people's attitudes and beliefs about value.

Anticipation

Value is created by the anticipation of benefits to be derived in the future. In real estate markets, the current value of a property is usually not based on its historical prices or the cost of its creation. Rather, value is based on the market participants' perceptions of the future benefits of acquisition.

The value of owner-occupied residential property is based primarily on expected future advantages, amenities, and the opportunity cost of ownership and occupancy. Prior to the property's sale, the primary investment return is measured in these amenities and the economic benefit of owning rather than renting property, not in the receipt of income. The value of income-producing real estate is based on the economic benefits (income and appreciation) it is expected to produce in the future. Therefore, real property appraisers must be aware of local, regional, and national real estate trends that affect the perceptions of buyers and sellers and their anticipations of the future. Historical data on a property or a market is relevant only insofar as it helps interpret current market anticipations.

All values are anticipations of the future.—Justice Oliver Wendell Holmes, Jr.

anticipation
The perception that value is created by the expectation of benefits to be derived in the future.

Change

The dynamic nature of the social, economic, governmental, and environmental forces that influence real property value accounts for change. Although change is inevitable and continuous, the process may be gradual and not easily discernible. In active markets, change may occur rapidly. Abrupt changes may be precipitated by plant or military base closures, tax law revisions, the start of new construction, or natural disasters. The pervasiveness of change is evident in the real estate market, where the social, economic, governmental, and environmental forces that affect real estate are in constant transition. Changes in these forces

change
The result of the cause and effect relationship among the forces that influence real property value.

influence the demand for and supply of real estate and, therefore, individual property values. Appraisers attempt to identify current and anticipated changes in the market that could affect current property values, but, because change is not always predictable, opinions of value are said to be valid only as of the specified date of valuation. An appraiser's analyses and conclusions reflect what the market anticipates, rather than what the appraiser or the owner anticipates.

Shifts in market preferences also provide evidence of change. Real estate is not readily adaptable to new consumer preferences and thus often suffers obsolescence, i.e., an impairment of desirability and usefulness. The physical, functional, and external impairments observed in buildings as they age result in depreciation, which is defined as a loss in property value from any cause. Depreciation may be seen as the difference between the cost to reproduce or replace a property and its present value. In general, losses in property value are caused by deterioration or obsolescence. Because obsolescence can begin in the design phase and deterioration may start while a building or improvement is still being constructed, the different types of deterioration and obsolescence found in a property have unique implications in appraisal. (A detailed discussion of deterioration and obsolescence is presented in Chapter 29.)

Supply and Demand, Substitution, Balance, and Externalities

The appraisal principles of supply and demand, substitution, balance, and externalities can be applied to the unique physical and legal characteristics of a particular parcel of real property. When these basic economic principles are in proper accord, they indicate highest and best use, which has great significance in real property appraisal. (Highest and best use is discussed in detail in Chapter 16.)

Supply and Demand

In keeping with the principle of supply and demand, an increase in the supply of an item or a decrease in the demand for an item tends to reduce its price. The opposite conditions produce an opposite effect. The relationship between supply and demand may not be directly proportional, but the interaction of these forces is fundamental to economic theory. The interaction of suppliers and demanders, whether they be sellers and buyers or landlords and tenants, constitutes a market.

Usually property values vary directly with changes in demand and inversely with changes in supply. If properties for a particular use become more abundant relative to demand, their value at equilibrium declines. By contrast, if properties become relatively more scarce (supply declines relative to demand), the price of the properties at equilibrium increases. The supply of and demand for commodities always tend to move toward equilibrium. At this theoretical point (which almost never occurs), market value, price, and cost are equal.

In real estate, supply is the amount of a type of real estate available for sale or lease at various prices in a given market at a given time. Typically, more of an item will be supplied at a higher price and less at a lower price. Therefore, the supply of an item at a particular price, at a particular time, and in a particular place indicates that item's relative scarcity, which is a basic factor of value.

supply and demand
In economic theory, the principle that states that the price of a commodity, good, or service varies directly, but not necessarily proportionately, with demand, and inversely, but not necessarily proportionately, with supply. In a real estate appraisal context, the principle of supply and demand states that the price of real property varies directly, but not necessarily proportionately, with demand and inversely, but not necessarily proportionately, with supply.

The supply of real estate is dependent on the costs of the four agents of production, which are brought together to produce a product that is offered for sale. When demand in a particular market increases, property values are driven up and the quantity of new properties offered for sale generally increases. When the supply of the agents of production declines, property values again tend to rise. On the other hand, increases in the productivity of labor, greater technological efficiency, improvements in capital goods, and the use of more capital goods per worker can all reduce development costs. A building boom set in motion by the rising expectations of profit among developers may result in an oversupply of properties.

Real property is both a physical commodity and the use of the real estate, so the supply of real estate in a market relates to the usability as well as the physical quantity of the available space. Consequently, those involved in real estate are primarily concerned with the supply of land suitable for a specific use, not simply the total number of acres available.

Generally the quantity of space supplied for a given use is slow to adjust to changes in price levels. The length of time needed to build new structures, the large amount of capital required, and government regulations often hamper a supplier's ability to meet changes in the market. The quality of space, however, can change more rapidly because suppliers can convert nonproductive space to alternative uses, cure deferred maintenance, and partition existing space into smaller units.

Demand is the desire and ability to purchase or lease goods and services. In real estate, demand is the amount of a type of real estate desired for purchase or rent at various prices in a given market for a given period of time. Typically less of an item will be demanded at a higher price, and more will be demanded at a lower price.

Because it is difficult to augment the supply of real property for a specific use in a short time, values are strongly affected by current demand. Demand, like supply, can be characterized in terms of both quantity and quality. For example, demand in a residential market may be defined by the number of households in the market area, the household incomes, and the size and characteristics of the households and specific housing preferences. Demand that is supported by purchasing power results in effective demand, which is the type of demand considered by the market. Appraisers must interpret market behavior to ascertain

competition (among properties)
The level of productivity and amenities or benefits characteristic of each property considering the advantageous or disadvantageous position of the property relative to the competitors.

the existing relationship between the supply of and the demand for the type of property being appraised.

Competition between buyers or tenants represents the interactive efforts of two or more potential buyers or tenants to make a purchase or secure a lease. Between sellers or landlords, competition represents the interactive efforts of two or more potential sellers or landlords to effect a sale or lease. Competition is fundamental to the dynamics of supply and demand in a free enterprise, profit-maximizing economic system.

Buyers and sellers of real property operate in a competitive market setting. In essence, each property competes with all other properties suitable for the same use in a particular market segment and often with properties from other market segments, such as

- A profitable hotel faces competition from newer hotels nearby.
- Existing residential subdivisions compete with new subdivisions.
- Downtown retail properties compete with suburban shopping centers.

Over time, competitive market forces tend to reduce unusually high profits. Profit encourages competition, but excess profits tend to breed ruinous competition. For example, the first retail store to open in a new and expanding area may generate more profit than is considered typical for that type of enterprise. If no barriers to entry exist, owners of similar retail enterprises will likely gravitate to the area to compete for the surplus profits. Eventually there may not be enough business to support all the retailers. A few stores may profit, but others will fail. The effects of competition and market trends on profit levels are especially evident to appraisers making income projections as part of the income capitalization approach to value.

Substitution

The principle of substitution states that when several similar or commensurate commodities, goods, or services are available, the one with the lowest price attracts the greatest demand and widest distribution. This principle assumes rational, prudent market behavior with no undue cost due to delay. According to the principle of substitution, a buyer will not pay more for one property than for another that is equally desirable.

Property values tend to be set by the price of acquiring an equally desirable substitute property. The principle of substitution recognizes that buyers and sellers of real property have options, i.e., other properties are available for similar uses. The substitution of one property for another may be considered in terms of use, structural design, or earnings. The cost of acquisition may be the cost to purchase a similar site and construct a building of equivalent utility, assuming no undue cost due to delay. This is the basis of the cost approach. On the other hand, the cost of acquisition may be the price of acquiring an existing property of equal utility, again assuming no undue cost due to delay. This is the basis of the sales comparison approach.

The principle of substitution is equally applicable to properties such as houses, which are purchased for their amenity-producing attributes, and properties purchased for their income-producing capabilities. The amenity-producing attributes of residential properties may include excellence of design, quality of workmanship, or superior construction materials. For an income-producing property, an equally desirable substitute might be an alternative investment property that produces equivalent investment returns with equivalent risk. The limits of property prices, rents, and rates tend to be set by the prevailing prices, rents, and rates of equally desirable substitutes. The principle of substitution is fundamental to all three traditional approaches to value–sales comparison, cost, and income capitalization.

Although the principle of substitution applies in most situations, sometimes the characteristics of a product are perceived by the market to be unique. The demand generated for such products may result in unique pricing.[9] For example, a market may not have ready substitutes for special-purpose properties like a historic residence, medical office building, or high-tech manufacturing plant. In those situations, the appraiser may have to research substitute properties in a broader market or employ analytical techniques appropriate for limited-market properties.

Balance

The principle of balance holds that real property value is created and sustained when contrasting, opposing, or interacting elements are in a state of equilibrium. This principle applies to relationships among various property components as well as the relationship between the costs of production and the property's productivity. Land, labor, capital, and entrepreneurial coordination are the agents of production, but for most real property the critical combination is the land and improvements. Economic balance is achieved when the combination of land and improvements is optimal–i.e., when no marginal benefit or utility is achieved by adding another unit of capital.

The principle of balance governs the related principles of diminishing returns, contribution, surplus productivity, and conformity. The law of diminishing returns holds that increments in the agents of production added to a parcel of property produce greater net income up to a certain point. At this point, the point of decreasing or diminishing returns, maximum value is achieved. Any additional expenditures will not produce a return commensurate with the additional investment. When the point of decreasing returns is reached, further increments in the agents of production will cause productivity to decline proportionally. This is also known as the principle of diminishing marginal productivity.

> The principles of balance, decreasing marginal utility, contribution, surplus productivity, and conformity explain how the integration of property components affects property value.

9. The specific issues involved in the valuation of unique properties are addressed in Frank E. Harrison, *Appraising the Tough Ones: Creative Ways to Value Complex Residential Properties* (Chicago: Appraisal Institute, 1996).

The fertilization of farmland provides a simple example. Applying fertilizer to a land parcel increases crop yield only up to a point. Beyond that point the additional fertilizer will produce no further increase in the marginal output of the acreage. The optimum amount of fertilization is achieved when the value of the increment in yield resulting from the last unit of fertilizer equals the additional expenditure on fertilizer. This is the point of balance.

As a further illustration, consider a developer who is deciding how many bedrooms to include in a one-unit dwelling being developed for sale on the residential market. The typical one-unit dwelling in this residential market has three bedrooms. It may be uneconomic to include a fourth bedroom if the cost to build it exceeds the value added to the property.

The principle of balance also applies to the relationship between a property and its environment. A proper mix of various types and locations of land uses in an area creates and sustains value. A residence near other residences has much more market appeal than a residence next to a landfill.

The principle of balance and the principles of contribution, surplus productivity, and conformity are interdependent and crucial in highest and best use analyses and market value estimation. These concepts form the theoretical foundation for estimating all forms of depreciation in the cost approach, making adjustments in the sales comparison approach, and calculating expected earnings in the income capitalization approach.

The principle of contribution states that the value of a particular component is measured in terms of its contribution to the value of the whole property or as the amount that its absence would detract from the value of the whole. The cost of an item does not necessarily equal its value. A swimming pool that costs $30,000 to install does not necessarily increase the value of a residential property by $30,000. Rather, the pool's dollar contribution to value is measured in terms of its benefit or utility in the market. The swimming pool's contribution to value may be

- Higher than its cost (if properties with swimming pools are in very high demand in the market).
- Equal to its cost.
- Lower than its cost, though still contributing positively to value. This is the most common situation, i.e., more than zero but less than its cost.
- No contribution to value. Adding a swimming pool could have no effect on the value of that property in that market at that time.
- A negative contribution to value. The swimming pool may need to be removed at an additional cost for the property to reach its highest and best use.

The contribution of the existing improvements may not be in proper balance with the total property. Espe-

law of decreasing returns
The premise that additional expenditures beyond a certain point (the point of decreasing returns) will not yield a return commensurate with the additional investment; also known as law of diminishing returns.

law of increasing returns
The premise that larger amounts of the agents of production produce greater net income up to a certain point (the point of decreasing returns).

cially in transitional areas, a property's present use may not use the land to its full potential. Nevertheless, an existing, less-than-optimal use, called an *interim use*, will continue until it is economically feasible for a developer to absorb the costs of converting the property, either by razing and replacing the existing improvements or by rehabilitating them.

Surplus productivity is the net income to the land remaining after the costs of the other agents of production have been paid. The classical economists of the eighteenth and nineteenth centuries identified the surplus with land rent, which they understood to account for land value. Traditionally, the principle of surplus productivity has provided the basis for the residual concept of land returns and residual valuation techniques. (See Chapter 23.) The principles of surplus productivity and residual returns to the land are useful in establishing the highest and best use of land and in analyzing which option among alternative land use options will yield the highest value. Some twentieth-century economists argue that surplus productivity should be ascribed to a different agent of production, i.e., the entrepreneurial coordination required to combine the land, labor, and capital into a complete real estate product.

The principle of conformity holds that real property value is created and sustained when the characteristics of a property conform to the demands of its market. The styles and uses of the properties in a given area may conform for several reasons, including economic pressures and the shared preferences of owners for certain types of structures, amenities, and services. The imposition and enforcement of zoning ordinances and plans by local governments to regulate land use may also contribute to conformity. Standards of conformity set by the market are subject to change. Local building codes and private restrictions, which tend to establish conformity in basic property characteristics such as size, style, and design, are often difficult to change and may hasten the pace of obsolescence.

Individual markets also set standards of conformity, especially in terms of price. According to the principle of progression, a lower-priced property will be worth more in a higher-priced neighborhood than it would in a neighborhood of comparable properties. Under the principle of regression, a higher-priced property will be worth less in a lower-priced neighborhood than it would in a neighborhood of comparable properties. Of course, there are exceptions to these principles. The seasonal cottages and luxurious vacation homes that line a popular recreational lake may exert no effect, either positive or negative, on the value of one another because the market accepts the diversity.

Externalities

The principle of externalities states that factors external to a property can have either a positive or negative effect on its value. Bridges and highways, police and fire protection, and a host of other essential structures and services are positive externalities that are provided most efficiently through common purchase by the government. Negative externalities result when inconveniences are imposed on property owners by the actions of others. For example, a firm that violates environmental law by dumping hazardous waste and manages to evade responsibility imposes the cleanup costs on others.

Because it is physically immobile, real estate is affected by external influences more strongly than most other economic goods, services, or commodities. Externalities may refer to the use or physical attributes of properties located near the subject property or to the economic conditions that affect the market in which the subject property competes. For example, an increase in the purchasing power of the households that constitute the trade area for a retail facility will likely have a positive effect on the sales (income-producing) potential of the property.

On a broad level, international economic conditions can influence real estate values through externalities such as the availability of foreign capital or the effect of increasing foreign trade on the growth of the national economy. The effects of foreign trade are particularly strong in states bordering Mexico and on the West Coast, which have economies subject to shifts in trade volume with Latin American and Pacific Rim countries.

National fiscal policy also plays a vital role in the economy and, consequently, in real estate markets. The Tax Reform Act of 1986 eliminated many of the tax advantages of investing in income-producing property. This change had a far-reaching effect on the value of investment-grade properties. Due in part to the tax advantages available prior to 1986, some real estate markets had been overbuilt. After the tax law was changed, the oversupply was recognized and values in these markets declined significantly.

The slowdown in the housing market nationally in 2007 caused by the subprime mortgage crisis put a halt to the rapid rise in housing prices toward the end of the first decade of the twenty-first century. The decline of the US dollar relative to foreign currencies in the middle of the same decade brought new opportunities for foreign investors in various US markets.

At the community and neighborhood levels, property values are affected by local laws, local government policies and administration, property taxes, economic growth, and social attitudes. Different property value trends can be found in communities in the same region and among neighborhoods in the same community. Appraisers should be familiar with external events at all levels that can influence property values.

The Valuation Process

The valuation process is a systematic procedure an appraiser follows to provide answers to a client's questions about real property value. It is a model that can be adapted to a wide variety of questions that relate to value. It can also be used–perhaps with some modification–to answer questions not directly related to value, as in the case of review and consulting assignments.

The valuation process begins when the appraiser enters into an agreement with a client to provide a valuation service. Generally, the terms of the agreement are satisfied when the appraiser delivers the assignment results (opinions and conclusions) that were agreed upon with the client. The objective of most appraisal assignments is to develop an opinion of market value. The valuation process contains all the steps appropriate to this type of assignment. The model also provides the framework for developing an opinion of other defined values.

The valuation process is accomplished through specific steps. The number of steps followed depends on the intended use of the assignment results, the nature of the property, the scope of work deemed appropriate for the assignment, and the availability of data. The model provides a pattern that can be used in any appraisal assignment to perform market research and data analysis, to apply appraisal techniques, and to integrate the results of these activities into an opinion of defined value. In

> The valuation process is a systematic set of procedures an appraiser follows to provide answers to a client's questions about real property value.

addition to assisting appraisers in their work, models that apply the valuation process are recognized by the market of appraisal users and facilitate their understanding of appraisal conclusions.

Research begins after the appraisal problem has been identified and the scope of work required to solve the problem has been determined. The analysis of data relevant to the problem starts with an investigation of trends observed at the market level–international, national, regional, or neighborhood. This investigation (i.e., the market analysis) helps the appraiser understand the interrelationships among the principles, forces, and factors that affect real property value in the specific market area. Research also provides raw data from which the appraiser can extract quantitative information and other evidence of market trends. Such trends may include positive or negative percentage changes in property value over a number of years, the population movement into an area, and the number of employment opportunities available and their effect on the purchasing power of potential property users.

In assignments to develop an opinion of market value, the ultimate goal of the valuation process is a well-supported value conclusion that reflects all of the pertinent factors that influence the market value of the property being appraised. To achieve this goal, an appraiser studies a property from three different viewpoints, which are referred to as the *approaches to value*.

1. In the cost approach, value is estimated as the current cost of reproducing or replacing the improvements (including an appropriate entrepreneurial incentive or profit), minus the loss in value from depreciation, plus land value.
2. In the sales comparison approach, value is indicated by recent sales of comparable properties in the market.
3. In the income capitalization approach, value is indicated by a property's earning power, based on the capitalization of income.

Traditionally, specific appraisal techniques are applied within the three approaches to derive indications of real property value. One or more approaches to value may be used depending on which approaches are necessary to produce credible assignment results, given the intended use.

The three approaches are interrelated.[1] Each requires the gathering and analysis of data that pertains to the property being appraised. Each approach is outlined briefly in this chapter and discussed in detail in subsequent sections of this book. From the approaches applied, the appraiser develops separate indications of value for the property being appraised. To complete the valuation process, the appraiser integrates the information drawn from market research, data analysis, and the application of the approaches to reach a value conclusion. This conclusion may be presented as a single point estimate of value or, if the

1. The sales comparison approach was once known as the "market approach." However, this is a misnomer because all three approaches to value are "market" approaches in that they rely on market data.

assignment permits, as a range within which the value may fall (or as a point referenced from a benchmark). An effective integration of all the elements in the process depends on the appraiser's skill, experience, and judgment.

The components of the valuation process are shown in Figure 4.1.

Figure 4.1 The Valuation Process

Identification of the Problem					
Identify client and intended users	Identify the intended use	Identify the purpose of the assignment (type and definition of value)	Identify the effective date of the opinion	Identify the relevant characteristics of the property	Assignment conditions

Scope of Work Determination

Data Collection and Property Description		
Market Area Data General characteristics of region, city, and neighborhood	*Subject Property Data* Subject characteristics of land use and improvements, personal property, business assets, etc.	*Comparable Property Data* Sales, listings, offerings vacancies, cost and depreciation, income and expenses, capitalization rates, etc.

Data Analysis	
Market Analysis Demand studies Supply studies Marketability studies	*Highest and Best Use Analysis* Land as though vacant Ideal improvement Property as improved

Land Value Opinion

Application of the Approaches to Value		
Sales Comparison Approach	Income Capitalization Approach	Cost Approach

Reconciliation of Value Indications and Final Opinion of Value

Report of Defined Value

Identification of the Appraisal Problem

The first step in the valuation process is the development of a clear understanding of the problem to be solved. This sets the parameters for the assignment. To solve any problem, the problem must first be identified, and only then can the appropriate solution to the problem be determined. In appraisal practice, problem identification logically precedes scope of work determination.

Identification of the appraisal problem involves identifying each of the following:

- client
- intended users, if any, in addition to the client
- intended use of the appraisal
- type of value and its definition
- effective date of the opinions and conclusions
- identification of the characteristics of the property that are relevant to the type and definition of value and intended use of the appraisal (including its location, the property rights to be valued, and other features)
- assignment conditions, including extraordinary assumptions, hypothetical conditions, and additional requirements to be followed

Before identifying the characteristics of the property and any extraordinary assumptions and hypothetical conditions that are relevant to the purpose of the assignment, the appraiser must clearly identify the client, intended users, and intended use of the appraisal, the purpose of the assignment, and the effective date of the opinion of value. Once the appraisal problem has been identified, the appraiser can determine the appropriate scope of work for the assignment.

Scope of Work Determination

Scope of work is the most critical decision an appraiser will make in performing an assignment. (The topic is discussed in more detail in Chapter 9.) Solving an appraisal problem involves three steps:

1. Identifying the problem
2. Determining the solution (or scope of work)
3. Applying the solution

None of the three steps can be omitted, and each must be performed in order.

To analyze the problem, the appraiser identifies seven key assignment elements: (1) client, (2) intended users in addition to the client, (3) intended use, (4) objective of the appraisal, or type of value and its definition, (5) effective date, (6) property characteristics that are relevant to the assignment such as the interest to be valued and physical and legal characteristics), and (7) assignment conditions such as hypothetical conditions, extraordinary assumptions, and other requirements. These elements provide the framework for the assignment and allow the appraiser to identify the problem to be solved.

The second step is to determine the scope of work to solve the problem. Scope of work encompasses all aspects of the valuation process, including which approaches to value will be used; how much data is to be gathered, from what sources, from which geographic area, and over what time period; the extent of the data verification process; and the extent of property inspection, if any.

It is important that appraisers fully understand the importance of determining the scope of work. More information on scope of work can be found in the handbook *Scope of Work* published by the Appraisal Institute.

The scope of work decision is appropriate when it allows the appraiser to arrive at credible assignment results and is consistent with the expectations of similar clients and the work that would be performed by the appraiser's peers in a similar situation.

Planning the Appraisal

To complete an assignment efficiently, each step in the valuation process should be planned and scheduled. Time and personnel requirements will vary with the amount and complexity of the work. Some assignments may be completed in a few days. For more complex appraisal problems, weeks or months may be spent gathering, analyzing, and applying all pertinent data.

Some assignments can be performed by a single appraiser, while others require the assistance of other staff members or appraisal specialists. Sometimes the assistance of specialists in other fields is needed. For example, in valuing a hotel property, the appraiser's findings may be augmented by the professional opinion of a personal property appraiser. Recognizing when work can or must be delegated improves efficiency and enhances accuracy, but appraisers should also be aware

Scope Creep

The recently coined term *scope creep* generally refers to a shift in the focus or parameters of a given project or role, often resulting in more work at little or no additional compensation for the provider of the service. Examples include the increasing number of photographs required in many appraisal assignments and increasing institutional reporting requirements such as the recent implementation of the Market Conditions Addendum to the Appraisal Report (Form 1004MC) by Fannie Mae. Granted, digital cameras have made the chore of documenting a property with photographs less onerous than it used to be, but the client's increased expectation of how many photographs are necessary might not correlate with an increase in appraisal fees.

The best defense against scope creep within an assignment is a discussion of the client's expectations up front and a clear statement of the anticipated scope of work in the engagement letter or some other preliminary written agreement. For example, in some cases the client might assume that the appraiser would willingly testify at a property tax hearing for no additional compensation, reasoning that the testimony is simply reporting the conclusions of the appraisal to another intended user. It might be advisable for the appraiser and the client to reach an agreement up front that the appraisal will be performed for a set fee, and potential testimony at a hearing would entail a separate assignment with its own scope of work to be determined at the appropriate time if necessary.

See also Robin L. Phillips, "Scope Creep," *Valuation* (First Quarter 2011): 20-25.

of the responsibilities inherent in the use of reports prepared by others. (These types of concerns are addressed in the Appraisal Institute's Guide Note 4 and Standards Rule 2-3 of the Uniform Standards of Professional Appraisal Practice.) The appraiser or appraisers signing the certification bear the ultimate responsibility for the assignment. That is, any appraiser who signs any portion of an appraisal report must sign the certification. With a comprehensive view of the assignment, the appraiser can recognize the type and volume of work to be done and schedule and delegate that work properly.

The appraiser's work plan usually includes an outline of the proposed appraisal report. The major parts of the report are delineated, and the data and procedures involved in each section are noted. Using this outline, data can be assembled intelligently and the appropriate amount of time can be allocated to each step in the valuation process.

Data Collection and Property Description

Following the preliminary analysis (i.e., the identification of the appraisal problem and determination of the scope of work), the appraiser gathers data on the market area, the subject property, and comparable properties in the market. The data needed by appraisers can be divided into general data and specific data.

General data includes information about trends in the social, economic, governmental, and environmental forces that affect property value in the defined market area. A trend is a momentum or tendency in a general direction brought about by a series of interrelated changes. Trends such as population shifts, declining office building occupancy rates, and increased housing starts in a market area are identified by analyzing general data. General data can contribute significantly to an appraiser's understanding of the marketplace.

Specific data relates to the property being appraised and to comparable properties. This data includes legal, physical, locational, cost, and income and expense information about the properties and the details of comparable sales. Financial arrangements that could affect selling prices are also considered.

Data on comparable properties can be either general data that an appraiser has on file or specific data that must be gathered for a particular assignment. More often, comparable property data is specific supply and demand data that relates to the competitive position of properties similar to the subject. Supply data includes inventories of existing and proposed competitive properties, vacancy rates, and absorption rates. Demand data may consist of population, income, employment, and survey data pertaining to potential property users. From this data an estimate of future demand for the present or prospective use or uses of the subject property is developed.

The amount and type of data collected for an appraisal depend on the approaches used to develop an opinion of value and on the defined scope of work. In a given valuation assignment, more than one approach to value is often appropriate and necessary to arrive at a value opinion. Depending on the problem or problems to be addressed, one approach may be given greater emphasis in deriving the final opinion of value. In conducting a particular assignment, the appraiser's judgment and experience and the quantity and quality of data available for analysis may determine which approach or approaches are used.

The data collected should be meaningful and relevant. All pertinent value influences, facts, and conclusions about trends should be clearly indicated in the report and related specifically to the property being appraised. Because the data selected forms the basis for the appraiser's judgments, a thorough explanation of the significance of the data reported ensures that the reader will understand these judgments.

Irrelevant data should be excluded because the inclusion of that data may detract from the credibility of the appraiser's analyses and conclusions. Data on prior sales of the subject property is almost always relevant. It is not sufficient to simply report the subject's sales history. When an opinion of market value is to be developed, professional standards require that the appraiser analyze all sales of the subject property that occurred in the three years prior to the date of value. Any agreements of sale (e.g., contracts), options, or listings that are current as of the date of appraisal and available in the normal course of business must also be analyzed. Listing the sales or other agreements is just a start.

Declining markets prove a challenge. In the 2013 market, analyzing sales of the subject property that occurred within the previous three years was difficult. Many agricultural, residential, industrial, and office properties went through the foreclosure process, and the titles to these properties were transferred to banks and other lenders. Information on the details of these transactions was often not available.

Data Analysis

Once the appropriate data on the market area, subject property, and site has been collected and reviewed for accuracy, the appraiser begins the process of data analysis, which has two components: market analysis and highest and best use analysis. Even the simplest valuation assignments must be based on a solid understanding of prevalent market conditions and the highest and best use of the real estate. The two forms of analysis are related. In fact, an appraiser's investigation into trends affecting the economic base of the market area leads directly into the determination of highest and best use.

Market Analysis

Market analysis is a study of market conditions for a specific type of property. A description of prevalent market conditions helps the reader of an appraisal report understand the motivations of participants in the market for the subject property. Broad market conditions provide the background for local and neighborhood market influences that have direct bearing on the value of the subject property.

Analyses of market conditions and highest and best use are crucial to the valuation process when a market value opinion is the objective of the assignment.

Market analysis, which is discussed in detail in Chapter 15, serves two important functions. First, it provides a background against which local developments are considered. Second, a knowledge of the broad changes that affect supply and demand gives an appraiser an indication of how values change over time.

The data and conclusions generated through market analysis are essential components in other portions of the valuation process. In fact, most of the time and effort involved in the valuation process are devoted to market analysis, which includes collecting, verifying, and analyzing data.

Market analysis yields information needed for each of the three traditional approaches to value. In the cost approach, market analysis provides the basis for adjusting the cost of the subject property for depreciation, i.e., physical deterioration and functional and external obsolescence. In the income capitalization approach, all the necessary income, expense, and rate data is evaluated in light of the market forces of supply and demand. In the sales comparison approach, the conclusions of market analysis are used to delineate the market and thereby identify comparable properties.

The extent of market analysis and the level of detail appropriate for a particular assignment depend on the appraisal problem under examination. Appraisers who are doing business in a generally stable market on a daily basis should have all the necessary demographic and economic information to document market conditions on file. When the appraisal assignment is complex–e.g., an analysis of the feasibility of a subdivision development–a more detailed market analysis will be required. Regardless of the assignment's complexity, the logic of the market analysis should be communicated clearly to the reader in the appraisal report. The level of detail may depend on the needs of the client and other intended users and on the intended use of the report.

Highest and Best Use Analysis

Whenever a market value opinion is developed, highest and best use analysis is necessary. Through highest and best use analysis, the appraiser interprets the market forces that affect the subject property and identifies the use or uses on which the final opinion of value is based. (Highest and best use analysis is discussed in detail in Chapter 16.)

Although highest and best use analysis is an essential part of the valuation process, it is often one of the weakest areas in an appraisal. It is too often viewed as a necessary but fruitless exercise, when it is really the heart of the assignment in an analysis of market value. If highest and best use is not adequately addressed, the appraiser may inappropriately analyze the property being appraised.

When the assignment objective is to develop an opinion of market value, the appraiser must address the question of the highest and best use for whatever is being valued. In valuing an improved property, the appraiser must address the question of the highest and best use *as currently improved*. In valuing a vacant site, the appraiser must address highest and best use *as though vacant*. In valuing a site as if vacant (for example, in applying the cost approach to an improved property), the appraiser must address the question of the highest and best use *as if vacant*.

Analyzing the highest and best use of the land as though vacant helps the appraiser identify comparable properties. Whenever possible, the property being appraised should be compared with similar properties that have been sold recently in the same market. Potentially comparable properties that do not have the same highest and best use are usually eliminated from further analysis. Estimating the land's highest and best use as though vacant is a necessary part of deriving an opinion of land value.

There are two reasons to analyze the highest and best use of the property as improved. The first is to help identify potentially comparable properties. Each improved property should have the same or a similar highest and best use as the improved subject property, both as though vacant and as improved. The second reason to analyze the highest and best use of the property as improved is to decide which of the following options should be pursued:

- Maintain the improvements as is.
- Cure items of deferred maintenance and retain the improvements.
- Modify the improvements (e.g., renovate, modernize, or convert).
- Demolish the improvements.

In some situations, a property may be subject to restrictions (e.g., historic preservation) that prevent the improvements from being demolished. In this case, the highest and best use is limited by the restriction.

The highest and best use conclusion should specify the optimal use (or uses), when the property will be put to this use or achieve stabilized occupancy, and who would be the most likely purchaser or user of the property (e.g., an owner-operator of the property or an equity or debt investor).

Land Value Opinion

Land value can be a major component of total property value. Appraisers often develop an opinion of land value separately, even when valuing properties with extensive building improvements. Land value and building value may change at different rates because improvements are almost always subject to depreciation. For many appraisals, a separate opinion of land value is required.

Although a total property value estimate may be derived in the sales comparison or income capitalization approach without separating land and improvement values, it may be necessary to estimate land value separately to isolate the value the land contributes to the total property. In the cost approach, the value of the land must be estimated and stated separately.

Developing an opinion of land value can be considered a separate step in the valuation model or an essential technique for applying certain approaches to value, depending on the defined appraisal problem and on the highest and best use analysis. The relationship between highest

Of the various techniques that can be applied to estimate land value, sales comparison is usually the most reliable.

and best use and land value[2] may indicate whether an existing use is the highest and best use of the land.

Typically, land valuation is performed as part of a cost approach analysis, but if the cost approach is not applied in the assignment, it is possible to develop a well-supported appraisal without a separate land value conclusion. As one example, a land value conclusion is not required in the appraisal of one condominium unit in a large residential condominium project.

An appraiser can use several techniques to obtain an indication of land value:

- sales comparison
- extraction
- allocation
- subdivision development
- land residual
- ground rent capitalization

Usually the most reliable way to estimate land value is by sales comparison. When few sales are available, however, or when the value indications produced through sales comparison need additional support, procedures like extraction or allocation may be applied. The other methods of land valuation, which all involve income capitalization techniques, are subject to more limitations and are used less often in everyday appraisal practice. The subdivision development technique is a specialized valuation method useful in specific land use situations.[3] The land residual technique is used more often in highest and best use analysis to test the feasibility of various uses than to estimate land value as part of one of the traditional approaches to value. Ground rent capitalization can be used when land rents and land capitalization rates are readily available–e.g., for appraisals in well-developed areas. (These land valuation techniques are discussed in detail in Chapter 17.)

Application of the Approaches to Value

The valuation process is applied to develop a well-supported opinion of a defined value based on an analysis of pertinent general and specific data. Appraisers develop an opinion of property value with specific appraisal procedures that reflect three distinct methods of data analysis:

- sales comparison approach
- income capitalization approach
- cost approach

2. Appraisers distinguish between land (the earth's surface, both land and water, and anything that is attached to it, whether by the course of nature or by human hands) and a site (land that is improved so that it is ready to be used for a specific purpose). The distinctions between the two terms are discussed more fully in Chapter 12.
3. The valuation of subdivisions is discussed more fully in Don M. Emerson, Jr., *Subdivision Valuation* (Chicago: Appraisal Institute, 2008).

One or more of these approaches are used in all estimations of value. The approaches employed depend on the type of property, the intended use of the appraisal, the applicable scope of work, and the quality and quantity of data available for analysis.

> One of the three approaches to value—sales comparison, income capitalization, and cost—may be especially effective in a given situation. An appraiser often employs more than one approach.

All three approaches are applicable to many appraisal problems, but one or more of the approaches may have greater significance in a given assignment. For example, the sales comparison approach is usually emphasized in the valuation of single-unit residential properties. However, this approach may not be applicable to specialized properties such as garbage disposal plants because comparable data may not be available. The income capitalization approach is used to value most income-producing properties, but it can be particularly unreliable in the market for commercial or industrial property where owner-occupants outbid investors. The income capitalization approach is not typically applied in valuing homes. The cost approach may be more applicable to new and special-purpose properties and less applicable in valuing properties with older improvements that suffer substantial depreciation, which can be difficult to estimate. Appraisers should apply all the approaches that are applicable and for which there is data. The alternative value indications derived can either support or refute one another.

Sales Comparison Approach

The sales comparison approach is most useful when a number of similar properties have recently been sold or are currently for sale in the subject property's market. Using this approach, an appraiser produces a value indication by comparing the subject property with similar (i.e., comparable) properties. The sale prices of the properties that are judged to be most comparable tend to indicate a range in which the value indication for the subject property will fall.

The appraiser estimates the degree of similarity or difference between the subject property and the comparable sales by considering various elements of comparison:

- real property rights conveyed
- financing terms
- conditions of sale
- expenditures made immediately after purchase
- market conditions
- location
- physical characteristics
- economic characteristics
- legal characteristics
- non-realty components of value

Dollar or percentage adjustments are then applied to the known sale price of each comparable property to derive an indicated value for the subject property. Qualitative analysis techniques may also be applied for elements of comparison for which quantitative adjustments cannot be developed. Through this comparative procedure, the appraiser renders an opinion of the value that was defined in the problem identification as of a specific date.

The sales comparison approach can provide an indication of value for fee simple, leased fee, or leasehold interests, depending on what real property rights are represented in the sales of comparable properties.

Income multipliers and capitalization rates may also be extracted through analysis of comparable sales, though these factors are not regarded as elements of comparison in the sales comparison approach. Instead, they should be applied in the income capitalization approach.

Income Capitalization Approach

In the income capitalization approach, the present value of the anticipated future benefits of property ownership is measured. A property's income and resale value upon reversion may be capitalized into a current, lump-sum value. There are two methods of income capitalization: direct capitalization and yield capitalization. In direct capitalization, the relationship between one year's income and value is reflected in either a capitalization rate or an income multiplier. In yield capitalization, several years' forecast income and a reversionary value at the end of a designated period are converted to present value using a yield rate. The most common application of yield capitalization is discounted cash flow analysis. Given the significant differences in how and when properties generate income, there are many variations in both direct and yield capitalization procedures, which are addressed in Chapter 20.

Like the sales comparison and cost approaches, the income capitalization approach requires extensive market research. Data collection and analysis for this approach are conducted against a background of supply and demand relationships, which provide information about trends and market anticipation.

The specific data that an appraiser investigates in the income capitalization approach might include the property's gross income expectancy, the expected reduction in gross income caused by vacancy and collection loss, the anticipated annual operating expenses, the pattern and duration of the property's income stream, and the anticipated reversionary value. After income and expenses are estimated, the income streams are capitalized by applying an appropriate rate or factor or converted into present value through discounting. In discounted cash flow analysis, the quantity, variability, timing, and duration of a set of periodic incomes and the quantity and timing of the reversion are specified and discounted to a present value at a specified yield rate. The rates used for capitalization or discounting are derived from acceptable rates of return for similar properties.

Like the other approaches to value, the income capitalization approach is applicable in the valuation of various property interests. Real property that produces income in the form of rent is usually leased, which creates legal estates of the ownership interests of the lessor and lessee (i.e., the leasehold and leased fee interests). The valuation of the fee simple interest of leased property, which is not an uncommon appraisal assignment, may or may not require the valuation of the individual interests.

Cost Approach

The cost approach is based on the understanding that market participants relate value to cost. In the cost approach, the value of a property is derived by adding the estimated value of the land to the current cost of constructing a reproduction or replacement for the improvements and then subtracting the amount of depreciation (i.e., deterioration and obsolescence) in the structures from all causes. Entrepreneurial incentive (the amount to developer expects to receive) or entrepreneurial profit (the amount actually received) may be included in the value indication. This approach is particularly useful in valuing new or nearly new improvements and properties that are not frequently exchanged in the market. Cost approach techniques can also be employed to derive information needed in the sales comparison and income capitalization approaches to value, such as the costs to cure items of deferred maintenance.

The current costs to construct the improvements can be obtained from cost estimators, cost manuals, builders, and contractors. Depreciation is measured through market research and the application of specific procedures. Land value is estimated separately in the cost approach.

Typically the cost approach provides an indication of the value of the fee simple interest. The value indication may need to be adjusted accordingly if a leased fee or other partial interest is being valued.

Final Reconciliation of Value Indications

The final analytical step in the valuation process is the reconciliation of the value indications derived into a value conclusion. Reconciliation occurs within each approach to value, but the final reconciliation occurs at the end of the valuation process. The value conclusion can be expressed as a single number, as a range of numbers, or as a number greater than or less than a specified, benchmark amount. The nature of reconciliation depends on the appraisal problem, the approaches that have been used, and the reliability and adequacy of the data used.

When all three approaches have been used, the appraiser examines the three separate indications and considers the relative dependability and applicability of

reconciliation

The last phase of any valuation assignment in which two or more value indications derived from market data are resolved into a final value opinion, which may be either a final range of value or a single point estimate. Professional standards typically require the appraiser to consider both the quantity and quality of available data in reconciliation.

final opinion of value

The opinion of value derived from the reconciliation of value indications and stated in the appraisal report; may be expressed as a single point, as a range, or in relation to a benchmark.

each approach. In the reconciliation section of the report, the appraiser can explain variations among the indications produced by the different approaches and account for differences between the value conclusions and methods applied.

Report of Defined Value

An appraisal report is the tangible expression of the appraiser's work. The preparation and delivery of the appraisal report is generally the last step in the valuation process. The report may be communicated to the client in writing or orally. Chapter 31 describes the requirements for appraisal reports and the circumstances under which they are prepared and submitted.

The report of the value opinion, which is the last step in the valuation process, addresses the data analyzed, the methods applied, and the reasoning that led to the value conclusion.

Elements of the Assignment

In the first step of the valuation process, an appraiser identifies all the assignment elements that are relevant in the appraisal:

- the client
- the intended users
- the intended use of the appraisal
- the purpose of the assignment, which includes the type and definition of value (with source)
- the effective date of the opinion of value
- the relevant characteristics of the property
- any assignment conditions such as extraordinary assumptions or hypothetical conditions

The combination of the elements creates a unique assignment. If an element changes, another assignment is created.

This chapter examines each significant element of the assignment, and the following chapters of this section of the textbook delve deeper into two fundamental and complex elements: (1) the type and definition of value and (2) the rights being appraised in the assignment.

Client

The client is the person who engages the appraiser. The client can be one person (such as an individual investor), one entity (such as a bank), or a number of people or entities acting together. The client is always considered to be an intended user, even in cases in which the client does not actually use the appraisal, such as when the client engages the appraiser on behalf of another intended user. In cases involving appraisal management companies, the company acts as an agent of the lender and engages the appraiser, but the lender is the client.

Intended Users

An intended user is a person (or entity) who the appraiser intends will use the results of the appraisal for some purpose. The client may provide the appraiser with information about other potential users of the appraisal, but the appraiser ultimately determines who the appropriate users are based on the appraisal problem to be solved. Identifying the intended users is necessary so that the appraiser can report the opinions and conclusions developed in the appraisal in a manner that is clear and understandable to the intended users.

Parties who receive or might receive a copy of the appraisal report are not necessarily intended users. The appraiser's responsibility is to the intended users identified in the report, not to all readers of the appraisal report. The client may request that the intended user not be identified in the report, but the appraiser must still retain that information in the workfile and provide a notice in the report that the identity of the intended user is being withheld upon request.

Intended Use

The intended use is the appraiser's intent regarding how the report is to be used. Identifying the intended user and intended use of an assignment is essential for the determination of the scope of work. That is, the appraiser must identify who needs the services and for what purpose that person (or entity) will use the information the appraiser provides.

The intended use of an appraisal is identified through communication with the client. The intended use might relate to

- financing
- litigation
- condemnation
- divorce proceedings
- buy/sell decisions
- tax reporting
- portfolio evaluation
- arbitration

- partnership value
- estate value
- charitable donation
- valuation for financial reporting

intended use of the appraisal
The appraiser's intent regarding the manner in which the appraisal report will be used.

The intended use is the key driver in determining the appropriate scope of work for the assignment. For example, an appraisal with an intended use related to condemnation often requires the development of two separate opinions of value, one before the taking and one after the taking. In contrast, an appraisal with an intended use related to financing may require the development of just one opinion of value (unless a separate value "as is," "upon completion," or "upon stabilization" is requested). A lender who needs an appraisal for financing purposes likely knows what is involved in the appraisal, but a property owner disputing the amount of just compensation received for property taken through eminent domain is not likely to understand the complexities of an appraisal related to condemnation.

In addition to its critical role in determining the scope of work, the intended use of the appraisal helps the appraiser identify the appropriate level of detail to provide to the intended user. For example, if the intended use of an appraisal of a single-unit house is for lending purposes, it is not likely to require the same level of detail as an appraisal of the same property requested with a different intended use such as use in a litigation matter.

Type of Value and Its Definition

The type of value (market value, investment value, use value, or other) appropriate for a specific assignment depends on the nature of the appraisal problem. That is, what type of value does the client need to know about–market value, use value, or some other type of value? Furthermore, the definition of the type of value used in an assignment may depend on the intended use and user.

In many real estate appraisal assignments, the type of value being investigated is market value. Note that clients, intended users, controlling jurisdictions, and the users of appraisal services might define *market value* differently, so a clear statement of the definition of the type of value being appraised (with source) helps the intended user of the appraisal better understand the appraiser's conclusions.

A clear definition of value (as well as other appraisal report preliminaries) can also show the intended user that the appraiser is competent and knows the assignment conditions. An inappropriate definition of value is a red flag that the appraisal may be faulty.

definition of value
A statement specifying the type of value to be estimated; must be identified in every appraisal assignment and included or referenced in every appraisal report.

Effective Date of the Opinion of Value

The appraiser's opinions and conclusions relate to a specific point in time. Given the client's needs and the nature of the assignment, the appraiser must identify the exact date the value opinion would be valid. The effective date of the opinion of value can be a current date, a retrospective (historical) date, or a prospective (future) date.

The date of the opinion of value (i.e., the effective date) should not be confused with the date the appraisal report or letter of transmittal is signed. The effective date of the appraisal refers to the point in time as of which the analyses and conclusions are relevant, not the date on which the report is prepared or delivered to the client.

Relevant Property Characteristics

The subject of an appraisal, i.e., what is being appraised, is an interest in an asset. The interest may be a fee simple, leased fee, leasehold, or other type of interest. In the case of a real property appraisal, the asset is the real estate, or the land and improvements to the land. The analysis of the subject property must account for characteristics that affect value, i.e., characteristics that affect the utility provided by the land and improvements.

Some of the most important characteristics relating to value include

- the real property rights being appraised (see Chapter 7)
- location (see Chapters 11 and 12)
- other physical characteristics such as size, layout, and quality of construction (see Chapter 13)
- economic characteristics such as rent levels and financing terms (see Chapter 10)
- legal characteristics such as land use and zoning restrictions

Some of the relevant information will be provided by the client, and some will be researched by the appraiser through interviews with property owners and market participants, firsthand observation of the subject property, and other activities. Public records are an obvious source of data on property characteristics. A complete legal description is commonly used to identify a subject property, although other information can be useful as well such as a simple street address or an annotated map.

Assignment Conditions

Almost all appraisal assignments are subject to some conditions that affect the scope of work and must be communicated to the client to put the appraiser's analysis in the proper context. Assignment conditions include

- general assumptions
- extraordinary assumptions
- hypothetical conditions

- laws and regulations
- jurisdictional exceptions
- other conditions that affect the scope of work for an assignment

General assumptions and applicable laws and regulations are generally straightforward. Extraordinary assumptions, hypothetical conditions, and jurisdictional exceptions are discussed in detail below.

Extraordinary Assumptions

An extraordinary assumption is something that is believed to be true for the sake of the appraisal but that may or may not in fact be true as of the effective date of the appraisal. Unlike general assumptions, which often apply to many typical appraisal assignments (and unfortunately are sometimes treated as boilerplate), extraordinary assumptions are specific to the assignment at hand.

An example of the use of an extraordinary assumption is an appraisal of a property located in an old industrial area in which the appraiser assumes that the property does not suffer from soil or groundwater contamination. In other words, the appraiser analyzes the land as though the soil was not contaminated for the purposes of the appraisal, even though the appraiser does not know for certain if the soil is affected by a detrimental condition.

If an extraordinary assumption ends up not being true, the results of the assignment will be affected. For example, if the property described above did suffer from contaminated soil and the appraisal was performed under the extraordinary assumption that the property did not have any soil-related issues, the effect of the contamination would not be accounted for in the appraiser's analysis. Specifically, the appraiser would not have considered the cost to remediate the contamination when working under the extraordinary assumption that contamination was not present. However, if the client had accepted the extraordinary assumption and understood the intended use of the appraisal, subject to the extraordinary assumption, then the appraiser's work would meet professional standards and would be a credible appraisal subject to the extraordinary assumption. If, after learning of the soil contamination, the client wanted an appraisal that accounted for the existence of the contamination, the appraiser and the client would need to agree on a new appraisal assignment that is not subject to the extraordinary assumption.

Appraisals may involve more than one extraordinary assumption, in which case communicating those conditions to the client in a conspicuous manner is a good practice. Handling extraordinary assumptions in a clear and conspicuous manner in appraisal reports is increasingly important when more than one condition of that sort can affect an appraisal.

Hypothetical Conditions

In contrast to an extraordinary assumption, which may or may not be true, a hypothetical condition is something that is known to be contrary to fact as of the effective date of the appraisal but that is taken to be true for the purposes of the appraisal.[1] For example, if a client wanted to know the value of a proposed development as if it were complete at the current time, the appraisal assignment could be performed under the hypothetical condition that the nonexistent improvements were already in place and ready for use as proposed. Returning to the example of the property located in an old industrial area, the appraiser would use a hypothetical condition if it was already known that the property was affected by soil contamination but the appraiser was developing an opinion of the value for the property as if it were not affected by such contamination. Such a value might be sought to determine the feasibility of cleanup options.

Describing an opinion of value developed subject to a hypothetical condition as a "hypothetical value" is a misnomer. The value itself is not hypothetical. As described earlier in this chapter, the type and definition of value are identified on their own as a distinct portion of the seven significant elements of the assignment, separately from the determination of assignment conditions such as a hypothetical condition.

An appraiser might not be able to identify extraordinary assumptions and hypothetical conditions that affect an appraisal until the analysis has actually begun. An effort should still be made to identify possible (or probable) extraordinary assumptions and hypothetical conditions affecting the assignment during the preliminary conversations with the client.

Extraordinary assumption and *hypothetical condition* are terms that appear in USPAP, but the standards do not require these labels. An extraordinary assumption or hypothetical condition may be identified in other ways (e.g., as a "special condition") as long as the substitute label is not misleading.

Jurisdictional Exceptions

Jurisdictional exceptions are rare but may affect an appraisal assignment when a relevant law or regulation precludes compliance with the relevant professional standards. The requirements of federal, state, or local laws and regulations, such as the Uniform Appraisal Standards for Federal Land Acquisitions, may contradict or supersede some portion of a set of professional standards, such as the Uniform Standards of Professional Appraisal Practice. Only the portion of the professional standards that contradicts the superseding regulation is affected by the jurisdictional exception. The balance of the professional standards remains in force.

Instructions from a client or an attorney alone would not be an appropriate jurisdictional exception. Also, a jurisdictional exception must be an explicit exception to professional standards. If a governmental

1. *International Valuation Standards 2011* defines a *special assumption* similarly: "an assumption that either assumes facts that differ from the actual facts existing at the *valuation date* or that would not be made by a typical market participant in a transaction on the valuation date." (12)

regulation prescribes a particular methodology for a specific situation but USPAP does not discuss specific methodologies for that sort of situation, a jurisdictional exception is not invoked. Rather, the prescribed methodology is likely a recognized technique used in appraisals in which the regulation is relevant, and an appraiser needs to use all the appraisal techniques that would be applied by the appraiser's peers and would result in a credible appraisal for the intended use. In this case, the regulation adds to rather than subtracts from the requirements of the professional standards.

Because of their complexity and potential for affecting the development and results of an appraisal, jurisdictional exceptions need to be identified at the beginning of an assignment rather than after the fact and displayed prominently in the appraisal report.

Identifying the Type of Value and Its Definition

One essential task that the appraiser must complete at the very onset of the valuation process is identifying and defining the type of value that will be the focus of the appraisal assignment. The type of value should be one of the terms of engagement between the client and appraiser. The appraiser should be certain of this at the time the assignment is accepted, notwithstanding certain unusual situations.

The definition of value, meanwhile, is the precise wording, cited from an authoritative source, that describes the type of value and specifies certain conditions that must be met for the assignment results to be credible and meaningful. In the appraisal report, the definition of value provides the client with a formal explanation of the type of value being appraised and thus the purpose of the appraisal. In fact, professional standards require that the definition of value be included in a report.

For appraisers, the use of the term *value* alone is often incomplete and is a potentially misleading description of an opinion of the relative worth of an asset. Appraisers typically refer to a particular type of value rather than use the word *value* on its own. The different value types clarify *whose* opinion is relevant and under what specific circumstances. For example, market value is the opinion of a "market" collectively under certain conditions relating to the amount of exposure on the market, motivations of buyers and sellers (or lessors and lessees), financing considerations, and so forth as specified in the definition of *market value*.

Market Value

The concept of market value is of paramount importance to business and real estate communities. Vast sums of debt and equity capital are committed each year to real estate investments and mortgage loans that are based on opinions of market value. Real estate taxation, litigation, and legislation also reflect an ongoing, active concern with market value issues. In virtually every aspect of the real estate industry and its regulation at local, state, and federal levels, market value considerations are essential to economic stability.

A number of different definitions of *market value* can be found in a variety of sources, including appraisal texts, real estate dictionaries, professional standards, federal and state regulations, licensing laws, and court decisions. Despite differing opinions on individual aspects of the market value definition, it is generally agreed that market value results from the collective value judgments of market participants. An opinion of market value must be based on objective observation of the collective actions of the market. Because the standard measure of these activities is cash, the increases or diminutions in market value caused by financing and other terms of sale are measured against an all-cash value.

The definition that follows incorporates the concepts that are most widely accepted, such as willing, able, and knowledgeable buyers and sellers who act prudently as of a specific date, and gives the appraiser a choice among three bases: (1) all cash, (2) terms equivalent to cash, or (3) other precisely revealed terms. The definition also requires increments or diminutions from the all-cash market value to be quantified in terms of cash.

> **Market Value**
> The most probable price, as of a specified date, in cash, or in terms equivalent to cash, or in other precisely revealed terms, for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions requisite to a fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress.

Some appraisers cite this definition verbatim in their appraisal reports and state separately that the value is stated in cash, in terms equivalent to cash, or in other terms. Other appraisers reword relevant phrases in the value definition–i.e., they may substitute "in cash" with "in terms arithmetically equivalent to cash" or "in terms precisely revealed below" as appropriate. This definition represents the concept of value in exchange.

> Market value is the major focus of most real property appraisal assignments. Both economic and legal definitions of *market value* have been developed and refined. Continual refinement is essential to the appraisal profession.

The concept of value in exchange is made explicit in the definition of *market value* developed by the International Valuation Standards Council (IVSC) and used in the International Valuation Standards. In these standards, *market value* is defined as

> [T]he estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's-length transaction,

after proper marketing and where the parties had each acted knowledgeably, prudently, and without compulsion.[1]

Various definitions of *market value* have been developed by the Appraisal Institute, the federal government, the International Valuation Standards Council, and others.

The general valuation framework guiding the International Valuation Standards reiterates the concept that the willingness to trade and the views attributed to market participants are "typical of those of buyers and sellers, or prospective buyers and sellers, active in a market on the valuation date, not to those of any particular individual or entity." The market value basis of valuation described in the International Valuation Standards is consistent with other discussions of market value in professional standards.

The Uniform Standards of Professional Appraisal Practice (USPAP) describe market value as

> [A] type of value, stated as an opinion, that presumes the transfer of a property (i.e., a right of ownership or a bundle of such rights), as of a certain date, under specific conditions set forth in the definition of the term identified by the appraiser as applicable in an appraisal.[2]

It is important to note that USPAP does not provide a citable definition of *market value*. Indeed, USPAP states that "appraisers are cautioned to identify the exact definition of market value, and its authority, applicable in each appraisal completed for the purpose of market value." Therefore, an appraiser may not cite USPAP as the source for a definition of *market value*.

Citable definitions of *market value* can be found in state and federal regulations, laws, or publications. For example, the following definition of *market value* is used by agencies that regulate federally insured financial institutions in the United States:

> The most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently, knowledgeably and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:
>
> 1. buyer and seller are typically motivated;
> 2. both parties are well informed or well advised, and each acting in what he or she considers his or her own best interest;
> 3. a reasonable time is allowed for exposure in the open market;
> 4. payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and
> 5. the price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions[3] granted by anyone associated with the sale.

1. International Valuation Standards Council, *International Valuation Standards 2011* (London: IVSC, 2011), 12.
2. The Appraisal Foundation, *Uniform Standards of Professional Appraisal Practice*, 2012-2013 ed., Definitions, U-3.
3. The definition of *market value* used by Fannie Mae and Freddie Mac includes additional discussion of financing and sales concessions:

    Adjustments to the comparables must be made for special or creative financing or sales concessions. No adjustments are necessary for those costs which are normally paid by sellers as a result of tradition or law in a market area; these costs are readily identifiable since the seller pays these costs in virtually all sales transactions. Adjustments for special or creative financing can be made by comparing the financing terms of the comparable property to financing terms offered by a third-party institutional lender that is not already involved in the property or transaction. Any adjustment should not be calculated based on a mechanical dollar-for-dollar comparison of the cost of the financing or concessions; rather, the dollar amount of any adjustment should approximate the market's reaction to the financing or concessions based on the appraiser's judgment. See Uniform Residential Appraisal Report Freddie Mac Form 70/Fannie Mae Form 1004, p. 4 (March 2005); also Fannie Mae Single Family 2007 Selling Guide, Part XI: Property and Appraisal Guidelines, 205: Definition of Market Value. The Fannie Mae/Freddie Mac definition requires that the effect on property value of any special or creative financing or sales concessions be determined and that the opinion of value reflect cash-equivalent terms. Special financing or sales concessions often characterize transactions in depressed markets.

The *Uniform Appraisal Standards for Federal Land Acquisitions* (also known as *The Yellow Book*) includes the following definition of *market value*, which must be used in appraisals made under the standards:

> Market value is the amount in cash, or on terms reasonably equivalent to cash, for which in all probability the property would have sold on the effective date of the appraisal, after a reasonable exposure time on the open competitive market, from a willing and reasonably knowledgeable seller to a willing and reasonably knowledgeable buyer, with neither acting under any compulsion to buy or sell, giving due consideration to all available economic uses of the property at the time of the appraisal.

The intended use of an appraisal dictates which definition of *market value* is applicable to a specific assignment. Client wishes or instructions do not change the basic requirement that the appraiser must identify an appraisal's intended use and cite an appropriate definition of *market value* for that use. Appraisers must understand why a particular definition of *market value* should be used, apply that definition according to established standards, and communicate these requirements clearly to the clients they serve. Government and regulatory agencies may redefine or reinterpret *market value* for specific types of assignments, so individuals performing appraisal services for these agencies or for institutions under their control must be sure to use the applicable definition.

Other Types of Value

Appraisals of the market value of real property are the most common types of assignments, but appraisers are also called upon by clients to develop opinions of a variety of other types of value such as the following:

- fair value
- use value
- investment value
- value of going concern
- public interest value
- assessed value
- insurable value
- liquidation value
- disposition value

Fair Value

Historically, the accounting profession in the United States has used the depreciated purchase price to report the value of corporate assets for tax purposes and for use in financial statements. In the wake of the auditing scandals that gave rise to the Sarbanes-Oxley Act of 2002, the International Accounting Standards Board (IASB) and the US Financial Accounting Standards Board (FASB) changed the generally accepted accounting principles (GAAP) to recognize that value in exchange is a more accurate measurement. In 2007, FASB defined *fair value* as

> [T]he price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.[4]

This definition is more akin to an opinion of *market value* as appraisers have long defined the term. Like market value, fair value measurement assumes that the asset or liability is exchanged in an orderly transaction between market participants to sell the asset or transfer the liability at the measurement date. An orderly transaction is a transaction that assumes exposure to the market for a period prior to the measurement date to allow for marketing activities that are usual and customary for transactions involving such assets or liabilities. It is not a forced transaction such as a forced liquidation or distress sale. The transaction to sell the asset or transfer the liability is a hypothetical transaction at the measurement date, considered from the perspective of a market participant who holds the asset or owes the liability. Therefore, the objective of a fair value measurement is to determine the price that would be received to sell the asset or paid to transfer the liability at the measurement date (i.e., an exit price).

Market participants are buyers and sellers in the principal (or most advantageous) market for the asset or liability who are

1. Independent of the reporting entity (i.e., they are not related parties)
2. Knowledgeable, having a reasonable understanding about the asset or liability and the transaction based on all available information, including information that might be obtained through due diligence efforts that are usual and customary
3. Able to transact for the asset or liability
4. Willing to transact for the asset or liability (i.e., they are motivated but not forced or otherwise compelled to do so)

The fair value of the asset or liability should be determined based on the assumptions that market participants would use in pricing the asset or liability.

A fair value measurement assumes the highest and best use of the asset by market participants, considering the use of the asset that is physically possible, legally permissible, and financially feasible at the measurement date. The highest and best use of the asset establishes the valuation premise used to measure the fair value of the asset, specifically:

1. In use. The highest and best use of the asset in use would provide maximum value to market participants principally through its use in combination with other assets as a group.
2. In exchange. The highest and best use of the asset is in exchange if the asset would provide maximum value to market participants principally on a stand-alone basis.

---

4. Originally defined in Financial Accounting Standard 157, which has been superseded by Financial Accounting Standards Board Accounting Standards Codification Topic 820: Fair Value Measurements and Disclosures. This definition is identical to the definitions of *fair value* in International Financial Reporting Standards (IFRS) 13, *Fair Value Measurement*, and International Accounting Standards (IAS) 16, *Property, Plant, and Equipment*.

The real estate appraiser may need to report both values so that the user of the report can make an informed decision.

The International Valuation Standards recognize the difference between the definition of *fair value* in IVS and the definition in the International Financial Reporting Standards (IFRS) and point out that the definition of *market value* in IVS is consistent with the definition of *fair value* in IFRS. "For most practical purposes, therefore, *market value* under IVS will meet the fair value measurement requirements under IFRS 13 subject to some specific assumptions required by the accounting standard such as stipulations as to the unit of account or ignoring restrictions on sale," according to IVS.

Use Value

In stark contrast to market value and fair value, use value is the value a specific property has for a specific use. In estimating use value, an appraiser focuses on the value the real estate contributes to the enterprise of which it is a part or the use to which it is devoted, without regard to the highest and best use of the property or the monetary amount that might be realized from its sale.

Real property has both a use value and a market value, which may be the same or different depending on the property and the market. For example, an older manufacturing plant that is still used by the original owner may have considerable use value to that owner but only a nominal market value for another use. Use value may vary depending on the management of the property and external conditions such as changes in business operations. For example, a factory designed around a particular assembly process may have one use value before a major change in assembly technology and another use value afterward.

Use value appraisal assignments may be performed to value assets (including real property) for mergers, acquisitions, corporate financial reporting, or securities issues. These types of assignments are sometimes encountered in appraising industrial real estate when the existing business includes real property.

Court decisions and specific statutes may also create the need for use value appraisals. For instance, many states require agricultural use appraisals of farmland for property tax purposes (i.e., value based on soil productivity) rather than opinions of value based on highest and best use. The current IRS regulation on estate taxes allows land under an interim agricultural use to be valued according to this alternative use even though the land has development potential.[5]

> **use value**
> In real estate appraisal, the value a specific property has for a specific use; may be the highest and best use of the property or some other use specified as a condition of the appraisal.

Use Value, Value in Use, and Investment Value in IVS

The term *value in use* is often used by appraisers synonymously with *use value*, but the former term has

5. The section on special-use valuation in United States Estate (and Generation-Skipping Transfer) Tax Return (IRS Instructions for Form 706) states: "Under section 2032A, you may elect to value certain farm and closely held business real property at its farm or business use value rather than its fair market value (FMV). Both special-use valuation and alternate valuation may be elected."

specific meanings in other contexts, which can cause confusion. In particular, the International Financial Reporting Standards define *value in use* as "the discounted present value of estimated future cash flows expected to arise from the continuing use of an asset and from its disposal at the end of its useful life." This definition is paraphrased in the International Valuation Standards application related to valuation for financial reporting.

investment value
The specific value of a property to a particular investor or class of investors based on individual investment requirements; distinguished from market value, which is impersonal and detached.

Earlier editions of the International Valuation Standards included a different definition of *value in use* as part of International Valuation Standard 2: Bases Other Than Market Value, but that definition was eventually deleted, eliminating the possible confusion between *value in use* and *investment value*. In IVS, the current definition of *investment value* is not specifically related to financial reporting as *value in use* now is.

Investment Value

Investment value represents the value of a specific property to a particular investor. As used in appraisal assignments, investment value is the value of a property to a particular investor based on that person's (or entity's) investment requirements. In contrast to market value, investment value is value to an individual, not necessarily value in the marketplace.

Investment value reflects the subjective relationship between a particular investor and a given investment. It differs in concept from market value, although investment value and market value indications sometimes may be similar. If the investor's requirements are typical of the market, investment value in this case will be the same as market value.

When measured in dollars, investment value is the price an investor would pay for an investment in light of its perceived capacity to satisfy that individual's desires, needs, or investment goals. To render an opinion of investment value, specific investment criteria must be known.

Value of a Going Concern

A going concern is an established and operating business with an indefinite future life. For certain types of properties (e.g., hotels and motels, restaurants, bowling alleys, manufacturing enterprises, athletic clubs, landfills), the physical real property assets are integral parts of an ongoing business. The market value of such a property (including all the tangible, intangible, and financial assets of the going concern, as if sold in aggregate) is often referred to as *business value* or *business enterprise value*, but in reality it is the market value of the going concern including real property, personal property, financial assets, and the intangible assets of the business. Appraisers may be asked to develop an opinion of the investment value, use value, or some other type of value of a going concern, but most appraisals of the value of a going concern relate to market value.

going concern
All tangible and intangible assets of an established and operating business with an indefinite life.

Traditionally, the term *going-concern value* has been used to describe the market value of a proven property operation, although a more accurate term is *market value of the going concern*. The concept of the value of the going concern can also be applied to a proposed business operation. The current definition of *going concern* highlights the assumption that the business enterprise is expected to continue operating well into the future (usually indefinitely). The market value of a going concern includes the incremental value associated with the business concern, which is distinct from the value of the tangible real property and personal property. The assemblage of the land, buildings, labor, equipment, financial assets, and the marketing operation creates an economically viable business that is expected to continue.

It may be difficult to separate the market value of the tangible assets (i.e., the land and the building) from the total market value of the business, but such a division of realty and non-realty assets may be required by the intended use of the appraisal. Application of the cost approach can be useful in separating the value of the tangible assets because the cost approach specifically excludes personal property and intangibles. An appraiser must always state when intangible assets are included in the property being appraised, even when the appraiser has not been able to separate the market value of the real property from the market value of the going concern.

Only qualified practitioners should undertake these kinds of assignments, which must be performed in compliance with the appropriate professional standards. It may be necessary for a real estate appraiser to collaborate with a personal property appraiser or a business appraiser or both on such an assignment.

Public Interest Value

Historically, *public interest value* has been used as a general term covering a family of value concepts that relate the highest and best use of property to noneconomic uses. (Other terms for similar concepts include *natural value*, *intrinsic value*, *aesthetic value*, *scenic value*, and *preservation value*.) The analysis of public interest value tends to be driven by social, political, and public policy goals rather than economic principles.

Assessed Value

In ad valorem taxation, *assessed value* refers to the value of a property according to the tax rolls. Assessed value may not conform to the definition of *market value*, but it is usually calculated in relation to a market value basis. Some municipalities estimate both an assessed value and a market value.

Appraisers of real property are generally not asked to develop an opinion of assessed value, although in property tax disputes appraisers are often asked by property owners to provide an opinion of market value for comparison with the assessed value. In other contexts, data on assessed values can be useful as supporting data in analyses for assignments involving other

assessed value
The value of a property according to the tax rolls in ad valorem taxation; may be higher or lower than market value, or based on an assessment ratio that is a percentage of market value.

types of value. For example, a comparison of assessed values can aid in the selection of comparable properties, or research into trends in assessed values can be used as secondary evidence of changing market conditions.

insurable value
The value of an asset or asset group that is covered by an insurance policy; can be estimated by deducting costs of noninsurable items (e.g., foundations) from the depreciated cost estimate.

Insurable Value

Traditionally, the value of an asset or assets covered by an insurance policy has been known as the *insurable value*, even though the amount is more accurately an indication of cost. The maximum reimbursement for direct physical damage or loss of property is limited to the amount shown on the contract. This value is often controlled by state law and varies from state to state.

The objective of an insurance policy is to return the insured party to the same position occupied prior to the loss. Insurable value may be based on the replacement or reproduction cost of physical items that are subject to loss from hazards. Land value is not included in the insurable value and items such as underground piping and below-grade foundations are typically excluded as well.

When asked to provide insurable value, an appraiser must identify and report the definition used and ensure that the analysis and conclusions are consistent with that definition.

Liquidation Value and Disposition Value

Properties in distressed markets often do not meet the conditions specified in the definition of *market value*. Other types of value might be more appropriate for properties when a forced sale or some other form of distress is influencing the decisions of the buyer or seller. In 1992, the Special Task Force on Value Definitions of the Appraisal Institute developed definitions of *liquidation value* and *disposition value*, and with minor changes to the wording over the years those value definitions remain relevant for certain appraisal assignments.

The current definition of *liquidation value* is

> The most probable price that a specified interest in real property should bring under the following conditions:
>
> 1. Consummation of a sale within a short time period.
> 2. The property is subjected to market conditions prevailing as of the date of valuation.
> 3. Both the buyer and seller are acting prudently and knowledgeably.
> 4. The seller is under extreme compulsion to sell.
> 5. The buyer is typically motivated.
> 6. Both parties are acting in what they consider to be their best interests.
> 7. A normal marketing effort is not possible due to the brief exposure time.
> 8. Payment will be made in cash in US dollars or in terms of financial arrangements comparable thereto.
> 9. The price represents the normal consideration for the property sold, unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.

This definition can also be modified to provide for valuation with specified financing terms.

The current definition of *disposition* value is

The most probable price that a specified interest in real property should bring under the following conditions:

1. Consummation of a sale within a future exposure time specified by the client.
2. The property is subjected to market conditions prevailing as of the date of valuation.
3. Both the buyer and seller are acting prudently and knowledgeably.
4. The seller is under compulsion to sell.
5. The buyer is typically motivated.
6. Both parties are acting in what they consider to be their best interests.
7. An adequate marketing effort will be made during the exposure time specified by the client.
8. Payment will be made in cash in U.S. dollars or in terms of financial arrangements comparable thereto.
9. The price represents the normal consideration for the property sold, unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.

This definition can also be modified to provide for valuation with specified financing terms.

According to Guide Note 11 of the Standards of Professional Appraisal Practice of the Appraisal Institute: Comparable Selection in a Declining Market, *market value* assignments address the following question:

What would the property likely sell for on the date of value after a typical exposure period on the open market?

In contrast, a *disposition value* assignment answers a different question:

What will the property likely sell for after a limited exposure on the market given that the seller is compelled to sell?

A *liquidation value* assignment answers yet another question:

What will the property likely sell for after a severely limited exposure on the market given that the seller is extremely compelled to sell?

In the case of both disposition value and liquidation value, the limited or severely limited exposure time on the market is specified by the client. If that time period is the same as what is typical in the current market, disposition value could be equal to market value.

The concept of *exposure time* is important to understand. *The Dictionary of Real Estate Appraisal*, 5th edition, defines it as follows:

The estimated length of time the property interest being appraised would have been offered on the market prior to the hypothetical consummation of a sale at market value on the effective date of the appraisal; a retrospective estimate based on an analysis of past events assuming a competitive and open market.

If the subject property is competing with properties that sold with limited exposure times in a market in which those sales are prevalent, these sales may constitute the "market." The value of the subject property must be estimated in recognition of such a market.

Guide Note 14 of the Standards of Professional Appraisal Practice of the Appraisal Institute: Concept of Exposure Time notes that exposure time is not an opinion of the appraiser when it is specified by the client. Rather, the exposure time is a condition of the assignment. The guide note further points out that the definition of *disposition value* includes the idea of "future exposure time," which is often interpreted as a contradiction in terms. Suppose an appraiser is developing an opinion of value subject to the condition that a sale would occur within, say, five months from now as defined by the client. The appraisal assignment would be a prospective valuation, and the exposure time would be in the future relative to the date of the appraisal report. The opinion of value is in the future relative to the date of the report but still predates the effective date of value as described in the definition of *exposure time*.

Identifying the Rights to Be Appraised

In the introductory step of the valuation process, the appraiser's identification of the rights to be appraised is the practical application of the bundle of rights theory in a real property appraisal assignment. As discussed earlier in the book, the *bundle of rights* is a metaphor for the complete collection of the individual ownership interests. For example, within the bundle of rights, the right to use the real estate is separate and distinct from the right to sell the real estate, the right to lease it, and many other rights.

The sticks in the bundle of rights each have some type of value. For example, the owner of the fee simple estate (i.e., the holder of the complete set of sticks in the bundle) can trade the rights to occupy a certain amount of space within an existing building on the land in exchange for rent. In this way, the familiar relationship of landlord to tenant can be thought of as an exchange of property rights, and the appraiser can develop an opinion of the market value of the right to use and occupy the leased premises. This right does not cease to exist when the owner of the fee simple estate separates it from the complete bundle of rights. Rather, it is held by someone else, in this case the tenant.

The real property rights to be appraised are singled out among the relevant characteristics of the property because, like the appropriate type and definition of value for the assignment, the property rights appraised are a fundamental element of the assignment. An oversight in the analysis of some other characteristic of the property may or may not have a noticeable effect on the ultimate opinion of value, but a poor understanding of what precisely is being valued guarantees a critical error in the development of the appraisal.[1]

In all appraisal assignments, the interest to be valued is determined by the needs of the client. The fact that a property is leased does not mean the appraiser must value a leased fee or leasehold estate. The appraisal problem to be solved is a question of which stick (or sticks) in the bundle the client needs to have valued. It is often the case that no one entity actually holds that set of sticks.

Real property appraisal involves not only the identification and valuation of a variety of different rights, but also the analysis of the many limitations on those rights, and the effect that the limitations have on value. Some limitations on ownership, such as eminent domain, are public while others such as deed restrictions are private. These limitations on ownership are actually rights that are not held by the property owner. In other words, the owner loses the ability to do certain things by no longer holding certain sticks in the bundle of rights. For example, the government holds the right of eminent domain, and the property owner gives up the right to use and occupy the condemned portions in the event that the government exercises its right.

This chapter examines the types of individual property interests that appraisers commonly deal with and the various forms of property ownership through which individuals or groups hold interests in real property.

Partial Interests in Real Property

A partial interest is any interest or group of interests that makes up less than the entire bundle of rights. Partial interests can be created in several ways:

- economically
- legally
- physically
- financially

Figure 7.1 illustrates alternatives an appraiser must consider when identifying the real property interest being appraised.

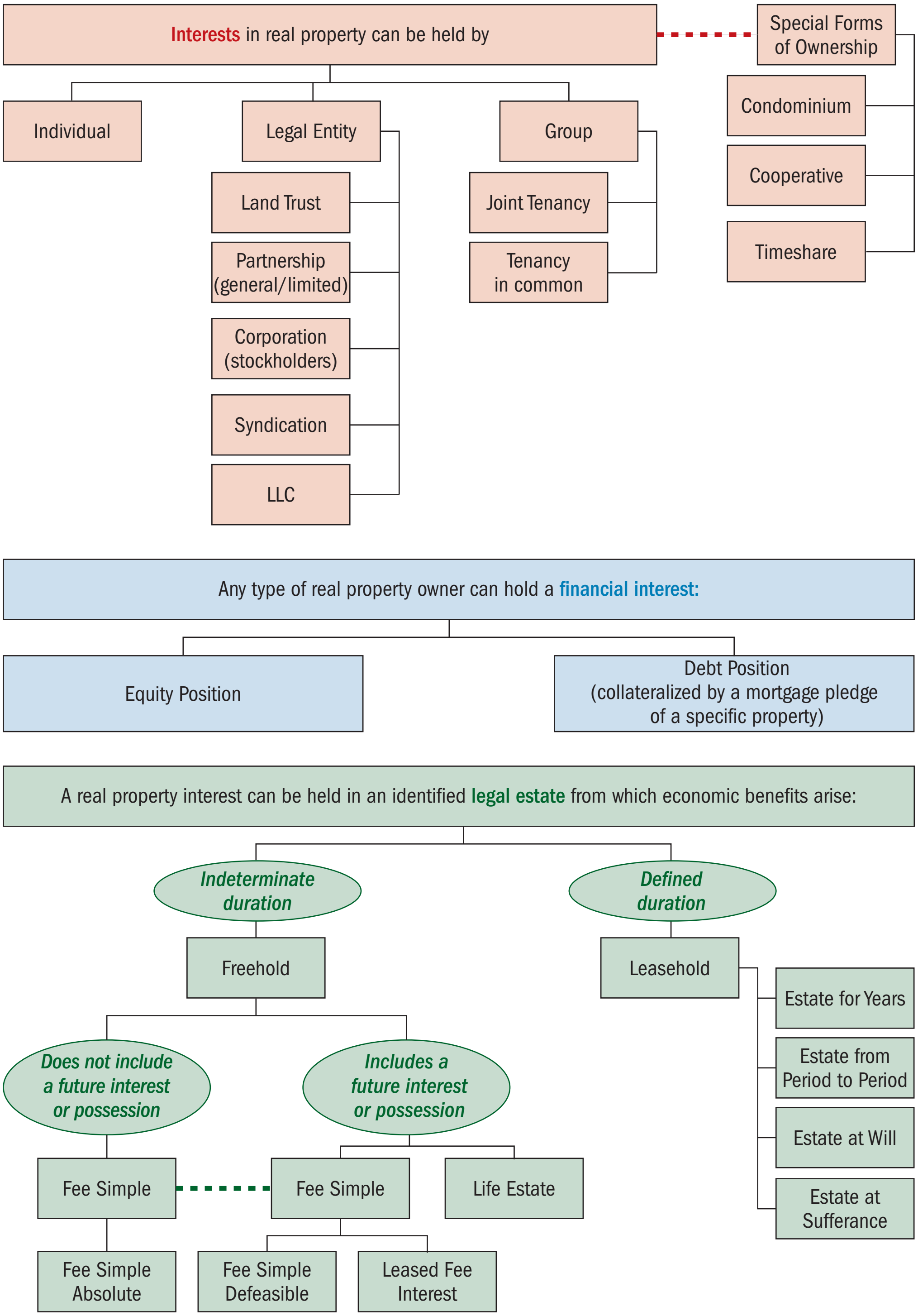
> Leases specify the rights of the lessor (e.g., to collect rent, to get the property back when the lease expires, to dispose of the property through sale or transfer) and the rights of the lessee (e.g., to use, occupy, improve, and sublease the property).

Economic Interests

The most common type of economic interest is created when the fee simple interest is divided by a lease. In such a circumstance, the lessor and the lessee each obtain partial interests, which are stipulated in contract form and are subject to contract law. The divided interests resulting from a lease represent two distinct

1. See David Lennhoff, "You Can't Get the Value Right If You Get the Rights Wrong," *The Appraisal Journal* (Winter 2009): 60-65.

Figure 7.1 Interests Created by Real Property Ownership



but related interests–the leased fee interest and the leasehold interest. Additional economic interests, including subleasehold (or sandwich) interests, can also be created.

Leased Fee Interests

A leased fee interest is the lessor's, or landlord's, interest. A landlord holds specified rights that include the right of use and occupancy conveyed by lease to others. The rights of the lessor (the leased fee owner) and the lessee (leaseholder) are specified by contract terms contained in the lease. Although the specific details of leases vary, holding a leased fee interest generally provides the lessor with the following:

- rent to be paid by the lessee under stipulated terms
- the right of repossession at the termination of the lease
- default provisions

When a lease is legally delivered, the lessor must surrender possession of the property to the tenant for the lease period and abide by the lease provisions. The lessor's interest in a property is considered a leased fee interest regardless of the duration of the lease, the specified rent, the parties to the lease, or any of the terms in the lease contract.

Leasehold Interests

The leasehold estate is the lessee's, or tenant's, estate. When a lease is created, the tenant usually acquires the rights to possess the property for the lease period, to sublease the property (if this is allowed by the lease and desired by the tenant), and perhaps to improve the property under the restrictions specified in the lease. In return, the tenant is obligated to pay rent, give the property back at the end of the lease term, remove any improvements the lessee has modified or constructed (if specified), and abide by the lease provisions. The most important obligation of a tenant is to pay rent.

The relationship between contract and market rent greatly affects the value of a leasehold interest. A leasehold interest may have value if contract rent is less than market rent, creating a rental advantage for the tenant. However, the contract advantage of the leasehold estate may not be marketable. For example, the original lease contract may prohibit subletting, or the remaining lease term may be too short to be marketable to potential sublease tenants. This relationship, in turn, is likely to affect the value of the leased fee interest. The value of a leased fee interest encumbered with a fixed rent that is below market rates may be worth less than the unencumbered fee simple interest or the leased fee interest with rent at market levels. When contract rent exceeds market rent, the leasehold is said to have negative value. Even in such circumstances, the tenant still has the right to occupy the premises and, despite the contractual disadvantage,

leased fee interest
The ownership interest held by the lessor, which includes the right to the contract rent specified in the lease plus the reversionary right when the lease expires.

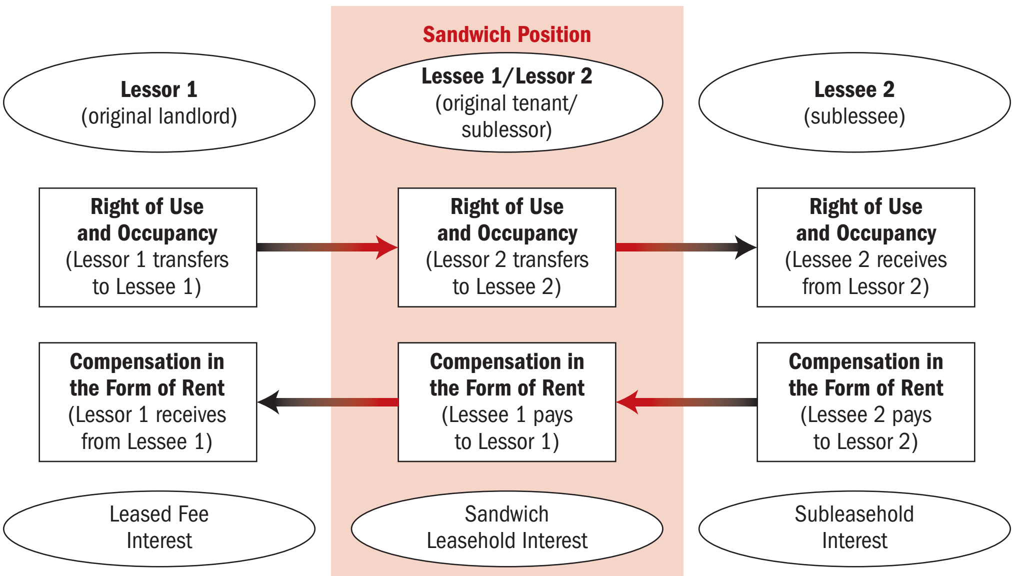
leasehold interest
The right held by the lessee to use and occupy real estate for a stated term and under the conditions specified in the lease.

may have other benefits that warrant continued occupancy. It is also possible that the contract disadvantage hurts the tenant's business and increases the risk of continued occupancy.

Subleasehold or Sandwich Interests

Normally a tenant is free to sublease all or part of a property, but many leases require that the landlord's consent be obtained. A sublease is an agreement in which the tenant in an existing lease conveys to a third party the interest that the lessee enjoys (the right of use and occupancy of part or all of the property) for part or all of the remaining term of the lease. In a sublease, the original lessee is "sandwiched" between a lessor and a sublessee (see Figure 7.2). The original lessee's interest has value if the contract rent is less than the rent collected from the sublessee. Subleasing does not release the lessee from the obligations to the

Figure 7.2 Sandwich Position in a Sublease Transaction



lessor defined in the lease agreement. A sublease may affect all the parties, including the owner of the leased fee interest, and such arrangements are common and increasingly upheld by the courts.

A lease contract may contain a provision that explicitly forbids subletting. Without either the right to sublet or a term that is long enough to be marketable, a leasehold position may have no economic benefits and, therefore, no market value. (Only when a lease is assignable can it have market value for subleasing

> **sublease**
> An agreement in which the lessee in a prior lease conveys the right of use and occupancy of a property to another, the sublessee, for a specific period of time, which may or may not be coterminous with the underlying lease term.

purposes.) Furthermore, the value of the leased fee interest would likely be diminished in this case because a lessee who no longer has need of the leased premises and is not allowed to sublease the space is likely to default on the lease.

Legal Interests

Virtually every property is subject to some kind of easement or other legal restriction on use that creates a partial interest. Some are permanent easements, while others may only exist for a short period of time. Often appraisers have to either estimate the value of property subject to an easement or estimate the value of the easement itself. In certain ownership situations, a life estate may be created, which in turn creates several partial interests. Transferable development rights are another type of special partial interest created by legal circumstances.

> **sandwich lease**
> A lease in which an intermediate, or sandwich, leaseholder is the lessee of one party and the lessor of another. The owner of the sandwich lease is neither the fee owner nor the user of the property; he or she may be a leaseholder in a chain of leases, excluding the ultimate sublessee.
>
> **life tenant**
> One who owns an estate in real property for his or her own lifetime, the lifetime of another person, or an indefinite period limited by a lifetime.
>
> **remainderman**
> A person who is entitled to an estate after a prior estate or interest has expired; also called *remainder interest* or *remainder*.

Life Estates

A life estate is defined as the total rights of use, occupancy, and control of a specified property limited to the lifetime of a designated party. The designated party is generally known as the life tenant and is obligated to maintain the property in good condition and pay all applicable taxes during the term of the life estate. Two interests are created by a life estate, and both may need to be valued by an appraiser. The first interest is that of the life tenant. The second is the remainder interest, the party who acquires the possessory interest in the property upon the death of the life tenant. Life estates can be created in several ways:

- by operations of law
- by wills
- by deeds of conveyance

For example, a fee owner may leave a will that gives land to his widow for her remaining lifetime and, at her death, the land is passed on to their children. Thus, the widow acquires a life estate and functions as a life tenant with the children becoming the remaindermen. A living fee owner may deed his property to a family member as remainderman and, by the terms of the conveyance, retain a life estate for himself. This practice might eliminate the expense of probating the will after the owner dies, but it may also call for the assessment of a gift tax.

Easements

An easement is an interest in real property that transfers use, but not ownership, of a portion of an owner's property. Easements usually permit a specific portion of a property to be used for identified purposes, such as access to an adjoining property or as the location of a certain underground utility. Although surface easements are the most common, subterranean and overhead easements are used for public utilities, fiber-optic cables, subways, and bridges. Other easements such as scenic easements and facade easements may prohibit the owner of the underlying fee simple estate from certain uses of the property without giving the holder of the easement any possessory interest in the real estate.

Clearly a property that enjoys the benefit of an easement gains additional rights, while a property that is subject to an easement is burdened. The easement attaches to the property benefitted and is referred to as an *easement appurtenant*. The property whose owner acquires an easement is known as the *dominant tenement*. The property that is subject to the easement is called the *servient tenement*.

Easement rights can be transferred in perpetuity or for a limited time period. An easement can be created in several ways:

- by a contract between private parties
- by prescription
- by governmental entities or public utilities through the exercise of eminent domain

A conservation easement is a typical example of a contract between private parties, in which case a land owner enters into an agreement with, say, a conservation group that limits the future use of a portion of the owner's property, often to ensure that some natural environment will not be developed. The property owner hands over certain specified rights of use and receives a tax deduction. In exchange the conservation group may or may not pay compensation (and offer ongoing property tax savings). An example of an easement created by prescription might be a right of access granted to the public who for many years have used a trail as a shortcut through a parcel of privately owned land. Public utilities often have certain limited powers of eminent domain which they may use to impose a temporary construction easement and an access easement on private property to install and maintain equipment like a natural gas pipeline or electrical lines and towers. In rare cases, an easement will be created by adverse posession, which is the actual, exclusive, open, notorious, hostile, and continuous possession and occupation of real property under an evident claim of right or title.

easement
The right to use another's land for a stated purpose. Access or right-of-way easements may be acquired by private parties or public utilities. Governments may be the beneficiaries of easements placed on privately owned land that is dedicated to conservation, open space, or preservation.

easement appurtenant
An easement that is attached to, benefits, and passes with the transfer of the dominant estate; runs with the land for the benefit of the dominant estate and continues to burden the servient estate, although such an estate may be transferred to new owners.

conservation easement
An interest in real property restricting future land use to preservation, conservation, wildlife habitat, or some combination of those uses. A conservation easement may permit farming, timber harvesting, or other uses of a rural nature to continue, subject to the easement.

easement in gross
An easement that benefits a legal person or entity (individual, corporation, partnership, LLC, government entity, etc.) and not a particular tract of land; an easement having a servient but no dominant estate.

preservation easement
A voluntary legal agreement that becomes part of the chain of title thereby protecting a historic, archaeological, or cultural resource.

Transferable Development Rights

Transferable development rights (TDRs), sometimes referred to as *severable use rights* (SURs), emerged in the real estate industry during the 1970s. A transferable development right is a development right that is separated from a landowner's bundle of rights and transferred, generally by sale, to another landowner in another location. Some TDRs preserve property uses for agricultural production, open space, or historic buildings. In this arrangement, a preservation, or sending, district and a development, or receiving, district are identified. Landowners in the preservation district are assigned development rights, which they cannot use to develop their own land but can sell to landowners in the development district. The landowners in the development district can use the transferred rights to build at higher densities than zoning laws in the development district would normally permit.

transferable development right (TDR)
A development right that cannot be used by the landowner, or that the owner chooses not to use, but can be sold to landowners in another location or leased for a period of years to then revert back to the original owner; often used to preserve agricultural land; may also be used to preserve historic sites or buildings and open space or to protect scenic features. TDRs are said to be transferred from a landowner in a sending district to the use of a landowner in a receiving district.

Another situation in which development rights are transferred results from the constrained capacity of an existing utility. For example, consider a community that decides to impose a construction moratorium pending the expansion of its present sewage plant or the building of a new plant. Before the moratorium, a landowner was granted the right to hook up 100 projected single-unit residences to the existing plant. A second landowner, however, did not obtain the right to link up his 50 proposed single-unit residences to the sewage treatment plant and will have to wait for expansion of the plant's capacity. The second landowner risks financial loss if he cannot develop the land immediately, so he eagerly purchases from the first landowner the right to link up his 50 residential units to the plant.

Although these rights may vary from state to state, transferable development rights are generally an interest in real property only as long as they are attached to the land. When they are sold, they become personal property, only becoming real property again when they are attached to another tract of land. TDRs can be banked to facilitate the timing of the transfer of rights.

Physical Interests

Physical interests in real property can be separated either horizontally or vertically. The most common methods of creating horizontal divisions of real property are through subdivision and assemblage. In subdivision, a large tract of land is broken down into smaller units, which are then marketed individually. In assemblage, two or more parcels of real estate are combined into one parcel. The higher value, known as *plottage value*, created for the assembled parcel is greater than the separate value of the individual parcels. Consider two adjacent, half-acre industrial sites in an area where one-acre sites are most desirable. The value of each half-acre site is $200,000, but when assembled the one-acre site has a value of $500,000. Conversely, when the market seeks smaller sites, the unit values of larger sites will likely be lower.

subsurface rights
The rights to the use and profits of the underground portion of a designated property; usually refers to the right to extract coal, minerals, oil, gas, or other hydrocarbon substances as designated in the grant; may include a right of way over designated portions of the surface.

Vertical interests in real property may have to be considered separately by an appraiser in sales, leases, mortgages, and other realty transactions. The most common vertical interests in real property are subsurface rights and air rights. A subsurface right is the right to the use of and profits from the underground portion of a designated property. The term usually refers to the right to extract minerals from below the earth's surface and to construct tunnels for railroads, motor vehicles, and public utilities. Air rights are the property rights associated with the use, control, and regulation of air space over a parcel of real estate. Ownership of a condominium unit in a high-rise building is defined in three dimensions and includes air rights. Both of these fractional interests represent portions of a fee simple estate, and each embodies the idea of land as a three-dimensional entity.

The vertical division of real property is significant because engineering advances have dramatically affected land use and, therefore, highest and best use considerations. The development of steel-framed building construction, the passenger elevator, deep tunnel excavation techniques, and communications technology have all helped to shape the modern urban landscape. As the density of building in urban areas increases, fewer sites are available for new construction and land values escalate. This trend has produced a growing interest in developing air rights.

Air rights can be sold or leased, with the seller retaining one or more easements for a specialized use such as the operation of a railroad line on the land beneath the improvements developed in the vertical space above the parcel. Air rights may be subdivided as well, as when the owner of the fee simple interest sells or leases only the land and air that are to be occupied by a particular improvement.

Air rights can also be transferred in various ways. Often the air rights to one property are shifted to another property within the same building zone under legal planning regulations. The transfer of air rights allows developers to adjust the density of land use without putting adverse pressure on owners, neighborhoods, or districts. This practice underscores the importance of local zoning authorities, which regulate building heights, building functions, setbacks, and other variables involved in the development of air rights. As an example, the most common form of air rights transfer in New York City involves merging two lots. A developer will buy adjacent lots so that the larger combined lot area will be used in calculations of floor area ratio (FAR), i.e., the measure in the local zoning code that dictates how large a building can be. If the area of the combined parcel is twice that of the original site of the new building, the allowable aboveground area of the new building could be doubled

air rights

The right to undisturbed use and control of designated air space above a specific land area within stated elevations. Such rights may be acquired to construct a building above the land or building of another or to protect the light and air of an existing or proposed structure on an adjoining lot.

by building higher without violating the maximum floor area ratio. In effect, the allowable use of the airspace above one of the original parcels (say, an existing low-rise commercial building) is transferred to the other (a new high-rise residential building).

Financial Interests

The financial aspects of property interests have a major effect on real estate investment practices. The analysis of mortgage and equity components is of particular importance. Mortgage funds are secured debt positions, while equity investments are venture capital. Fee simple, leased fee, and leasehold interests can all be mortgaged, thereby subdividing these interests into mortgage and equity components. Other possible financial arrangements include senior and subordinated debt, sale-leaseback financing, and equity syndications.

Equity Interests

The equity in real property is the owner's interest after all claims and liens have been satisfied. An equity interest, like a mortgage loan, represents a financial interest in real property. Equity ownership in real property can be legally accomplished in many ways–e.g., as an individual owner, joint owner, partner, or shareholder in a corporation.

The legal form of equity ownership does not affect property value in most appraisal assignments. However, an appraiser is sometimes called upon to render an opinion of the value of a specific legal form of equity interest. For example, an appraiser may be asked to appraise an equity interest for estate tax purposes or for sale or purchase decisions when a limited partner's equity interest in a partnership was created solely to make the individual the legal owner of certain limited rights in the real property. In appraising partial interests appraisers should keep in mind that the sum of the parts is not necessarily equal to the value of the whole. For example, a 60% undivided interest that is worth $200,000 and a 40% undivided interest that is worth $50,000 does not necessarily mean that the value of the fee simple interest is $250,000. Partial interests are often valued at less than their pro rata share of ownership, especially if the holder of the partial interest does not have any voice in the management or control of the asset.[2]

Mortgage Interests

A mortgage instrument creates mortgagor and mortgagee positions. In investment analysis assignments, appraisers are often asked to research the value of mortgage interests. Mortgage-equity analysis has a long history in appraisal literature (see Chapter 23), and techniques for comparing the value of mortgages with different terms are well established (see Chapter 18).

Mortgage interests trade regularly in the secondary market, with varying degrees of governmental intervention to promote liquidity and competition. Conditions in the mortgage market can have a tremendous effect on property value, as was seen in the economic downturn that followed the housing crisis beginning in 2007. Economic trends involving the mortgage and capital markets are discussed more fully in Chapter 10.

Forms of Ownership

The various property interests described earlier in this chapter can be owned by individuals, by a group, or by various legal entities that are defined by state law. Identifying the relevant form of ownership of the assets involved in an assignment is part of an appraiser's investigation into the rights to be appraised. In effect, the forms of ownership discussed in this final section of the chapter identify who owns the interests discussed previously (i.e., what is owned).

Concurrent Ownership of Real Property

Individual ownership is legally known as *ownership in severalty*. However, individuals can hold ownership under certain legal entities, such as 100% ownership of the beneficial interest in a land trust or 100%

2. Professional standards require appraisers to analyze the effect on value of an entire assemblage of interests rather than adding together the individual values of the component parts.

tenancy
The holding of property by any form of title.

joint tenancy
Joint ownership by two or more persons with the right of survivorship.

ownership of the stock of a corporation that owns real estate. *Tenancy* is defined as the holding of property by any form of title.

Concurrent ownership includes joint tenancy, tenancy by the entirety, and tenancy in common. Joint tenancy is joint ownership by two or more persons with the right of survivorship. Under this arrangement, each party has an identical interest and right of possession. Upon the death of one joint tenant, ownership is automatically vested in the remaining joint tenant or tenants. Tenancy by the entirety is an estate held by a husband and wife in which neither has a disposable interest in the property during the lifetime of the other, except through joint action. It has the same survivorship provision as a joint tenancy, but tenancy by the entirety applies only to spouses. Tenancy in common is an estate held by two or more persons, each of whom has an undivided interest. In this estate the undivided interests may or may not be equally shared by the holders and there is no right of survivorship. One tenant in common may sell off an undivided interest without the approval or knowledge of the other tenant or tenants in common.

Legal Entity Ownership of Real Property

In addition to individual ownership, real property can be owned by a variety of different legal entities such as

- land trusts
- partnerships
- corporations and companies
- syndications

Like individuals, these entities can own a fee simple interest or partial interests in real property.

A group of real estate investors often choose one form of ownership over another to take advantage of tax savings offered by a particular ownership structure, to limit personal liability through a different form of ownership, or to avoid corporate reporting. The legal framework for all these ownership structures can vary by state, so investors may favor certain structures in different states or may even incorporate in another state after comparing the advantages and disadvantages of the relevant laws in different states.

land trust
A legal vehicle for partial ownership interests in real property in which independently owned properties are conveyed to a trustee; may be used to effect a profitable assemblage or, in some cases, to facilitate the assigning of property as collateral for a loan.

Land Trusts

Trusts are sometimes used as legal vehicles to create partial ownership interests in real property. In a land trust, one or more properties are conveyed by special deed to a trustee, which then owns the real property. Either the original owners or some other designated individual or persons become the owners of the beneficial interest in the trust. A trust agreement is established to outline the duties and functions of the trustee. A trustee is usually a separate, specialized company or an independent department of a bank.

A trustee can take no actions other than those specified and allowed in the trust agreement without written permission of the owner or owners of the beneficial interest. For example, in one trust agreement a trustee may be required to manage a property actively and collect rents. However, in another trust agreement regarding a different property, the same trustee will be prohibited from managing the property and collecting rents. One important legal aspect of a trust arrangement is that a judgment against a beneficiary is not a lien against the real estate.

Partnerships

A partnership is a business arrangement in which two or more persons jointly own a business and share in its profits and losses. Partnerships are used extensively in real estate acquisition because they pool individual funds for property ownership and operation. Two types of partnerships are prevalent in the ownership of real property: general partnerships and limited partnerships.

In a general partnership, all partners share in business gains and each is personally responsible for all liabilities of the partnership. One important aspect of a general partnership is that the agreement automatically terminates when a general partner dies.

Limited partnerships have both general partners and limited partners. All partners participate by pooling funds. However, unlike general partnerships in which all partners actively participate in the business of the partnership, in a limited partnership the partners can be either active or passive. General partners are active members of the partnership who manage the business and assume full liability for partnership obligations. Limited partners, on the other hand, are passive members of the partnership. They are not actively involved in the business of the partnership, and their liability is restricted to the amount of their capital contribution. Through a limited partnership, a group of investors can jointly acquire real property that they might be unable to acquire as individuals.

Stock Corporations

Like partnerships, stock corporations allow many investors to pool funds to purchase and own real property. However, unlike partnerships, the individual investors in a stock corporation do not hold an interest in the real property. Rather, they own shares of stock,

partnership
A business arrangement in which two or more persons jointly own a business and share in its profits and losses.

general partnership
An ownership arrangement in which all partners share in investment gains and losses and each has personal and unlimited responsibility for all liabilities.

limited partnership
An ownership arrangement consisting of general and limited partners. General partners manage the business and assume full liability for partnership debt, while limited partners are passive and liable only to the extent of their own capital contributions.

stock corporation
A common legal entity in which investors provide organizational capital by subscribing to shares that represent ownership and a right to all proprietary benefits but are subject to the prior claims of operating expenses and debt service on capital raised by selling bonds, debentures, and other money market instruments.

usually recognized as personal property, that can be private or publicly traded. The owner of the real property is the legal entity, the corporation.

A stock corporation may be organized to hold title to a single asset, such as a parcel of real estate, or multiple assets, such as a portfolio of property investments. Ownership of the corporate entity is divided into partial interests by selling shares to an investment group. Any specific stock holding represents a percentage of total corporate ownership. For example, if a particular investor owns 250 shares out of 10,000 total shares issued by the corporation, that investor owns 2.5% of the corporation. This percentage is an ownership share in the corporation, not a percentage of any real property held by the corporation.

Limited Liability Companies

A limited liability company (LLC) incorporates features of both a corporation and a partnership. The "limited liability" of an LLC is similar to that of a corporation, in which the members of the LLC do not risk their personal assets. On the other hand, like a partnership an LLC can function as a pass-through entity with earnings taxed only at the level of the interest holder, not at the corporate level as well. By 1997, all US states had adopted legislation authorizing the establishment of LLCs.

The owners of a limited liability company are members, rather than shareholders or partners, and thus are not subject to some of the restrictions imposed on ownership under a corporate or partnership structure. Unless otherwise specified, management is generally vested in the members of an LLC in proportion to their contributions of capital. Members may separate their right to a share of the company profits from the right to participate in management or to vote on matters affecting the company. These separated rights can then be assigned to a transferee without disrupting the operation of the company. The transfer of ownership interests in a limited liability company is generally simpler than the transfer of shares in a corporation or partnership.

Syndications

Syndications are another means for selling interests or rights in real property. A syndication creates a private or public partnership to pool funds for the acquisition, development, holding, management, or disposition of real estate. Syndications are established when an individual or group purchases interests in real property for the purpose of transferring them to a limited partnership, which in turn sells the interests to investors.

At one time, syndications were popular because the investment value of syndicate shares usually included income tax shelter benefits. Such investments offered small income returns during the early years, when the value of the investment was perceived to lie largely in its income tax benefits (tax deductions and tax deferrals). However, the Tax Reform Act of 1986 significantly reduced the use of real estate investments as income shelters.

syndication
A private or public partnership that pools funds for the acquisition and development of real estate projects or other business ventures.

Although syndications usually involve some sort of partnership, they differ from partnerships insofar as the rights of investors in a syndication are different than the rights of general or limited partners in a partnership. In theory syndication arrangements may be simple, but in practice they are often complex because syndications frequently purchase more than real estate, e.g., management services.

Special Forms of Ownership

In addition to concurrent ownership and ownership by legal entities, there are several special forms of ownership that involve a combination of individual and joint property rights, including

- condominium ownership
- cooperative ownership
- timesharing

Condominium Ownership

A condominium is a form of ownership of separate units or portions of multiunit buildings. While residential and retail properties were once the main types of property held in condominium ownership, most property types now exist in condominium ownership, including offices, industrial buildings, retail structures, and even garden plots, marina slips, and undeveloped land where the access roads and utilities are the common property. There are also land condominiums, which are land subdivisions in all but name, in which the use of the condominium form of ownership allows the declarant to avoid certain zoning restrictions pertaining to the subdivided lots. For example, in a subdivision the Federal Acquisition Regulation (FAR) limits that would have applied to each lot individually instead would apply only to the undivided parcel. In real estate markets outside the United States, variants of condominium ownership can be the most common type of ownership.

A condominium unit is a separate ownership, and title is held by an individual owner. The unit may be separately leased, sold, or mortgaged. In a traditional condominium, the owner holds title to an individual unit and an undivided partial interest in the common areas of the total condominium project–e.g., the land, the public portions of the building, the foundation, the outer walls, and the spaces provided for parking and recreation. Thus, the owner possesses a three-dimensional space within the outer walls, roof or ceiling, and floors and has an undivided interest in common areas along with the other owners. The master deed for a condominium typically describes the boundaries of the property using the length and width of the space just like a deed for a conventional property, but the condominium master deed also describes the property in three dimensions (i.e., the vertical boundaries of the unit). A condominium owner usually receives a short deed referring to the master deed and identifying the individual unit by a unit number.

Limited common elements also exist in certain condominium projects. In this arrangement, certain common elements, such as

condominium ownership
A form of fee ownership of separate units or portions of multiunit buildings that provides for formal filing and recording of a divided interest in real property.

parking stalls, storage units, or plots of surrounding land, are reserved for the use of some but not all of the condominium owners. The owners of units in a condominium project usually form an association to manage the project in accordance with adopted bylaws. The expenses of management and maintenance are divided proportionately among the owners, who pay a monthly fee.

The master deed usually provides for the establishment of a condominium owners association, and the bylaws of that organization generally set forth any rules such as the responsibilities of unit owners for assessments and maintenance fees and any restrictions such as restrictions on pets or color choices.

The real estate market slump that began in 2007 had a particularly devastating effect on condominium developments. For example, consider a condominium project in which a substantial number of units remain unsold and the owners of some other units are experiencing bankruptcy or foreclosure. If the developer is no longer in business, the few solvent owners of units must assume financial responsibility for the upkeep of the common areas even though they were only responsible for a fraction of these expenses under their initial homeowner agreements. Situations like this are common in some overbuilt areas, and they are one reason that condominium and townhouse developments have not recovered from the housing crisis to the same extent as detached single-unit homes.

Cooperative Ownership

In certain areas, cooperative ownership of apartments is popular. The most notable example is New York City, where the percentage of units owned cooperatively was 55% in 2009 with the remainder owned as condominiums. By comparison, only 9% of units nationwide were owned cooperatively in 2009, according to the American Housing Survey.[3] In a co-op, a stock corporation is organized, acquires title to an apartment building, prices the various apartments, and issues an authorized number of shares at a specified par value. Individual owners purchase shares of stock, with the price per unit determining the number of shares that an occupant must purchase. In cooperative ownership, each owner of stock receives a proprietary lease on a specific apartment and is obligated to make a monthly payment that represents the proportionate share of operating expenses and debt service on the underlying mortgage, which is paid by the corporation. The lease obligates the occupant to pay a monthly maintenance fee, which may be adjusted at times by the corporation's board of directors. The fee covers the expenses of management, operations, and maintenance of public areas. Because the shareholders can vote their shares in electing directors, they have some control over property conditions.

3. For further comparison of condominium and cooperative ownership, see Michael H. Schill, Ioan Voicu, and Jonathan Miller, "The Condominium Versus Cooperative Puzzle: An Empirical Analysis of Housing in New York City," *Journal of Legal Studies*, vol. 36, no. 2 (2007): 275-324.

An alternative method for financing cooperatives has emerged in some areas. In the past cooperative corporations arranged mortgages on entire apartment properties. Cooperative shareholders had to fund their purchases with 100% equity or borrow the money from commercial banks using short-term, personal notes. Now, however, a cooperative corporation can arrange a mortgage on the total property, and individual apartment shareholders can mortgage their stock for up to 75% of its value. These new mortgage arrangements have made cooperative apartment properties much more marketable.

cooperative ownership
A form of ownership in which each owner of stock in a cooperative apartment building or housing corporation receives a proprietary lease on a specific apartment and is obligated to pay a monthly maintenance charge that represents the proportionate share of operating expenses and debt service on the underlying mortgage, which is paid by the corporation. This proportionate share is based on the proportion of the total stock owned.

Historically, the complicated financing structure of cooperatively owned property, with the owner of a cooperative apartment typically paying both for a loan on the individual unit and for a share of the blanket mortgage on the entire building, has been seen as a disadvantage of cooperative ownership compared to condominium ownership. Buyers of units in a cooperatively owned building would have to take into account the greater risk inherent in the underlying mortgage for the entire property. Co-op restrictions may not allow subletting, which would be seen as a negative influence on value by someone who viewed the unit as an investment and might want to rent the unit out based on the income potential of similar units in the market. The perceived social exclusivity of a cooperative building, where a board of directors often has more influence on whether a unit can be bought and sold than a condominium association does, and the greater power of a co-op board to punish rule-breakers can be both disadvantages and advantages depending on the perspective of particular buyers and sellers.

Timesharing

Timesharing involves the sale of either limited ownership interests in or rights to use and occupy residential apartments or hotel rooms. There are two forms of timesharing, and it is imperative that the appraiser distinguish between them when appraising timeshare projects or analyzing timeshare comparables. In the first form, fee timesharing, the purchaser of a fee timeshare receives a deed that conveys title to a unit for a specific part of a year, thereby limiting the ownership. The purchaser has the right to sell, lease, or bequeath the timeshare. The interest can be mortgaged and title can be recorded. The second form of timesharing, non-fee timesharing, does not convey a legal title in the property. Typically a purchaser receives only the right to use a timeshare unit and related premises.

There are subcategories for both types of timesharing. The two types of fee timesharing are timeshare ownership and interval ownership. In timeshare ownership a purchaser receives a deed to a particular unit as a tenant in common. Each purchaser agrees to use the unit only dur-

timesharing

Limited ownership interests in, or the rights of use and occupancy of, residential apartments or hotel rooms. There are two forms of timesharing: fee timeshares and non-fee timeshares. Fee timeshares may be based on timeshare ownership or interval ownership. There are three types of non-fee timeshares: a prepaid lease arrangement, a vacation license, and a club membership.

ing the time period stipulated in the deed. In interval ownership the ownership period may only last for the duration of the project. At the end of the specified time period, the ownership reverts to the interval owners as tenants in common. They then have the option of selling the property and dividing the proceeds, or continuing as tenants in common and renewing the interval estate. Timeshare owners and interval owners pay operating expenses, including a proportionate share of taxes, insurance, and other costs, and a fee for common area maintenance (CAM) and management. In many projects, 50 one-week intervals are created. The remaining two weeks of each year are reserved for maintenance and major repairs.

The three types of non-fee timesharing are leasehold interest, vacation license, and club membership.[4] The leasehold interest type of timesharing is essentially a prepaid lease arrangement. A vacation license involves the transfer of a license from the developer to the purchaser, giving the latter the right to use a given type of unit for specified time periods over the life of the vacation license contract. In the club membership form of ownership, timeshare patrons purchase membership for a specified number of years in a club that owns, leases, or operates the timeshare property. The purchaser receives the right to use a particular type of unit for a specified period during each year of membership.

4. Under the laws of some states, vacation licenses and club memberships are not considered interests in real estate, but personal property.

Scope of Work

In the valuation process, the identification of the assignment elements leads directly into the determination of the scope of work of an assignment, i.e., the type and extent of research needed to solve an appraisal problem. Professional standards place the responsibility for determining the appropriate scope of work in the appraisal assignment squarely on the shoulders of the appraiser.[1] The scope of work for an assignment is acceptable if it leads to credible assignment results, is consistent with the expectations of parties who are regularly intended users for similar assignments, and is consistent with what the actions of the appraiser's peers would be in the same or a similar assignment.

The practice of developing a scope of work is a bottom-up process: the appraiser starts with the professional appraisal practices that are essential in all assignments and then considers the applicability of the professional standards and practices to the problem at hand. The ideal solution is arrived at not by reducing a standardized procedure to the specific requirements, but rather by building a logical framework for the assignment from the ground up.

In effect, scope of work provides appraisers with flexibility to perform the level of analysis that is appropriate for the needs of a specific appraisal assignment.

scope of work
The type and extent of research and analyses in an assignment.

1. See also Stephanie Coleman, *Scope of Work* (Chicago: Appraisal Institute, 2006).

Scope of Work in Professional Standards

Professional appraisal standards usually provide for the possibility of departure or exception from some portion of the standards when certain conditions are met. Conceptually, scope of work is the opposite of departure, i.e., it focuses on what the appraiser does to solve the appraisal problem rather than what the appraiser does not do.

Relevant references in the Uniform Standards of Professional Appraisal Practice include

- Scope of Work Rule
- Advisory Opinion 22: Scope of Work in Market Value Appraisal Assignments, Real Property
- Advisory Opinion 28: Scope of Work Decision, Performance, and Disclosure
- Advisory Opinion 29: An Acceptable Scope of Work

In the International Valuation Standards, relevant references include

- General Standards: IVS 101 Scope of Work

Standards clearly require consideration and disclosure of the scope of work in any appraisal or appraisal review assignment.

However, with that flexibility comes the responsibility to determine what the appropriate level of analysis is and to communicate that to the client. As a result, ready-made solutions are not necessarily the best. Instead, an appraisal in which an appraiser demonstrates a clear understanding of the problem to be solved for the client and provides the precise amount of analysis and detail desired will likely be seen as the most credible. In fact, the demand from clients for appraisals tailored to their specific informational needs prompted the shift in the profession from a one-size-fits-all process to the current emphasis on a scope of work tailored to the particular assignment. The appraisal profession is likely to follow other professions in increasing the customization of services to meet specific needs in the marketplace, which will make the determination of scope of work more important than ever.

Problem Solving

An appraisal assignment is a problem to be solved. In solving any problem, there are three major steps to the process:

1. Identify the problem.
2. Determine the solution (i.e., scope of work).
3. Apply the solution.

None of the three steps may be omitted, and each must be carried out in this logical order.

Identifying the Problem

The identification of the seven significant assignment elements discussed in the preceding three chapters is, in effect, the process of identifying the appraisal problem. Only after the elements of the assignment are understood can the appraiser move on to the second step, determining the scope of work necessary to solve the problem.

The scope of work for an assignment is acceptable if it leads to credible assignment results, is consistent with the expectations of parties who are regularly intended users for similar assignments, and is consistent with what the actions of the appraiser's peers would be in the same or a similar assignment.

The problems that appraisers are asked to solve can be small or large, simple or complex. For example, in a typical appraisal for residential mortgage lending, the problem is relatively straightforward. The client–the lending institution–needs an opinion of market value from the appraiser as part of the institution's due diligence before approving (or not approving) a home loan. Contrast this with an appraisal of vacant land on the edge of a suburban area recovering from the recent economic downturn that might (or might not) be ready for new development. The client–a property owner–wants to know if developing a new facility is currently feasible (or when it will be feasible). This problem is more complex. More than one opinion of value might be necessary in this case: (1) the current market value of the vacant land and (2) the market value of the improved land at various points in the future (e.g., upon completion of construction and upon stabilization). As a third example, consider an appraisal of an existing office building in a property tax dispute. The property itself might not pose a complex problem, but the intended use of the results of the analysis can complicate the scope of work. The client–the owner of the office building–wants the appraiser to develop an opinion of the market value of the property that the client can compare with the assessed value estimated by the county assessor. The client may even ask the appraiser to testify at a hearing, where the appraiser's analysis and opinion of value could be under the scrutiny of an opposing party.

In the examples above, all the information collected and analyzed in the appraiser's consultation with the client and preliminary investigation of the property characteristics and assignment conditions helps the appraiser answer the questions *who*, *what*, *when*, *where*, and *why*. The appraiser answers the question *how* by determining the scope of work.

Determining the Solution

The scope of work that would solve a particular problem must not only meet the expectations of the client and parties who are regularly intended users of similar assignments, but also must be consistent with the actions of an appraiser's peers in similar situations, according to professional standards. Determining the scope of work that meets the expectations of the client and other intended users fulfills the business needs of both the appraiser and client, i.e., the appraiser is providing the client with the service the client needs. The scope of work that would be acceptable to an appraiser's peers is more of a community standard and is tied directly to the credibility of the appraisal. An understanding of what accepted techniques and data other appraisers would consider as the basis of an appropriate solution to the client's problem is a prerequisite for professional competency.

Figures 8.1, 8.2, and 8.3 illustrate the types of appraisal-related activities involved in assignments along the spectrum from least-intensive

Figure 8.1 Identification of Relevant Real Property Characteristics

Process:	Physical	Legal (e.g., zoning)	Economic (e.g., actual gross income)
Least Intensive	No inspection*	No research*	Obtain from owner*
	Drive-by inspection*	Examine zoning maps*	Read leases
	Exterior inspection with exterior measurements*	Talk to planning/zoning department*	Read leases, verify with management company
Most Intensive	Interior inspection, with exterior measurements	Talk to planning/zoning department, obtain and read zoning ordinance	Read leases, verify with management company and tenants

* Extraordinary assumptions will need to be stated about information taken to be true when it is uncertain.

Source: Stephanie Coleman, *Scope of Work* (Chicago: Appraisal Institute, 2006), 52.

Figure 8.2 Application of the Three Approaches to Value

Process:	Sales Comparison Approach	Income Capitalization Approach	Cost Approach
Least Intensive	Not necessary; omitted	Not necessary; omitted	Not necessary; omitted
	Comparable data from files; no adjustments to comparables in analysis	Comparable rental, expense, and vacancy data from files; capitalization rates from readily available sources	Land valuation via extraction; comparable cost data from readily available sources
	Comparable data from readily available sources confirmed with one or more parties to the transaction; adjustments supportable	Comparable data, including capitalization rates from readily available sources; confirmed with one or more parties to the transaction	Comparable cost data from cost manual but verified
Most Intensive	Thorough search of all available data sources; confirmation with one or more parties to the transaction; adjustments via paired sales analysis	Thorough search of all available data sources; confirmation with one or more parties to the transaction; local vacancy survey	Land valuation via sales comparison method with complete verification of sales information; comparable cost data obtained from local contractors

Source: Stephanie Coleman, *Scope of Work* (Chicago: Appraisal Institute, 2006), 53.

Figure 8.3 Development of Highest and Best Use Opinion (Market Value Appraisals)

Process:	
Least Intensive	Inferred, based on readily observed evidence such as surrounding land uses, age and condition of existing improvements, and known market demand for property type*
	Application of four tests (physically possible, legally permissible, financially feasible, maximally productive) but based on readily observed evidence*
	Application of four tests (physically possible, legally permissible, financially feasible, maximally productive) with research into each factor, testing for feasibility
Most Intensive	Application of four tests (physically possible, legally permissible, financially feasible, maximally productive) with complete market analysis and feasibility study

* Extraordinary assumptions may need to be stated about information taken to be true when it is uncertain.

Source: Stephanie Coleman, *Scope of Work* (Chicago: Appraisal Institute, 2006), 53.

scope of work to most-intensive scope of work. Similar analyses can be performed on any step in the valuation process to help determine the appropriate scope of work for a particular activity.

In the appraisal for a home loan described earlier, the problem was identified as developing an opinion of market value of a residential property for use in a lending institution's due diligence. For this assignment, the scope of work of the application of the sales comparison approach would likely be relatively intensive, with supportable adjustments to recent comparable data providing the most credible evidence of market value. The typical client for this type of assignment might not expect the appraiser to apply the cost approach in this assignment, and the appraiser's peers would likely agree, as long as the reason for omitting the approach is explained in the appraisal report. Similarly, the income capitalization approach would likely be of little relevance in an appraisal of owner-occupied housing. As a result, the scope of work for the cost and income capitalization approaches in this assignment would likely be on the least-intensive side of the spectrum or perhaps omitted altogether as unnecessary.

In the assignment to appraise vacant land, the problem is a feasibility study of potential development on the subject site, with opinions of market value needed at different points along the development timeline. The analysis of market conditions and highest and best use of the subject site would undoubtedly be at the more-intensive end of the spectrum for this assignment. Also, the scope of work would have to incorporate numerous assignment conditions (for example, extraordinary assumptions) that would not be relevant to the appraisal of the home in the previous example. Most significantly, this assignment would call for extraordinary assumptions relating to the completion of construction at a future date and the stabilization of occupancy within the as-yet-unbuilt improvements at some other date in the future. Current and future market conditions to support rent projections and the absorption of new space would likely require significant research and market support to be credible, so the application of the income capitalization approach in this assignment would probably be at the most-intensive end of the scale.

In the appraisal of the existing office building, the problem was identified as a straightforward appraisal of the market value of the subject property with the complication that the client's intended use of the appraisal was for a property tax appeal. To remain an unbiased professional, the appraiser cannot let the nature of the assignment dictate the results. That is, even though the client would want the appraiser's opinion of market value to be a lower amount than the assessed value, the appraiser cannot allow those expectations of the client to influence the analyses and conclusions. In this situation the intended use of the appraisal may legitimately influence the scope of work in certain ways. For example, the scope of work of data collection and verification for an appraisal that may be scrutinized in a potentially contentious hearing might be more intensive than in the assignment to appraise the vacant land. The representatives of the assessor's office would likely use any errors or inconsistencies in the data supporting the appraiser's opinion of value to impugn that testimony. In contrast, the owner of the vacant land is not likely to dispute the accuracy of every adjustment because the intended use of the appraisal is essentially informational, helping the landowner decide on a course of action and manage the risk inherent in development activity.

As another example, suppose the appraiser of the existing office building finds that the aging improvements are in poor condition and thus suffer from significant physical deterioration. In this case, the scope of work of the application of the cost approach would be more intensive than in the appraisal of a newer, better-maintained building because of the importance of supporting estimates of depreciation with market evidence, which can be a difficult process.

Applying the Solution

An appraiser who has determined the scope of work has a plan in place to complete the assignment. However, the initial determination of the scope of work of the assignment may not be what the appraiser must ultimately do to solve the problem. As an appraiser gathers and analyzes data and comes to conclusions, the scope of work necessary to arrive at a solution to the client's problem may change. For example, the market area from which data is collected may need to be expanded if an adequate supply of useful data on comparable sales and leases cannot be found within the original market area that the appraiser studied. In this way, the application of the solution to the problem is an ongoing process of revisiting the scope of work as new information comes to light.

Suppose that the appraiser of the office building researched the property record in the assessor's office and found that the property description listed the office building as having fifteen floors when in fact the building has five floors. The discovery of that simple clerical error may be enough to solve the client's problem, i.e., to demonstrate that the assessor's office has overvalued the property. At this point, the appraiser could continue with the original scope of work of the assignment as agreed upon with the client at the onset, and indeed the client may still want to know the appraiser's opinion of the market value of the property for comparison with the assessor's estimate of value using the correct building size. However, a consultation with the client at this point might resolve the situation. The client benefits from a quicker and possibly less expensive solution to the problem, and the appraiser is no longer committed to a time-consuming assignment and is able to move on to a new assignment, having solved a problem and provided a valuable service.

Just as often, more work than is initially anticipated may be required for an appraisal to be credible. Suppose an appraiser of the vacant land discovers at the time of inspection that the parcel benefits from exquisite views of the ocean, far superior to the views afforded by any other parcel in the area and far superior to what the appraiser expected. The appraiser's scope of work will now need to be expanded to include a careful analysis of the impact of the views on the subject property. The appraiser may need to analyze less recent sales or sales in other areas to properly evaluate the effect on value of the views.

Disclosure of Scope of Work

Appraisers must clearly disclose the scope of work that was applied to develop the opinions and conclusions reported to the client. The disclosure of the scope of work in the appraisal report must be sufficient so that the intended users understand the scope of work that was performed. The scope of work discussion should address the following topic areas:

- the extent to which the property was identified
- the extent to which the property was inspected
- the type and extent of data researched
- the type and extent of analyses applied

The scope of work discussion must address what was done and what was not done if an intended user might expect that a certain component of the valuation process had been performed. If any of the three approaches to value were excluded, their exclusion must be explained. In addition, if one or more persons provided significant real property appraisal assistance but did not sign the report, their contributions must be explained in the appraisal report and noted in the certification.

In the appraisal of the house for lending purposes, the client would most likely expect (and perhaps require) the appraisal report to be submitted on a standardized form like the Uniform Residential Appraisal Report (Form 1004). The appraiser would then have to determine whether the scope of work discussion included on the form provided enough detail to disclose the scope of work necessary to develop a credible appraisal and, if not, supplement the form. The appraisal of the office building would likely need to be communicated in an extensively documented narrative report so that the appraiser would be able to disclose what activities were performed in applying each of the approaches to value.

A separate section of a written report devoted to the scope of work provides the reader of the report with a clear picture of what the appraiser did, but the disclosure of the scope of work can be handled at various relevant points along the way, e.g., disclosure of the scope of work of the application of the sales comparison approach in the section of the report covering that approach. And a combination of these two methods works as well, with a general disclosure of the scope of work in the introductory section of the report and more detailed discussions of scope of work at appropriate points later in the report.

> Avoid "boilerplate" scope of work discussions in appraisal reports. The scope of work should be tailored to the particular assignment.

Data Collection

In real estate appraisal, the quality and quantity of information available for analysis are as important as the methods and techniques used to process the data and complete the assignment. Therefore, the ability to determine the amount and type of data needed to answer the client's question, to distinguish between different kinds of data, to research reliable data sources, and to manage information is essential to effective appraisal practice.

Identifying comparable properties and collecting other market data for use in the valuation process was once a time-consuming and expensive process. The growth of data vendors and the increasing accessibility of market data through electronic sources have shifted the historical emphasis of appraisal practice from data collection to data analysis. Still, collecting accurate, reliable data remains an essential task because the conclusions of the analyses of appraisers are only as good as the data that supports those conclusions.

The process of finding, filtering, and organizing data has been improved exponentially by the Internet and the wide availability of sophisticated information technology. To that end, appraisers need new skills, refined judgment, and improved research techniques to gather and manage information efficiently in the rapidly evolving data universe.

Data Fundamentals

Data is increasingly omnipresent, almost overwhelming. In early 2012, it was estimated that 90% of the world's data had been generated in the preceding two years, with little expectation of the rate slowing. However, data is formatted and cataloged primarily for use by the system that generated it. The challenge for appraisers in the twenty-first century is no longer simply finding data (although in declining or inactive real estate markets, transactional data can still be scarce) and passing that data along to their clients. Rather, filtering and reconciling relevant and meaningful information from the glut of growing sources and using that data to support the conclusions of the appraisal analysis is more important than ever. Today clients are more sophisticated and demand more detailed evidence that the appraiser identified and analyzed the best and most relevant data.

In most appraisal analyses, appraisers will need to gather and examine more than one type of data. The description of the architectural style of the subject property, an appraiser's judgment of the current condition of the improvements, and historical and forecast rent levels of competitive properties in the subject property's market area are all examples of the wide variety of information that appraisers routinely collect. The types of data needed in any appraisal assignment can be as diverse as the many influences on value in the marketplace.

An important distinction can be made between data that is available and applicable to the analysis in enough detail for an appraiser to properly formulate and support an opinion of value and the data provided to a client in a report. Successful analysis depends on the depth, quantity, and quality of the data that an appraiser can synthesize. By contrast, the appraisal reporting process is concerned with communicating the specific conclusions of the analysis to the client. The appraiser makes preliminary decisions about the relevance and usefulness of different types of data in a given assignment as part of the development of the scope of work of the assignment.

Data Collection in the Scope of Work

The scope of work of an appraisal assignment includes consideration of the extent of the data collection process. For a complex assignment, the data collection process may be much more difficult than for a straightforward assignment in which the macro-level data about the market and the micro-level data about the subject and comparable properties are readily available from standard sources.

The data collection process can differ from state to state. Many states have open property records available to appraisers, but others are nondisclosure states where sales data can only be confirmed with the actual parties to the sale. Also, government programs can require different levels of data collection and documentation. For example, certain specific data is required to complete the Uniform Residential Appraisal Report (URAR) for a government-backed loan program.

Before beginning the process of data collection, the appraiser determines which types of data will be needed to answer the client's question about value. Thus, the nature of the data collected is greatly dependent on the scope of the assignment, the property type being appraised, and the market conditions within the market area identified by the appraiser. In the appraisal report, the appraiser communicates the type of data chosen for analysis to the client with the analyses. The appraiser may also communicate what data was *not* chosen for analysis and the reasons for the exclusion of any investigation, information, method, or technique that could be viewed as potentially relevant to the assignment by the client, another intended user, or the appraiser's peers.

Different types of data are useful in the different portions of the valuation process. First, an appraiser may collect macro-level data on the demographics of the market area and competitive supply and demand data on competitive properties to perform market analysis. Then additional data is gathered for highest and best use analysis, which requires micro-level data such as information on the physical characteristics of the subject property, zoning restrictions, and the income anticipated from alternative uses. The analysis undertaken in the application of the three approaches to value generally requires micro-level data on both the subject property, such as cost data for the subject property improvements in the cost approach, and competitive properties, such as information on comparable sales transactions in the sales comparison approach.

Understanding the content and sources of macro-level and micro-level data facilitates data analysis in valuation and consulting assignments. Before analyzing the data, however, an appraiser should organize all the data accumulated in the investigation. Market data grids, like the cost survey worksheet used in the cost approach, the adjustment grid used in the sales comparison approach, and the reconstructed operating statement used in the income capitalization approach, are carefully prepared spreadsheets that provide a tabular representation of market data organized into useful, measurable categories (see Figure 9.1). If the information to be analyzed is complex, the appraiser may need to design several different types of market data grids to isolate and study specific data.

Once the data has been collected and organized, it can be analyzed to solve the problem posed by the appraisal assignment. Market analysis and highest and best use analysis are the most obvious forms of data analysis, but each of the three approaches to value is also a form of analysis that relies on market data gathered through an inferred or fundamental market analysis and presented as support for the value conclusions derived. The validity of each approach's conclusions and, ultimately, the final opinion of market value depend on how well the market data presented supports those conclusions.

In the appraisal report, the analysis must answer the implied question, "Why is this information relevant?" The analysis should tie the

Figure 9.1 Sample Market Data Grids

Sales Adjustment Grid—Subdivision Lot Sales

	Sale 1	Sale 2	Sale 3
Unadjusted price/lot	$65,000	$55,000	$60,000
Property rights conveyed	× 1.00	× 1.00	× 1.00
Intermediate adjusted price	*$65,000*	*$55,000*	*$60,000*
Financing terms	× 1.00	× 0.95	× 1.00
Intermediate adjusted price	*$65,000*	*$52,250*	*$60,000*
Conditions of sale	× 1.00	× 1.10	× 1.00
Intermediate adjusted price	*$65,000*	*$57,475*	*$60,000*
Market conditions (-2%/mo.)	× 0.86	× 0.96	× 0.88
Intermediate adjusted price	*$55,900*	*$55,176*	*$52,800*
Location adjustment	($4,000)	–	–
Average lot size adjustment	($4,000)	–	($4,000)
Lot premiums adjustment	–	–	–
Number of lots adjustment	–	($7,000)	–
Subject by comparison	$47,900	$48,176	$48,800

Reconstructed Operating Statement

	Year 1	Year 2	Year 3	Year 4	Year 5
Potential gross income	$450,000	$463,500	$477,405	$491,727	$506,479
Less vacancy	$33,600	$34,608	$35,646	$36,716	$37,817
Effective gross income	$416,400	$428,892	$441,759	$455,011	$468,662
Less operating expenses	$112,500	$116,156	$119,931	$123,529	$127,544
Net operating income	$303,900	$312,736	$321,828	$331,482	$341,118
Less tenant improvements		$34,000		$80,000	
Less leasing commissions		$40,000		$23,000	
Net cash flow	$303,900	$238,736	$321,828	$228,482	$341,118
Reversion (Year 5)					$3,500,000

economic and financial data to the real estate market in general and to the particular market in which the real estate being appraised is located. For example, if the appraiser's economic data shows that the rate of employment growth is decreasing, then the appraisal report should illustrate how this will affect the market in general and the type of property and individual property being appraised in particular.

Data Sampling

Appraisers rarely have access to all available information for use in their analyses. Even when an appraiser has conducted extensive research, sample information frequently must be used. Therefore, the principles and implications of sampling should be understood.

Appraisers frequently must deal with incomplete information. Research involves the collection of both specific data and sample data for analytical purposes. The data used by appraisers is seldom a random sample. To establish a framework for selecting and drawing a random

How Much Data Is Enough?

Most appraisal assignments begin without full knowledge of how much data is needed. One school of thought would suggest that appraisers collect only as much data as needed to achieve the desired results. Subscribing to this theory requires an appraiser to be clear on that objective. In real estate appraisal, the objective is most commonly credible assignment results, and while appraisers understand the concept, at the beginning of an assignment they can be unclear about what will be needed to achieve that outcome.

Determining the appropriate amount of data for an assignment hinges on the concept of credible assignment results. Professional standards make it clear that credibility is always measured in the context of intended use. For example, the Scope of Work Rule of USPAP requires that an appraiser must "gather and analyze information about those assignment elements that are necessary to properly identify the appraisal, appraisal review, or appraisal consulting problem to be solved." Likewise, Standard 1 requires the appraiser to "correctly complete research and analysis necessary to produce a credible appraisal." Ultimately, the intended use of the assignment results is the key driver for nearly every decision an appraiser will make in the course of the assignment, which includes deciding how much data is enough.

Gathering data is not a one-time event. No one foray into the available sources will satisfy all the data requirements for a typical assignment. In many cases, a certain amount of basic data will be furnished by the client at the beginning of the assignment. Then the appraiser will perform research and gather initial data to form the foundation of the assignment. At this point, the appraiser still may not know where the assignment is ultimately going to lead, so the first round of data acquisition might have the primary benefit of informing subsequent research.

Appraisers should pause to assess the results of their research as they move from one round of research to another so they can understand the strengths and weaknesses of the data already in hand. At each phase of data research, appraisers should be asking questions such as

- What decisions are we trying to make with the data?
- What is the minimum amount of data needed to support those decisions?
- How much uncertainty in the resulting analysis of that data is acceptable?
- How much might the addition of one or two data points to an existing population of data change the results?

The more precision required in the analysis, the more likely that additional data will result in more reliable results. To make inferences about trends and patterns from data, it is almost always best to use the largest populations of data that can be assembled practically. However, an appraiser needs to balance the amount of work required to acquire additional data with the probable benefit to the analysis of that data.

The ultimate determination of how much data is enough becomes self-evident when an appraiser concludes an assignment with the confidence that the client, intended users of the assignment results, and the appraiser's peers will view the work as competently and professionally prepared and worthy of belief.

How Often Does Data Need to Be Updated?

General data, including information on population trends, employment figures, vacancy factors, certain replacement cost figures, and financing availability, typically does not fluctuate rapidly, so updating these items on an assignment-by-assignment basis is not required. However, specific data—i.e., data relevant only to the assignment at hand—may need to be verified when the assignment is accepted and verified again when the appraisal report is delivered to the client.

sampling, strict requirements must be met. More often, appraisers deal with judgment samples, i.e., sample data that is selected on the basis of personal judgment and is thought to constitute a representative group. While certain statistical tests used with random samples cannot be applied to judgment samples, in many circumstances judgment samples can produce superior results. For example, data selected from five shopping centers by an experienced analyst may be more comparable to the subject shopping center than a random sampling of data from a broader array of shopping centers.

The use of sample data has both strengths and weaknesses:

Strengths	Weaknesses
· Samples are generally less expensive and more readily obtained than complete data. · Selected samples are sometimes more indicative than a broader survey. · Samples are easily tabulated, lend themselves to cross-referencing, and provide a foundation for statistical inference, including probability studies. · Often samples may be the only source of data available.	· Sampling must be conducted carefully and the data must be properly interpreted. If not, the results can be inaccurate and misleading, cost more than they are worth, and be less reliable than they appear. · Sampling requires special training and understanding. Many people misunderstand or mistrust samples for a variety of reasons.

Whether or not the appraiser conducts formal sampling, the extent to which sample data has been used should be considered in the analytical process. The risks associated with identified sample data and the uncertainties associated with other potential data must be considered.

Data samples may be particularly important when other data is scarce or when the available data is less applicable due to market changes. Sampling may be the only way to obtain some types of data. Samples are particularly important in

- quantifying market demand
- defining market characteristics
- identifying market attitudes, perceptions, and motivations
- analyzing market behavior
- interpreting market activities and intentions

Data Standards

As a rule, good quality data makes good analysis possible. The availability of standardized data makes more robust analysis possible and enhances research opportunities in a data-rich real estate environment. Data standards are essential for sharing quality data and ensuring that the data can be put to various uses by the many users of data within the broader real estate community. Furthermore, mundane tasks relating to the standardization of data sets are easily handled using the XML format that has become a de facto Internet standard for passing data between systems. After industry standards organizations agree on semantic definitions and policies for their application, XML allows those definitions to become a common representation of the same data from different systems.

The standardization of property and transaction data across heterogeneous real estate markets and their respective information systems has lagged behind the implementation of data standards in many other industries. In recent years, the clients of appraisers have spearheaded the movement toward uniform data standards by demanding more consistency, efficiency, and transparency within the appraisal process. For example, in 2011 residential appraisers had to adapt to the new, standardized reporting requirements of the Uniform Appraisal Dataset (UAD), which was introduced for use in appraisals performed for conventional mortgage loans that will be sold to government-sponsored enterprises (GSEs) such as Fannie Mae and Freddie Mac.

Although the GSEs have had long-established appraisal policies and requirements, the responsibility for ensuring compliance rested almost entirely with the loan seller (i.e., the lender). Upon delivery of a mortgage loan to either GSE, the lender "represented and warranted" to Fannie Mae or Freddie Mac that the lender had manufactured the loan in accordance with the respective GSE's requirements. However, almost no information about the collateral for that loan was transmitted–only the borrower name, property address, and loan-to-value ratio were delivered with the loan package. Under the "rep and warrant" model, if the loan subsequently went into default, Fannie Mae or Freddie Mac would then receive access to the full loan file for investigation. If it was determined at that point that the appraisal was faulty, the lender might be forced to buy back the loan from Fannie Mae or Freddie Mac and undertake the foreclosure process itself. In effect, the GSEs did not have access to any appraisal data at loan origination, and they only received appraisal data on defaulted loans.

Following the housing crisis in 2007, Fannie Mae began developing a new electronic appraisal delivery system that would require lenders to deliver the entire appraisal report in electronic form to Fannie Mae before the loan could be sold. When the Federal Housing Finance Agency became the conservator to both Fannie Mae and Freddie Mac, a larger data standards initiative for both GSEs was developed that led to the implementation of the Uniform Collateral Data Portal and the UAD requirements.

It is important to note that two major standards groups have been involved in the development and dissemination of broader appraisal data standards predating the lending crisis that spurred the implementation of the UAD:

- the Mortgage Industry Standards Maintenance Organization (MISMO)
- the Open Standards Consortium for Real Estate (OSCRE)

The mortgage industry, an important driver in the broader real estate industry, has been working toward data standardization through the Mortgage Industry Standards Maintenance Organization, formed in 1999 as a nonprofit subsidiary of the Mortgage Bankers Association. In late 2009, the GSEs selected the MISMO version 2.6 Valuation Response XML format as the basis for the UAD. The Open Standards Consortium for Real Estate brings together data standards from every sector of real estate. OSCRE is different from MISMO in that MISMO's core focus is data standards specific to mortgage-related and real property reporting information, whereas OSCRE goes beyond data standards into business process standards. MISMO and OSCRE are working to establish common data terms so that, throughout the life cycle of a building, all parties are able to use terms consistently.

The implementation of data standards and the evolution of tools for organizing and analyzing property and transaction data are likely to become more important as the appraisal profession moves into global markets.

Types of Data Used in Real Estate Appraisal

Macro-Level Data

An appraiser working in a specific market on a daily basis will often have general data on file. Macro-level data consists of information about the social, economic, governmental, and environmental forces that affect property value. This information is part of the background knowledge that appraisers bring to their assignments. All macro-level data is ultimately understood in terms of how it affects the economic climate in which real property transactions occur. Macro-level data is most frequently used in the analysis of a region or city and to a lesser degree in the analysis of a smaller market area. In analyzing macro-level data, appraisers observe the operation of appraisal principles by studying the interaction of the four forces that affect an area's property values. Although the four forces provide convenient categories for examining macro-level data, it is the interaction of those forces that creates trends and ultimately influences property value.

Economic Trends

Appraisers must recognize and understand the economic trends that affect the value of real property. It is not enough to know that economic changes have occurred. The probable direction, extent, impact, and cause of these changes must also be studied to identify and forecast trends.

The particular trends considered by an appraiser vary with the appraisal problem and the type of real estate being appraised. (Table 9.1 lists useful economic indicators appraisers often track to analyze trends in the marketplace.) For example, to develop an opinion of the market value of a shopping center with the income capitalization approach to value, the appraiser must forecast the base rent and overage rent under a percentage lease.[1] The shopping center's total potential gross income depends on trends in the number of households in the trade area, the income of these households, and their typical expenditures on the goods and services supplied by the center's tenants. The availability of alternative shopping facilities in competitive markets also must be considered.

The national economy reflects the economic condition of the various geographic regions of the United States. The economic health of a region depends on the status of its economic activity, which in turn

1. See Chapter 21 for the definitions of *percentage lease*, *base rent*, and *overage rent*.

Table 9.1 Economic Trends and Useful Economic Indicators

Trends	Useful Economic Indicators
International economic trends	Changes in: · balance of foreign trade · rates of foreign exchange · commodity price levels · wage levels · interest rates · industrial production levels · volume of retail sales
National and regional economic trends	Changes in: · gross national product · gross domestic product · national income · the balance of payments to other nations · price level indexes · interest rates · aggregate employment and unemployment statistics · the number of housing starts and building permits issued · the dollar volume of construction · other macro-level data Note: A time series of economic indicators, which describes and measures changes or movements over a period of time, may reveal fluctuations in long-term trends and help put current statistics in perspective—i.e., help determine the current position of the economic cycle.
Local economic trends	Changes in: · population · net household formation · the diversity of the economic base of the community · the level and stability of employment · wage rates · household or family income
Economic trends affecting rural land	Changes in: · size and complexity of business operations in farming, ranching, timber-harvesting, drilling, or mining · level of mechanization or labor-intensiveness · degree of dependence on government subsidies or government-leased lands · prospective competition from imports

encompasses the economic activities in individual areas and communities within the region's geographic boundaries. Minor disruptions in the economic growth of one community may not appreciably affect the entire region if the regional and national economies are strong.

The extent to which an appraiser is concerned with the national or regional economy and the economy of the city or market area depends on the size and type of property being appraised. For example, a large regional shopping center that serves a trade area of 500,000 people and an automobile assembly plant that employs 5,000 workers may be more sensitive to the general state of the economy than are medical-dental office buildings or retail service operations in suburban residential areas.

In the global economy, the economic well-being of one nation may directly and indirectly affect other nations. There is much foreign investment in US real estate, partly because the stability of the US government gives foreign investors some measure of protection. As a result, political instability in other countries can influence the demand for, and value of, real estate in the United States.

International economic trends can have significant effects on local economies and specific real estate markets. For example, the status of the Asian economy can affect the level of international trade, which in turn has a major impact on the economy of Pacific Rim port cities (and perhaps the demand for warehouse space). Increasingly, trends in international financing can influence local real estate markets as well. In the 1980s, using financing techniques unavailable to American investors, Japanese investors could pay inflated prices for prestigious properties in Hawaii and California, including most of the luxury hotel rooms in Hawaii. At the time, real estate appraisers in Hawaii had to provide two different values reflecting the influence of Japanese investment practices (often without the benefit of a pro forma statement, lease analysis, or market study) and traditional US lending practices. The collapse of the Japanese economy, due in part to bad loans made by Japanese banks, eventually caused prices in the Hawaiian real estate market to plunge, with Japanese investors losing billions of dollars on their investments.

The state of the national economy is basic to any real estate appraisal. Financial institutions must compete for funds to lend, not only with one another but also with money market mutual funds. Lending rates reflect this ongoing competition, and demand in the market adjusts itself accordingly.

Federal programs and tax policies can affect the value of real estate. The Tax Reform Act of 1986 eliminated many of the tax advantages of owning property by modifying the Accelerated Cost Recovery System, which often allowed a property to contribute more value as a tax shelter than as an operating business. Along with modification of Section 1031 of the Internal Revenue Code in 1984, the Tax Reform Act encouraged "like-kind" exchanges.[2] The 1031 exchange program allows a property owner to defer capital gains taxes if real property is exchanged for other real property, within certain limitations as defined in the code. The sale price of a comparable property involved in a 1031 exchange may have to be adjusted to reflect the tax savings of that transaction as compared to a traditional sale.

To understand how national and even international economic trends influence property value, an appraiser studies how the region and com-

2. See also Jack P. Friedman and Jack C. Harris, "Tax Reform Encourages 1031 Exchanges: What the Appraiser Should Know About Section 1031," *The Appraisal Journal* (January 1987): 79-93, and Joel Rosenfeld, "Section 1031—Tax-Deferred Exchanges: Real Estate's Best-Kept Secret for Tax Relief," *Real Estate Issues* (Winter 2000/2001): 12-16.

munity where the subject property is located may respond to these trends. The appraiser should examine the economic structure of the region and the community, the comparative advantages that each possesses, and the attitudes of local government and residents toward growth and change. For example, the increasing number of elderly households in the United States is less significant to property values in Minnesota than to values in Sunbelt states, which attract more retirees. A community with a no-growth policy may have substantially different local demographics and economic potential than one that does not discourage growth.

Regional economies influence local market conditions, but local markets do not necessarily parallel regional markets. Macroeconomic studies, which are concerned with broad areas such as cities and regions, are important to understanding real estate and real estate trends. These studies should not be confused with microeconomic studies, which appraisers perform to evaluate the factors influencing the market value of a particular real estate parcel. For example, regional trends may suggest an expected increase in population, but the local data available to the appraiser may indicate that the particular area will not benefit from this trend. While both studies are important, local trends are more likely to influence property values directly.

Appraisers of rural land should understand the links between the local rural economy, the regional economic base (agricultural, extractive, or recreational), and the national economy as well as the encroachment of suburban and urban land uses on rural land. The subject property should be analyzed in relation to comparable properties in the immediate agricultural, mining/drilling, or recreational district.

Climatic data can be important in analyzing many rural land uses. A drought in a grain-producing area or icy conditions in a citrus-growing region can have economic repercussions beyond disrupting local agricultural production. Tourism and recreational uses of rural land may be affected by the severe weather, and restaurants and hotels in the region may be forced to raise prices to keep up with the rising cost of food.[3]

Demographics

The population of a market and its geographic distribution are basic determinants of the need for real estate. Real estate improvements are provided in response to the demand generated by a population with effective purchasing power. A household–i.e., persons who occupy a group of rooms or a single room that constitutes one housing unit–imposes a basic demand for housing units. In analyzing a local housing market, knowledge of trends in the formation of households and household characteristics is crucial. The age, size, income, and other characteristics of households must be considered to determine the demand for housing.

household

A number of related or unrelated persons who live in one housing unit; all the persons occupying a group of rooms or a single room that constitutes one housing unit. A single person, a couple, or more than one family living in a single housing unit may make up a household.

3. For further discussion of trends affecting rural property, see *The Appraisal of Rural Property*, 2nd ed. (Denver and Chicago: American Society of Farm Managers and Rural Appraisers and Appraisal Institute, 2000).

Two demographic categories generate demand for two different types of space:

1. Households generate demand for space designed to fulfill basic human needs such as the need for housing and retail and medical services.
2. Employment generates demand for warehouse, industrial, office, and retail space used in producing goods and services.

Often households and employees generate demand for the same type of space, such as medical research and development space.

The demand for commercial and industrial real estate is created by a population's demand for the goods and services to be produced or distributed at these sites. Appraisers must be aware of changes in the characteristics and distribution of the population that consumes goods and services as well as changes in the work force that produces them. A changing population, coupled with technological advances, can rapidly alter the demand for the services provided by property, which can affect property value. (See Chapter 15 for more discussion of economic base analysis and how appraisers use employment data in estimating supply and demand.)

Government Regulations

To develop an opinion of value properly, the appraiser should understand the government regulations and actions that affect the subject property. The comparable properties selected for analysis should be similar to the subject property in terms of zoning and other characteristics.

In response to social attitudes, the government establishes land use regulations and provides public services such as transportation systems and municipal utilities. Information on zoning, master plans, environmental impacts, transportation systems, local annexation policies, and other regulations reveals governmental and social attitudes toward real estate.

Trends in Building Activity

A property's value as of a specific date may rise or fall due to fluctuations in building activity. Housing starts and the construction of commercial and industrial properties fluctuate in response to business cycles, political events, and the cost and availability of financing. These fluctuations follow the long-term trend of new construction. Short-term fluctuations result in temporary misallocations of supply, which can depress rents and prices.

The standing stock of housing units at any point in time consists of all units, occupied and vacant. The stock is continually altered by the construction or conversion of units in response to developers' perceptions of the demand for new housing and by the need to replace existing units.

Many months or even several years may pass between the time a developer decides to supply units and the time those units enter the market. During this period, changing conditions may reduce demand, and the units coming on the market may remain unrented and unsold, thus increasing vacancy rates. Developers may continue to produce additional units for some time, even in the face of rising vacancies. Once these excess units are produced, they remain on the market and can depress rents or prices until demand increases to remove the surplus. When the market tightens, the supply of units lags behind the increase in demand, resulting in abnormally low vacancy rates and upward pressure on rents and prices. Ultimately, supply increases as developers respond to increased demand.

Fluctuations in the local supply of and demand for real estate (i.e., the life cycle of the market area) are influenced by regional and national conditions. Therefore, an appraiser looks for regional and national trends that may indicate a positive or negative change in property values at the local level. Although all regions may not experience the same slump in construction, tight monetary policy affects the cost and availability of mortgage credit and exerts a moderating influence on supply, even in a rapidly growing region.

Commercial real estate is affected by business conditions and the cost and availability of financing. Because business firms pass their high financing costs on to consumers, residential construction may be restricted. If the demand for the goods and services produced or supplied by a business remains strong, the firm can raise prices and continue to expand even when credit is tight and interest rates are high.

Building Costs

The cost of replacing a building tends to follow the general price levels established over a long period, but these price levels vary from time to time and from place to place. Building costs generally decline or stabilize in periods of deflation and increase in periods of inflation. These costs are affected by material and labor costs, construction technology, architect and legal fees, financing costs, building codes, and public regulations such as zoning ordinances, environmental requirements, and subdivision regulations.

Construction costs can alter the quantity and character of demand and, therefore, the relative prices of property in real estate submarkets. The high cost of new buildings increases the demand for, and prices of, existing structures. When the cost of new structures increases, rehabilitation of existing buildings may become economically feasible. High building costs increase prices in single-unit residential submarkets, which can increase the demand for rental units and their prices. The size and quality of the dwelling units demanded decrease when building costs increase more rapidly than purchasing power.

Cost services such as Marshall & Swift/Boeckh, RS Means, and others are the primary sources of information on building costs. Appraisers can also collect information on building costs from properties that have been developed in a market area. (Chapter 28 covers building cost estimates in more detail.) Primary data collected by an appraiser qualifies as micro-level data about a property rather than macro-level data about the market.

Taxes

Real estate taxes are levied by municipalities (cities, townships, or counties) and taxing districts (i.e., school, fire, water, and local improvement districts). The taxing body reviews the annual budget to determine the amount of money that needs to be raised. After revenues from other sources (such as sales or income taxes, state or federal revenue sharing, and interest on investments) are deducted, the remaining funds must come from property taxes. Assessing officers estimate the value of each parcel of real estate in the jurisdiction periodically. Real estate taxes are based on the assessed value of real property, hence the term *ad valorem* ("according to value") *taxes*. The assessed value of property is normally based on, but not necessarily equivalent to, its market value. The objective of tax assessment is the equitable distribution of the tax burden based on real property value, but tax assessors do not attempt to develop opinions of value for specific parcels of property for use outside of ad valorem taxation.

The ratio of assessed value to market value is called the *common level ratio* or *assessment ratio*. (The *millage rate* refers to the taxes as a percentage of assessed value.) If, for example, the tax rate is \$60 per \$1,000 of assessed value and the assessment ratio is 50%, then the annual real estate tax (or effective tax rate) equals 3% of market value:

$$\$60/\$1{,}000 \times 50\% = 3\%$$

If assessed value is not based on market value, the formula is modified to reflect the difference. An effective tax rate can also be calculated by dividing the total amount of taxes by the market value of the property. Effective tax rates can be used to compare the tax burden on properties.

In jurisdictions where ad valorem real estate tax assessments have an established or implied relationship to market value, appraisal services may be required to resolve tax appeals. In some communities, the trend in real estate taxes is an important consideration. In cities where public expenditures for schools and municipal services have increased, a heavy tax burden can cause real estate values to decline. Under these circumstances, new construction may be discouraged. There may be several tax districts in a metropolitan area, each with a different policy. Understanding the system of ad valorem taxation in an area facilitates the appraiser's analysis of how taxes affect value.

Different levels of sales taxes, personal property taxes, and taxes on earnings can also affect the relative desirability of properties. Although these taxes may be uniform within a state, properties in different states often compete with one another. To attract new residents and industries, a state may impose taxes that are lower than those of surrounding states. This may increase demand and enhance property values in the state relative to values in bordering states. For example, consider two adjacent states competing for the location of a commercial printing operation. The printing company owns machinery and equipment worth millions of dollars that may be taxed as personal property rather than real property, which is more often the case for industrial operations than for commercial operations. The state that does not have a personal property tax would be a more attractive location than the state that levies a personal property tax.

Financing

The cost of financing includes the interest rate and any points, discounts, equity participations, or other charges that the lender requires to increase the effective yield on the loan. Financing depends on the borrower's ability to qualify for a loan, which may be determined based on the loan-to-value ratio, the housing expense-to-income ratio allowed for loans on single-unit homes, and the debt coverage and break-even ratios required for loans on income-producing properties. (These ratios are discussed in Chapter 23.) The cost and availability of financing typically have an inverse relationship. High interest rates and other costs usually result in a decrease in the demand for credit and the number of borrowers able to qualify.

The cost and availability of credit for real estate financing influence both the quantity and quality of the real estate demanded and supplied. When interest rates are high or mortgage funds are limited, households that would have been in the home ownership market find that their incomes cannot support the required expenses. Purchases are delayed and smaller homes with fewer amenities are bought. The cost of financing for land development and construction is reflected in the higher prices asked for new single-unit homes, and higher prices reduce the quantity of homes demanded.

The rental market is affected by the demand pressure of households that continue to rent and by the high cost of supplying new units, which results in part from financing costs. Occupancy rates and rents rise. Businesses try to pass on their higher occupancy costs to customers by increasing the prices of their products or services. If they cannot fully recover the increased occupancy cost, the value of these properties will decline or the quantity of commercial and individual space supplied will be reduced.

Micro-Level Data

Micro-level data includes details about the property being appraised and comparable sales and rental properties as well as local market characteristics relevant to the analysis of the subject property. In appraisals this data is used to determine highest and best use and to make the specific comparisons and analyses required to develop an opinion of value. The micro-level data about a subject property provided in land and building descriptions helps the appraiser select other micro-level data pertaining to comparable sales, rentals, construction costs, and specific characteristics of the local market that influence the value of the subject and comparable properties.

At the conclusion of the analysis of macro-level data, appraisers need to clearly spell out what this data and analysis means or implies for the specific market and property being valued. The same process is used in gathering comparable sales data, analyzing the data, and indicating what it means in relation to an opinion of value for the subject property. From relevant comparable sales, an appraiser extracts specific sale prices, rental terms, income and expense figures, rates of return on investment, construction costs, estimates of the economic life of improvements, and rates of depreciation. These figures are used in calculations that lead to an indication of value for the subject property.

An appraiser needs micro-level data to develop each of the three approaches to value. The appraiser uses the data to derive adjustments for value-influencing property characteristics, to isolate meaningful units of comparison, to develop capitalization rates, and to measure depreciation. By extracting relevant data from the largest quantity of data available, an appraiser develops a sense of the market. This perception is an essential component of appraisal judgment, which is applied in the valuation process and in the final reconciliation of value indications.

Micro-level data is analyzed through comparison. In each approach to value, certain items of information must be extracted from market data to make comparisons. Micro-level data is studied to determine if these items are present or absent and if they can be used to make reliable comparisons with the subject property. This sort of data can include information about properties that have sold as well as properties that have not sold or are under contract for sale but have not yet closed. If, for example, the subject property is an apartment building, an appraiser could use sales of other apartment buildings to support adjustments for changes in market condition, locational differences, or the contribution of various physical characteristics. Apartment buildings that have not sold can also be used to obtain information on rental rates and expenses.

An appraiser's analysis of the highest and best use of the land as though vacant and the property as improved determines what comparable micro-level data is collected and analyzed. The comparable properties should have the same highest and best use as the subject property. The nature and amount of research needed for a specific assignment depend on the property type, the purpose of the appraisal, and the complexity of the required analysis–in other words, the scope of work of the assignment.

Of particular significance to the analysis are the supply of competitive properties, the future demand for the property being appraised, and its highest and best use. After inspecting the subject property and gathering property-specific data, appraisers inventory the supply of properties that constitute the major competition for the subject property in its defined market.

Competitive Supply Inventory

The supply inventory includes all competitive properties:

- rental units
- properties that have been sold
- properties being offered for sale
- properties under construction
- proposed properties

The subject property will also have to be able to compete in a future market. Therefore, the appraiser's investigation must cover not only existing competition but also prospective projects that will compete with the subject.

Measures of Demand

Along with the supply inventory of major competitive properties, appraisers analyze the prospective demand for the subject property. An appraiser cannot assume the current use is necessarily the use for which the most demand will exist in the future. Even in the most stable markets, subtle shifts in the market appeal or utility of a category of properties can put some properties at a competitive disadvantage and benefit others. Even in volatile markets characterized by rapid changes due to factors such as accelerating growth, precipitous decline, or an upturn in proposed construction, appraisers need to quantify demand in some manner.

The specific techniques applied to study market demand can be highly sophisticated and may fall outside the scope of normal appraisal practice. In some cases the appraiser might use data compiled by special market research firms (proprietary data) to supplement the appraisal. All appraisers should, however, develop an understanding of market research techniques and acquire the skills needed to conduct basic demand studies. (For further discussion of market research and analysis techniques, see Chapter 15.) Of course, the data included in an appraisal report should be directly relevant to the property being appraised and the market in which the property competes. One common error appraisers make is to include irrelevant data in the report and leave out relevant information. For example, a client would be understandably annoyed with a report prepared to value an apartment property that includes a detailed market analysis of retail and office properties but only a cursory analysis of the market for apartment properties. Similarly, a single-tenant, owner-occupied property should not be valued using multitenant comparable properties. Great care should be exercised when importing data into a report from the workfile of a previous assignment to make sure that the imported information is relevant to the current assignment.

Data Sources and Verification

While many sources for macro- and micro-level data remain largely unchanged, the manner in which appraisers go about gathering and organizing data has been transformed by the digital age. The time and effort appraisers once spent locating property and transaction data and managing that data in various formats is now more often devoted to ordering data and eliminating unnecessary or irrelevant data from the readily accessible pools. In many ways, the current availability of certain data poses a greater challenge and requires sharper skills than the skills required to find similar data prior

> The terms of use stipulated by data sources may vary, so appraisers should be aware of any limitations a specific vendor may place on the use of data. Likewise, appraisers who purchase data should be aware of any disclaimers related to the accuracy of the data and responsibility for errors resulting from the use of the data.

to the Internet. Finding relevant data in small data sets is considerably easier than eliminating irrelevant data from seemingly endless data sets.

Computing power has also been growing at exponential rates. Software solutions and computers powerful enough to run them were previously only available to major companies with big budgets, but now they are affordable and ubiquitous. Organizing, summarizing, and describing large quantities of data is required to remain competitive in the current marketplace, and fortunately the tools needed are available, affordable, and relatively easy to use.

Sources of Macro-Level Data

The macro-level data needed to appraise real property is available from a wide variety of sources. A substantial amount of information is compiled and disseminated by federal, state, and local agencies. Trade associations and private business enterprises may also provide data. Table 9.2 lists some common sources of macro-level data.

Macro-level data is an integral part of an appraiser's office files. Data obtained from various sources can be cataloged and cross-indexed. Macro-level data such as multiple listing information and census data can be accessed by computer. Many local and regional planning and development agencies computerize the following information by geographic area:

- housing inventory and vacancies
- demolitions and conversions
- commercial construction
- household incomes
- new land use by zoning classification
- population and demographics
- housing forecasts

In recent years, many databases have been developed for online access to information. Such databases cover a broad range of topics and offer many options to appraisers performing general or specialized research. The information available is virtually unlimited and includes topics such as

- current and historical news
- industry analyses and reports
- corporate earnings and analyses
- local, regional, and national Yellow Pages listings
- publication indexes and articles

> Sources of macro-level data include federal government publications, state and local government offices, trade associations, and private research firms.

Developments in computer software and hardware have resulted in low-cost, high-performance database combinations for appraisers. Some databases are contained in a single computer, while others are shared by several computers through local networks or are stored in and accessed through cloud storage services (i.e., virtual data storage space usually through a third

Table 9.2 Commonly Used Sources of Macro-Level Data

Council of Economic Advisors	
Publications	*The Economic Report of the President*
	Economic Indicators (monthly publication prepared for the Joint Economic Committee)
Information Available	Data and analysis of housing starts and financing
	Information on
	· total output, income, and spending
	· employment, unemployment, and wages
	· production and business activity
	· prices
	· money, credit, and security markets
	· federal finance
	· international statistics
Where To Find It	http://www.whitehouse.gov/administration/eop/cea/economic-report-of-the-President
	http://www.whitehouse.gov/administration/eop/cea
Federal Reserve Board	
Publications	*The Federal Reserve Bulletin*
	Historical Chart Book
Information Available	Information on
	· gross national product
	· gross domestic product
	· national income
	· mortgage markets
	· interest rates
	· installment credit
	· sources of funds
	· business activity
	· the labor force, employment, and industrial production
	· housing and construction
	· international finance
Where To Find It	www.federalreserve.gov/publications.htm
National Vital Statistics System	
Publications	*Vital Statistics of the United States*
	National Vital Statistics Reports (formerly the *Monthly Vital Statistics Report*)
Information Available	Statistics on birth and death rates
Where To Find It	www.cdc.gov/nchs/nvss.htm
US Department of Commerce, Bureau of the Census	
Publications	*Census of Population*
	Census of Housing
	Census of Manufacturers
	Census of Agriculture
	American Housing Survey
	Economic Census
	Statistical Abstract of the United States
Information Available	· Current population
	· Population estimates
	· Population projections
	· Consumer income
	· Housing completions
	· Housing permits
	· Other housing statistics
	· Operational and performance data for American businesses
Where To Find It	www.census.gov/prod/www/titles.html
	www.business.census.gov

Table 9.2 Commonly Used Sources of Macro-Level Data *(continued)*

US Department of Commerce, Bureau of Economic Analysis	
Publication	*Survey of Current Business*
Information Available	· Consumer Price Index · Wholesale price index · Data on mortgage debt · Value of new construction
Where To Find It	www.bea.gov/scb/index.htm
US Department of Housing and Urban Development	
Publications	*American Housing Survey* *The State of the Cities* *FHA Outlook*
Information Available	· Reports on FHA building starts, financing, and housing programs administered by the department · Also FHA vacancy surveys for selected metropolitan areas
Where To Find It	www.hud.gov
US Department of Labor, Bureau of Labor Statistics	
Publication	*Monthly Labor Review*
Information Available	· Consumer Price Index · Wholesale prices · Monthly and annual employment and earnings figures
Where To Find It	http://stats.bls.gov/opub/mlr/mlrhome.htm
State and local departments of development, local and regional planning agencies, the state demographer, and regional or metropolitan transportation authorities	
Publications	Often these agencies publish directories of manufacturers that list, by county, the names of firms, their products, and their employment figures as well as other reports.
Information Available	Information on · population · households · employment · master plans · present and future utility · transportation systems
Where To Find It	Use online search engines to search for relevant terms such as "economic development," formal names of various local agencies, or national associations of applicable agencies such as the National Association of Regional Councils (www.narc.org) and the Association of Metropolitan Planning Organizations (www.ampo.org).
State bureaus of employment service or state bureaus of labor	
Publications	Research reports on various topics, e.g., Market Analysis of Key Workforce Trends (published by the Ohio Bureau of Labor Market Information) and Pennsylvania Labor Force (published by the Pennsylvania Center for Workforce Information and Analysis)
Information Available	County data on · employment · unemployment · wage rates
Where To Find It	Use online search engines to search for relevant terms such as "economic development" or formal names of state bureau of employment or labor.
Local Councils of Governments (COGs) and Metropolitan Planning Organizations (MPOs)	
Information Available	Statistical analyses, real estate reports, economic data, and free GIS data
Where To Find It	The National Association of Regional Councils (www.narc.org) compiles an extensive list of COGs and MPOs by state in the organization's online resource center.

Table 9.2 Commonly Used Sources of Macro-Level Data *(continued)*

Chambers of commerce	
Publications	Publications related to local business and demographics, e.g., the *Monthly Economic Indicators* report (published by The Austin Chamber of Commerce) and Washington Manufacturers Register (published by the Greater Seattle Chamber of Commerce)
Information Available	Information, often obtained from secondary sources such as the census, on · local population · households · employment · industry
Where To Find It	Use online search engines to search for relevant terms such as "population statistics" or formal names of local chamber. Also, see: http://www.uschamber.com/chambers/directory
Real estate associations such as American Real Estate Society (ARES), American Society of Appraisers (ASA), American Society of Farm Managers and Rural Appraisers (ASFMRA), Appraisal Institute, Building Owners and Managers Association (BOMA), Counselors of Real Estate, International Association of Assessing Officers (IAAO), Mortgage Bankers Association of America (MBA), National Association of Realtors and its affiliates, and Urban Land Institute (ULI)	
Publications	Many publications with data useful to appraisers · *Journal of Real Estate Research* · *Valuation* · *Real Estate Value Cycles* · *BOMA International/Cushman & Wakefield Market Intelligence Report* · *BOMA Experience Exchange Report* · *Real Estate Issues* · *Assessment Journal* · *Ratio Study Practices* · *The National Association of Realtors Commercial Real Estate Quarterly* · *National Real Estate Review: Market Conditions Report*
Information Available	Information on · national and regional economic indicators · existing home sales for the nation as a whole and for individual regions · office vacancy rates
Where To Find It	www.aresnet.org www.appraisers.org www.asfmra.com www.appraisalinstitute.org www.boma.org www.cre.org www.iaao.org www.mbaa.org www.realtor.org www.houselogic.com www.uli.org
National Association of Homebuilders	
Publications	*Sales and Marketing Management Magazine* *Survey of Buying Power*
Information Available	Information, by county and for selected cities, on · new housing starts · prices · construction costs · financing · households · income distribution · retail sales
Where To Find It	www.nahb.com

Table 9.2 Commonly Used Sources of Macro-Level Data *(continued)*

Private sources such as banks, utility companies, university research centers, private advisory firms, multiple listing services, and cost data services	
Publications	White papers and research reports
Information Available	Information on · bank debt · department store sales · employment indicators · land prices · corporate business indicators · mortgage money costs · wage rates · construction costs · deeds · mortgage recordings · installation of utility meters
Where To Find It	Utilities · www.utilityconnection.com University research centers · http://robinson.gsu.edu/realestate/index.html · www.lincolninst.edu/aboutlincoln/index.asp · http://bus.wisc.edu/knowledge-expertise/academic-departments/real-estate

party). Ongoing improvements in telecommunication programs and facilities, word processing, and electronic spreadsheets have facilitated appraisal analysis and report writing as has convenient, stable, and secure access to database information.

Sources of Micro-Level Data

Like sources of macro-level data, sources of micro-level data are diverse. Real property appraisal assignments almost invariably begin with a Web search (e.g., using Google, Bing, Yahoo, or another search engine) for the subject property by address, tax parcel number, or building name, if applicable. The advent of single-property websites for residential and commercial real estate marketing and building websites directed at tenants and the communities served by the building's tenants can by themselves provide a tremendous amount of micro-level data. These sites are useful places to launch a larger search for micro-level data.

> Sources of micro-level data include public records (e.g., deeds, recorded leases), newspapers (e.g., advertised sale prices and rentals), multiple listing services, cost-estimating manuals, and market participants such as brokers, lenders, contractors, owners, and tenants.

In addition to the data obtained from public records and published sources, personal contact with developers, builders, brokers, financial and legal specialists, property managers, local planners, and other real estate professionals can provide useful information. Practicing appraisers need communication skills as well as analytical techniques to research sales, improvement costs, and income and expense data thoroughly in performing appraisal assignments. Table 9.3 lists some commonly used sources of micro-level data.

Table 9.3 **Sources of Micro-Level Data**

CBRE, Inc. www.cbre.com	Corporate real estate services site with listing information as well as local market research reports.
Colliers International www.colliers.com	Corporate real estate services site with listing information as well as local market research reports.
CoStar www.costar.com	Database of researched information including properties for sale, property for lease, verified comparable sales transactions, and tenant information. Subscription basis.
Cushman & Wakefield, Inc. www.cushwake.com	Corporate real estate services site with listing information as well as local market research reports.
Jones Lang LaSalle www.joneslanglasalle.com	Corporate real estate services site with listing information as well as local market research reports.
LoopNet www.loopnet.com	Site with listing and sales information. Some free; some subscription based.
Marcus & Millichap Real Estate Investment Services www.marcusmillichap.com	Corporate real estate services site with listing information as well as local market research reports.
NAI Global www.naiglobal.com	Corporate real estate services site with listing information as well as local market research reports.
RealtyRates.com www.realtyrates.com	Real estate investment, financial and market rates and returns for commercial properties across the United States. Some free survey data and some by subscription only.
Reis, Inc. www.reis.com	Commercial real estate performance information and analysis at the metro (city), submarket (neighborhood), and property level. Includes some sales data, rental data, new construction data, real estate market information, and other data. Subscriptions for a fee. Appraisal Institute members receive a discount.
Site to Do Business www.stdbonline.com	Demographic data with robust reporting and analytical tools. The company has different subscription levels with one free for Appraisal Institute members and a more complete use of the site for a fee.
Transwestern www.transwestern.net	Corporate real estate services site with listing information as well as local market research reports.

Public Records

The appraiser searches public records for a copy of the property deed to the subject or comparable properties as needed. In most jurisdictions, public property records can now be searched electronically. The deed provides important information about the property and the sales transaction, including the full names of the parties involved, the transaction date, and a legal description of the property. The property rights included in the transaction and any outstanding liens on the title may also be indicated in some areas. Note that an appraiser who develops an opinion of market value must report and *analyze* all sales of the subject property that occurred in the three years prior to the date of value.[4] Any

4. The emphasis in Standard 1 of the Uniform Standards of Professional Appraisal Practice is to "correctly complete research and analysis necessary to produce a credible appraisal." The requirement in that standard to research and analyze sales within three years prior to the date of value is a minimum period. In some situations, researching, analyzing, and reporting a longer history will be necessary to produce credible assignment results.

agreements of sale (contracts), options, or listings that are current as of the date of appraisal also must be analyzed. Of course, listing the sales or other agreements is just a start. Analyzing this data will be explored in depth in the discussion of the sales comparison approach in subsequent chapters.

Occasionally the names of the parties may raise a concern that unusual motivations were involved in the sale. For example, a sale from John Smith to Mary Smith Jones may be a transfer from a father to a daughter. A sale from John Smith, William Jones, and Harold Long to the SJL Corporation may be a change of ownership in name only, not an arm's-length transaction arrived at by unrelated parties under no duress.

In some states the law requires that the consideration paid upon transfer of title be shown on the deed. However, this consideration does not always reflect the actual sale price. To reduce transfer taxes, some purchasers–e.g., buyers of motels or apartments–deduct the estimated value of personal property from the true consideration paid. Because these personal property values are sometimes inflated, the recorded consideration for the real property may be less than the actual consideration. In one case, the consideration indicated on the deed may be overstated to obtain a higher loan than is warranted. In another, the consideration may be understated to justify a low property tax assessment. Although some states require that the actual consideration be listed on the deed, other states–i.e., nondisclosure states–allow the consideration to be reported as "$10 and other valuable consideration."

The local tax assessor's records may include property data for the subject property and comparable properties, with land and building sketches, area measurements, sale prices, and other information. In some locations, legal or private publishing services issue information about revenue stamps and other facts pertaining to current property transfers.

Listings and Offerings

Whenever possible, an appraiser should gather information about properties offered for sale. An appraiser can request to be added to the mailing lists of banks, brokers, and others who offer properties for sale. Advertisements of listed properties suggest the strength or weakness of the local market for a particular type of property and the sales activity in a particular area. Information on purchase offers may also be obtained from brokers or managers. Listings usually reflect the upper limit of value, while offers commonly set the lower limit of value.

> **listing**
> A written contract in which an owner employs a broker to sell his or her real estate.
>
> **offering**
> A set of terms presented by the bidder, a prospective buyer or tenant, that are subject to negotiation. If the other party, a seller or landlord, accepts these terms, the offer will result in a contract.

Listings and offerings can be useful indicators of the values anticipated by sellers and buyers and reflect the likely turnover of competitive properties. Listings are usually set at a level that will excite market interest and therefore may be employed to test market activity. They are relevant market phenomena that the appraiser considers in analyzing competitive supply and demand. The appraiser may find that tabulating information about competitive properties in a market data grid facilitates comparing the market position of the subject property to that of the competition.

Every major market in the United States is served by a multiple listing service (MLS). As of 2012, about 80% of the active MLS systems in the United States were operated by a board of Realtors. In this digital age, all MLS data is published electronically. An MLS primarily contains data on residential properties listed for sale during the calendar year or fiscal quarter and cites their listing prices. The service will contain fairly complete information about these properties, including descriptions and brokers' names. However, details about a property's square footage, basement area, or exact age may be inaccurate or excluded. In certain areas, access to the multiple listing service or electronic databases can be purchased. Multiple listing services sometimes publish the sale prices of properties that have been sold. In the past, only a small percentage of commercial, industrial, or special-purpose properties were included in traditional MLS databases, but more recently commercial MLS systems have proliferated through the efforts of commercial boards of Realtors.

The national MLS landscape is in a state of flux, as new business models challenge the historical domination of property data by local MLS organizations, which have previously controlled the dissemination of information relating to sales, listings, pending sales, and withdrawn sales. There have been some limited mergers of MLS organizations that overlap or share members, but the impetus for large-scale mergers in this area has been limited by competitive concerns and potential issues cited by the US Department of Justice.

In recent years, large national brokerage companies such as Realogy and Re/Max have aggregated a variety of disparate data on a national level and made this information available to consumers. In 2008, the National Association of Realtors established the Realtors Property Resource, a na-

The Real Estate Transaction Standard (RETS)

The development and implementation of the Real Estate Transaction Standard (RETS) for real estate data providers is expected to supersede the electronic data interchange (EDI) efforts of the 1980s and 1990s and facilitate data transfer between partners in the real estate industry. Creating and improving RETS is a collaborative effort of real estate brokers, franchises, associations, and their technology partners such as MLS vendors, Internet data exchange (IDX) vendors, transaction management and electronic forms vendors, and others to simplify moving real estate information from system to system and to simplify solution development efforts. For example, as RETS usage matures and expands, multiple listing services with geographic overlaps will be able to create data-sharing policies that provide their members with a single point of entry to search multiple MLS data sets.

The goal of RETS is to create standards that provide brokers with efficient control over their listing data. With the adoption of a single standard across the industry, brokers will be able to enter listings once and deliver them when and where they want, including to national property databases. A standardized data format will also increase the accuracy and timeliness of data by eliminating duplication and avoiding the cost and time involved in converting data into different formats.

The MLS Committee of the National Association of Realtors requires all MLS providers to adopt RETS. The standard is managed by the Real Estate Standards Organization (RESO).

tional database of property information available only to members of the organization. Unfortunately, competition among aggregators to amass the largest number of listings may lead to poor quality data, i.e., institutional emphasis on quantity over quality control increases the likelihood of duplicates, dated information, and incorrect information in the databases.

The potential for misuse of pooled data is a concern. Ensuring the confidentiality of certain information in real property transactions is a continuously evolving issue. Both the Uniform Standards of Professional Appraisal Practice and federal legislation such as the Gramm-Leach-Bliley Act of 1999 set forth privacy requirements regarding confidential information. Certain shared databases allow for restricted access to certain fields within data records deemed confidential by the contributor of the data; other databases only pool data that is not considered confidential.

Published News

Most city newspapers feature real estate news, and many business trade publications cover real estate activity on a local, regional, or national basis. Although some of the news may be incomplete or inaccurate, an appraiser can use this secondary source to confirm details because the names of the negotiating brokers and the parties to transactions are usually published.

Market Participants

Other real estate professionals such as brokers, appraisers, managers, and bankers can often provide information about transactions and suggest valuable leads. Individual sources may be definitive, but if the information obtained from real estate professionals is third-party data, the appraiser should look for separate verification. Personal verification, particularly relating to confirmation of comparable rentals and sales, is an essential part of the appraisal process.

Sources of Competitive Supply and Demand Data

A competitive supply inventory is compiled in several steps:

1. The appraiser first conducts a field inspection to inventory competitive properties in the subject market area and competitive market areas.
2. The appraiser then can interview owners, managers, and brokers of competitive properties in the area as well as developers and city planners. Field inspection and interviews are especially important because investors rely heavily on local competitive supply and demand analyses.
3. An examination of building permits (both issued and acted upon), plat maps, and surveys of competitive sites provides insight into prospective supply.
4. Data on available space, as well as vacancy, absorption, and turnover rates in specific property markets, can be obtained from electronic databases and reports prepared by real estate research firms.

Demand can be estimated using demographic data (population and vital statistics) and economic data (employment and income statistics) for the market area. The Bureau of the Census (Department of Commerce) and Bureau of Labor Statistics compile and publish statistical data, which is often also available in electronic form. Other private and public sources provide historical data and projections based on small area populations. Appraisers who rely on projections prepared by market research firms should have a clear understanding of the methodology used to make the projection. Otherwise the data may represent little more than a blind data set. To test the reasonableness of small area projections, comparisons should be made between the demographic data and the supply data collected in the specified market. Supply data may include building permits and market sales or absorption rates kept by public agencies such as building inspection, city planning, and public works departments.

Personal observation is also useful in estimating local demand. For example, the planned closing of an army base should be considered in analyzing the future demand for adjacent commercial properties such as dry cleaners, motels, bars, and restaurants. An appraiser who has observed development near highway interchanges will be able to anticipate that a proposed freeway interchange will generate future demand for shops, service stations, and motels catering to the needs of motorists and tourists.

Selecting Comparable Data and Establishing Comparability

Descriptions and classifications of the characteristics and components of comparable properties are assembled in land and improvement analyses. The appraiser selects data from these analyses and analyzes it in the sales comparison, cost, and income capitalization approaches. The data used for comparison in the three approaches should come from properties that are similar to the property being appraised. A good comparable sale is a competitive alternative–i.e., a property that the buyer of the subject property would also consider. The selection of comparables is directed to some extent by the availability of data. Investigation of an active market usually reveals an adequate and representative number of transactions within a restricted area and time period.

An appraiser gathers broad information about a market from its pattern of sales. Important market characteristics can be revealed by significant factors such as

- number of sales
- period of time covered by the sales
- availability of property for sale
- rate of absorption
- rate of turnover–i.e., volume of sales and level of activity
- characteristics and motivations of buyers and sellers
- terms and conditions of sale
- use of property before and after its sale

Geographic Information Systems and TIGER Data

The Topographically Integrated Geographic Encoding and Referencing (TIGER) system created by the US Bureau of the Census in the 1980s is of special relevance to appraisals of sites being considered for development. TIGER files contain the geographic base information used to create maps based on the most recent census and are essential ingredients in a geographic information system (GIS). A geographic information system using TIGER/Line data allows an appraiser to analyze information on traffic analysis zones, acreage available for development, zone densities, and other physical characteristics and geographical relationships in a market area. Other GIS databases contain information about local taxes (e.g., property assessments, school levies) and infrastructure (e.g., gas lines).*

geographic information systems (GIS)
An organized collection of computer hardware, software, geographic data, and personnel designed to efficiently capture, store, update, manipulate, analyze, and display all forms of geographically referenced information.

Topographically Integrated Geographic Encoding and Referencing (TIGER) data files
Geographically referenced data files that are commercially available to GIS users.

Geographic information system technology facilitates the addition of geographic reference data to individual items in real estate databases. Personal computers and larger, networked computer workstations can draw on this information to map or model the spatial referents and show the spatial relationships among the data points. Equally important, spreadsheets or tabular grids can be produced in written formats, which can help the user better understand these relationships.†

Data from public sources at local, state, and national levels is available and, in most cases, less expensive than the cost of undertaking primary research. A combination of public data and other data available from proprietary sources allows an appraiser to assemble and map information and then analyze that information in ways previously regarded as technically infeasible or too costly. Initially, real estate professionals were most interested in the mapping capabilities of GIS, but new technology is helping expand opportunities for data analysis and promoting greater understanding of the results of that analysis.

GIS can integrate digital maps with point-specific or area-specific data to answer basic questions such as

- What is found in a specific location?
- Where within a given area is a specific feature, activity, or event located?
- What changes have occurred in an area over a given period of time?
- What spatial patterns characterize a given area?
- What impact will a specific change have on the area?

The data used to generate these maps is typically found in computer databases that include referents to a specific point on the earth's surface (i.e., latitude and longitude) or a specific area (e.g., city, zip code area, census tract).

Given sufficient information, the system can quickly pinpoint properties with specific characteristics. For example, the system can identify the locations of all parcels of vacant land in a given county that have the following characteristics:

- contain 40 or more acres
- meet specific soil suitability standards
- are equipped with municipal water and sewer lines
- are zoned for residential use
- have an elementary school within a one-half mile radius and are adjacent to residential neighborhoods where the median home value exceeds $250,000

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* See also Gilbert H. Castle III, editor, *GIS in Real Estate: Integrating, Analyzing, and Presenting Locational Information* (Chicago: Appraisal Institute, 1998).

† See also Mark R. Linné and Michelle M. Thompson, editors, *Visual Valuation: Implementing Valuation Modeling and Geographic Information Solutions* (Chicago: Appraisal Institute, 2010).

Dallas, Texas, Dallas Country Club Area, LVRS

Dark Brown = Higher Values, Light Brown = Lower Values

Geographic information systems can easliy show locational influences on value in a manner that more vividly illustrates the relationships in a market area than a table or other, more traditional data illustration can.

Location Value Response Surface performed in ESRI's ArcGIS Geostatistical Analyst, courtesy of Patrick M. O'Connor, ASA, and Michael W. Ireland, CAE

The dramatic increase in the use of GIS equipment is the result of three factors:

- the decline in the price of high-powered personal computers
- improvements in GIS software
- expansion of commercially available geocoded data

In addition to commercially available TIGER data, accurate digital base maps for most areas of the United States are available at reasonable prices from the United States Geological Survey (USGS). (See Chapter 12 for more discussion of topography and land or site analysis.) Many local governments sell geocoded digital data on individual parcels that is compiled from assessment data and public record information. In the future, data vendors will continue to expand the amount of commercially available data compatible with GIS.

While analyzing data to establish comparability and select sales, an appraiser begins to form certain conclusions about the general market, the subject property, and the possible relationships between the data and the subject property. The appraiser identifies the following:

- market strengths and weaknesses
- the probable supply of, demand for, and marketability of properties similar to the property being appraised
- the variations and characteristics likely to have the greatest impact on the value of properties in the market

Thus, an appraiser analyzes data against a background of information about the particular area and the specific type of property.

The information needed to apply the cost and income capitalization approaches must often be obtained from market sources other than sales. This information may also be used to refine adjustments made in the sales comparison approach. In the investigation of general and market area data, an appraiser learns about trends in

- construction costs
- lease terms
- operating expenses
- vacancy rates

Examining trends in the market where the subject property is located provides additional specific data that can be used to derive value indications and successfully complete valuation assignments.

The geographic area from which comparable sales can be selected depends on the property type. In valuing certain types of retail property, only properties with main street frontage may be pertinent. For many large industrial properties and most investment properties, the entire community should be studied. For larger properties, regional or national markets may be relevant. For residential appraisals, adequate data can sometimes be found within a block of the subject property. Even in these cases, however, the appraiser should consider the broader market to place the subject property and the comparables in a general market context.

When comparable sales data is scarce in the subject property's immediate area, the appraiser may need to extend the data search to adjacent market areas and similar communities. The appraiser must establish the comparability of the alternative market before using data from that market. When the selection of data is limited to an unacceptably narrow sample of current market activity, the appraiser may decide to use sales that are less current or to interview brokers, buyers, sellers, owners, and tenants of similar properties in the area to obtain evidence of potential market activity such as listing prices or offers to purchase.

With computer analysis, a large number of properties can be studied in the course of a single assignment, which may generate a deeper understanding of each property's contribution to, and influence on, a given market. The appraiser should pay attention to several factors to judge if data is useful:

1. The degree of comparability
2. The quantity of information available
3. The authenticity and reliability of the data

The appraiser must not assume that all data pertinent to an assignment is completely reliable. Sales figures, costs, and other information subject to misrepresentation should be scrutinized for authenticity.

Appraisers seek data that will facilitate accurate comparisons, but every real estate parcel is unique. The comparability of properties varies, and an appraiser may find it necessary to place less confidence on a given comparable. Nevertheless, an appraiser may want to consider this comparable for its evidence of, and effect on, the marketplace.

Appraisers have a special responsibility to scrutinize the comparability of all data used in a valuation assignment. They must fully understand the concept of comparability and should avoid comparing properties with different highest and best uses, limiting their search for comparables, or selecting inappropriate factors for comparison.

Verification

A primary purpose of verifying a sale of real property is to make sure that the sale occurred under conditions that meet the definition of value used in the appraisal. The verification process also provides the appraiser with an opportunity to obtain accurate information about the property and to better understand the attitudes and motivations of the buyer and seller. An appraiser asks a few essential questions when verifying data:

- Is the data correct?
- Is the data complete?
- Was the sale or rental an arm's-length transaction?
- Were there any contingencies?
- Were any concessions involved?
- Does the data conform to relevant standards or regulatory requirements?
- Did any special or unusual conditions affect the sale or rental?

The Uniform Standards of Professional Appraisal Practice require that appraisers "collect, verify, and analyze all information necessary to achieve credible assignment results."[5] Appraisers investigate how much verification of data will be necessary for a specific assignment in the determination of scope of work. Many users of appraisal services permit the use of secondary data that has not been directly verified, whereas others require confirmation with more than one party to the transaction and stipulate who must perform the verification task. For example, an appraisal of a single-unit home for mortgage lending purposes is likely to require more verification of specific property data than a mass appraisal assignment involving the statistical analysis of a large database of property information purchased from a data vendor. Likewise, the Uniform Appraisal Standards for Federal Land Acquisitions require an appraiser to talk directly to a party to the transaction to verify data used in an appraisal assignment subject to the Yellow Book standards, which is a higher level of verification than is usually necessary in the aforementioned appraisal for mortgage lending purposes.

In addition to the scope of work of the assignment, the reliability of the original data source also has an effect on the scope of data verification.

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5. Standards Rule 1-4 of *Uniform Standards of Professional Appraisal Practice*, 2012-2013 ed. (Washington, D.C., The Appraisal Foundation, 2012), U-19.

By its nature, the primary data an appraiser collected himself or herself has already been verified, whereas secondary data such as comparable sales and rental data purchased from a vendor is unverified but generally reliable. Market data from informal sources (newspapers, real estate trade magazines, websites) is likely to be less reliable than data from a vendor and therefore may need to be verified before being used in an appraisal.

The most common verification technique is interviewing market participants. Effective interviewing techniques are a matter of personal style.

Data Organization

Data can be aggregated and analyzed in numerous ways. Market data tables are the most common tool used to organize data. They can be as detailed as required for meaningful analysis. In a basic table, an appraiser lists significant characteristics of the subject and comparable properties that have been isolated. This type of table summarizes the data presented and allows the appraiser to identify those factors that may account for differences in value and those that probably do not. The data array table only presents data. It is not used for comparing the properties. In an adjustment grid, the sale properties are compared to the subject and specific adjustments are made to their prices.

A market data table should include the total sale price of each comparable property and the date of each sale, which can be expressed in relation to the subject property's date of valuation (e.g., one month ago or 16 months ago). The table also includes information about the property rights conveyed, the financial arrangements of the sale, and any unusual motivations of the buyer or seller that may have resulted in a negotiating advantage, such as a desire to liquidate a property for inheritance tax or to acquire a particular property for expansion.

The market data table can include characteristics of the subject and comparable properties, information on sales transactions, and pertinent market data from other sources. The appraiser may choose to use two or more market data tables, i.e., one table for comparable sales data and other tables for information derived from other sources. Isolating micro-level data may indicate the type of information the appraiser will be able to derive from the collected data and identify variations among properties that may be significant to their value.

In examining the market data table, the appraiser may find that certain data is not pertinent and will not be useful in applying the approaches to value. For example, if an appraiser who is valuing an industrial property finds that the subject and the comparables all occupy one-acre sites, site size will probably not account for differences in the sale or unit prices of the properties. If the percentages of office space in the properties vary, however, the difference may have an effect on value.

Analysis of the data array table may indicate that additional data is required and that the appraiser needs to create other tables to include more information or to isolate the data required for specific approaches. Appraisers should see data analysis as a process and the market data

Figure 9.2 Comparison of Data Array Table and Adjustment Grid

	1597 N. Avenue B	3579 Second Street	1593 N. Fifth Avenue	3571 E. Argyle Street
Sale price		$565,000	$675,000	$378,000
Rights transferred	fee simple	fee simple	fee simple	fee simple
Financing	cash to seller	contract	cash to seller	cash to seller
Conditions of sale	arm's-length	arm's-length	arm's-length	arm's-length
Expend. after purchase	none needed	none needed	none needed	minor repairs
Market conditions	now	2 mos.	9 mos.	3 mos.
Location	good access	good access	good access	good access
Building design	one story/avg.	one story/avg.	one story/avg.	one story/avg.
Const. quality	brick/avg.	brick/avg.	steel/avg.	steel/inferior
Improvement age	8	12	9	5
Imprv. condition	average	average	average	average
Abv.-gd. bldg. area	9,086	8,000	12,000	10,000
Finished office	25.00%	25.00%	13.95%	25.00%
Basement sq. ft.	0	0	0	0
Functional utility	average	average	average	average
Other	none	none	none	none

	Subject Property	Comparable 1		Comparable 2		Comparable 3	
	1597 N. Avenue B	3579 Second Steet		1593 N. Fifth Avenue		3571 E. Argyle Street	
Sale price			$565,000		$675,000		$378,000
Rights transferred	fee simple	fee simple	$0	fee simple	$0	fee simple	$0
Subtotal			$565,000		$675,000		$378,000
Financing	cash to seller	contract	– $50,000	cash to seller	$0	cash to seller	$0
Subtotal			$515,000		$675,000		$378,000
Conditions of sale	arm's-length	arm's-length	$0	arm's-length	$0	arm's-length	$0
Subtotal			$515,000		$675,000		$378,000
Expend. after purchase	none needed	none needed	$0	none needed	$0	minor repairs	+ $40,000
Subtotal			$515,000		$675,000		$418,000
Market conditions	now	2 mos.	0.3%	9 mos.	1.3%	3 mos.	0.5%
Current, cash-equivalent price			$516,545		$683,775		$420,090
Location	good access	good access	$0	good access	$0	poor access	+ $42,000 (10%)
Building design	one story/avg.	one story/avg.	$0	one story/avg.	$0	one story/avg.	$0
Const. quality	brick/avg.	brick/avg.	$0	steel/avg.	$0	steel/inferior	+ $21,005 (5.0%)
Improvement age	8	12	+ $41,324 (8.0%)	9	+ $13,676 (2.0%)	5	– $25,205 (– 6.0%)
Imprv. condition	average	average	$0	average	$0	average	$0
Abv.-gd. bldg. area	9,086	8,000	+ $11,364 (+2.2%)	12,000	– $39,659 (– 5.8%)	10,000	– $7,562 (– 1.8%)
Finished office	25.00%	25.00%	$0	13.95%	+ $37,608 (5.5%)	25.00%	$0
Basement sq. ft.	0	0	$0	0	$0	0	$0
Functional utility	average	average	$0	average	$0	average	$0
Other	none	none	$0	none	$0	none	$0
Total adjustment			+ $52,688		+ $11,625		+ $30,238
Adjusted price			$569,233		$695,400		$450,328

table as a tool that facilitates this process and the derivation of valid indications of property value. Although many market data tables may be prepared in the development of an appraisal, not all tables are necessary for the appraisal report. Only those that will help to explain the significance of the data to the client need to be included in the appraisal report. (Further discussion and examples of the use of adjustment grids for data analysis are provided in Chapter 19.)

Economic Trends in Real Estate Markets and Capital Markets

Value is affected by the interplay of social, economic, governmental, and physical forces, which are continually changing, often in a cyclical pattern. Although the value of real estate may seem relatively stable in comparison to the value of stocks or commodities, it is still subject to the multitude of pressures and influences created by this interplay.

Appraisers collect data that illustrates the direction of the changes as well as their probable extent and impact to identify and reasonably project trends. A trend may be defined as a series of related changes brought about by a chain of causes and effects. For example, an economic trend being projected in an appraisal analysis may be rooted in social or governmental causes and effects like demographic shifts in an area or changes in federal tax laws. The direction, speed, duration, strength, and limits of these economic trends are forecast through economic base analysis, statistical analysis, market analysis, and analysis of economic indicators and surveys. Examples of some of the specific market characteristics and other general data that appraisers investigate to gain insight into economic trends are shown in Table 10.1.

The social forces studied by appraisers primarily relate to population characteristics. The demographic composition of the population reveals the potential demand for real estate, which makes the proper analysis and interpretation of demographic trends important in an appraiser's analysis.

Table 10.1 Forces that Influence Value in Real Estate Markets and Relevant General Data

Social forces	· Total population · Population composition by age and gender · Rate of household formation and dissolution · Attitudes toward education, law and order, and lifestyle options
Economic forces	· Employment · Wage levels · Business expansion · Economic base of the region and community · Price levels · Cost and availability of mortgage and equity capital · Inventory of available vacant and improved properties · Factors limiting additions to inventory · New development under construction or in the planning stage · Occupancy rates · Rental and price patterns of existing properties · Construction costs
Governmental forces	· National, state, and local tax laws and policies · Public services such as fire and police protection, utilities, refuse collection, and transportation networks · Local zoning, building codes, and health codes, especially those that obstruct or support land use · Special legislation that influences general property values: - rent control laws - statutory redemption laws - restrictions on forms of ownership such as those imposed on condominiums and timeshare arrangements - homestead exemption laws - environmental legislation regulating new developments and wetlands as well as the control of hazardous or toxic materials - legislation affecting the types of loans, loan terms, and investment powers of mortgage lending institutions
Environmental forces	· Climatic conditions · Topography and soil · Toxic contaminants such as asbestos, radon, and PCBs · Natural barriers to future development such as rivers, mountains, lakes, and oceans · Primary transportation systems, including federal and state highway systems, railroads, airports, and navigable waterways · The nature and desirability of the immediate area surrounding a property

To determine the influence of economic forces on value, appraisers analyze the relationships between current and anticipated supply and demand and the economic ability of the population to satisfy its wants, needs, and demands through its purchasing power. Economic trends and considerations may be studied in greater detail as the appraiser's analysis focuses on successively smaller geographic areas, as shown in the later chapters in this section of the text.

Political and legal activities at all levels of government can have a great impact on property values. Federal, state, and local governments provide many facilities and services that affect land use patterns. In fact, public sector activities at a particular time or in a particular place may overshadow the natural market forces of supply and demand. For example, changes to federal banking regulations have a tendency to reverberate throughout the capital markets, alternately loosening and tightening the supply of funds available for investment in real estate. More direct governmental action like the decision to bail out major car manufacturers in 2008-2009 can have a major effect on the economies of cities and states with an economic base dominated by the automobile industry like Detroit and the surrounding areas in Michigan.

Although many real estate professionals associate the word *environmental* predominantly with the conservation of natural resources (e.g., wildlife, timberlands, wetlands) and the regulation of man-made pollution, appraisers understand the environmental forces that affect the value of a specific real property in relation to the property's location. (Note that the treatment of hazardous substances in real estate appraisal is discussed in Chapter 12.) Location considers time-distance relationships, or *linkages*, between a property or neighborhood and all probable origins and destinations of residents coming to or going from the property or neighborhood. Location has both an environmental and an economic character. Time and distance are measures of relative access, which may be considered in terms of site ingress and egress, the characteristics of the areas through which traffic to and from the site passes, and transportation costs to and from the site.

The economic trends that affect the value of real property can be seen in the money supply, the capital markets, and the overall real estate marketplace itself. To keep abreast of the relative health of the marketplace in which real property trades, appraisers continuously gather data on the changes in those markets, which are the focus of the remainder of this chapter.

Real Estate Markets

The efficiency of a market is tied to the behavior of buyers and sellers as well as the characteristics of the products traded. Real estate markets can differ significantly from the markets for other goods and services and have never been considered truly efficient markets (see Table 10.2). Real estate products are heterogeneous, and information about real estate is often incomplete due to the confidentiality of transactions. Also, changes in supply lag behind changes in demand for a specific real estate product because of the time needed to bring a new building to market. In a more efficient market, like a stock exchange, supply quickly reacts to changes in demand.

Since the 1990s, the securitization of real estate and increased access to standardized property and transaction information, along with other changes in the larger economy, have made real estate markets relatively more efficient than they once were, although significant peaks

Table 10.2 Comparison of Efficient Markets and Real Estate Markets

Efficient Markets	Real Estate Markets
Goods and services are essentially homogeneous items that are readily substituted for one another.	No two parcels of real estate are physically identical.
A large number of market participants creates a competitive, free market, and none of these participants has a large enough share of the market to have a direct and measurable influence on price.	There are usually only a few buyers and sellers interested in a particular type of property at one time, in one price range, and in one location. An individual buyer or seller can influence price through exertion of control on supply or demand or both.
Supply and demand are never far out of balance. The market returns to equilibrium quickly through the effects of competition.	In stable real estate markets, supply and demand are considered causal factors, and price is the result of their interaction. Price changes are usually preceded by changes in market activity. Supply or demand often shifts suddenly during periods of no activity or increased activity or when properties are in transition.
Buyers and sellers are knowledgeable and fully informed about market conditions, the behavior of other market participants, past market activity, product quality, and product substitutability. Any information needed on bids, offers, and sales is readily available.	Buyers and sellers of real estate may not be well informed.
Buyers and sellers are brought together by an organized market mechanism, such as the New York Stock Exchange. Sellers can easily enter and exit the market in response to demand.	Buyers and sellers are not brought together formally.
Goods are readily consumed, quickly supplied, and easily transported from place to place.	Real estate is a durable product and, as an investment, it may be relatively unmarketable and illiquid.
Market efficiencies lead to low transaction costs.	Market inefficiencies lead to high transaction costs, e.g., broker's fees and commissions, closing costs on financing.
Market participants can act on new information quickly to take advantage of opportunities to increase supply to meet demand.	Market participants are not able to act quickly on new information, e.g., an increase in market demand will be followed by a lag as developers attempt to increase supply but are hampered by the long development times for new real estate products.

and troughs continue to exist as illustrated by the speculative bubble of 2007-2008. Nevertheless, efficiency in the real estate marketplace has a direct bearing on rate of return requirements. Consequently, a purchaser who understands the inefficiencies of the real estate market can usually gain benefits in terms of rates of return, relatively stable income, inflation protection, and other factors.

However, in more recent years, some of those benefits of real estate as an asset class have eroded. The increased access to data and new tools for data analysis likely contributed to the destructive competition among lenders leading up to the severe downturn in the real estate markets starting in 2007. The market forces that increased the efficiency of real estate markets and liquidity of real estate investments also reduced the transparency of the assets pooled in heavily traded securitized mortgage instruments, obscuring the risk involved in holding the loans that backed those securities from buyers. With increased efficiency in real estate markets came increased volatility.

In the wake of the housing crisis of 2007-2008, transparency in real estate markets has become a significant concern of market observers just as it was in the aftermath of real estate downturns in 1988-1989 and 1999-2000. The Truth in Lending Act protects consumers from predatory lending and provides regulators with the ability to curb some of the activities that can lead to fraud, and revisions to the act in 2008 added further protections for appraisers from coercion by lenders, brokers, and their agents. Predatory lending and client pressure on appraisers are the types of external influences on a market that spur destabilizing imbalances in supply and demand that a more efficient market would be able to smooth out.

The essential appraisal activity of real estate market analysis focuses on the motivations, attitudes, and interaction of market participants as they respond to the particular characteristics of real estate and to external influences that affect its value. (Real estate market analysis is discussed in detail in Chapter 15.) This focus underscores the need for objective real estate appraisal in a free market economy and the responsibility of appraisers to the communities they serve.

Cycles in Real Estate Markets

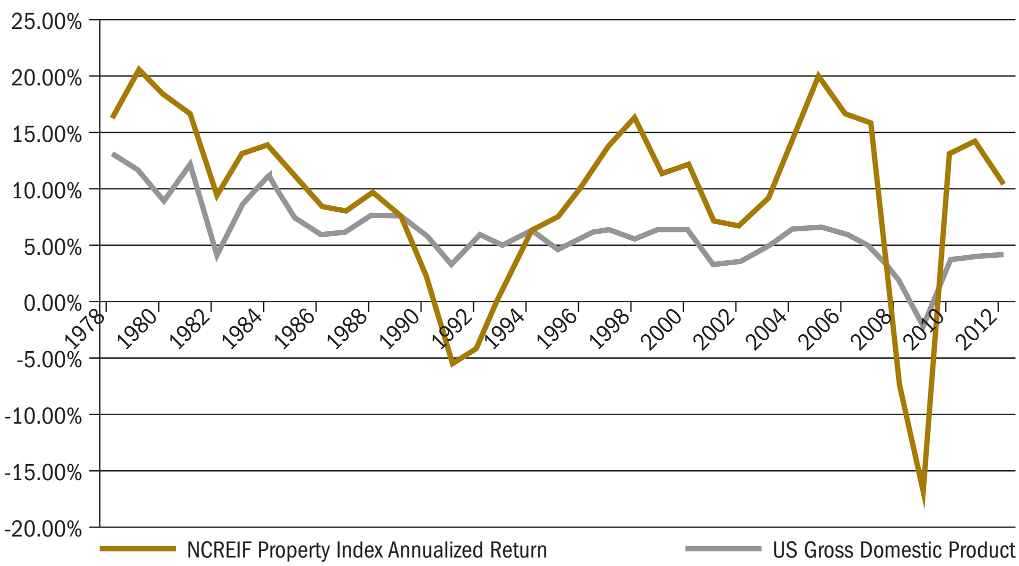
In the years following World War II (1946–1966), distinct patterns emerged in real estate and general business cycles in the United States. As business prospered, the demand for capital intensified, inflation accelerated, and an oversupply of goods and services was produced. Federal Reserve monetary policy and other economic controls would then be used to slow the pace of the economy and keep inflation in check. If the economy slowed too much, a recession would ensue.

When Congress wanted to revive the US economy, the industry invariably selected to provide economic stimulation was real estate, particularly home building. Programs were developed to provide abundant, moderately priced mortgage money. These programs usually involved loan insurance or guarantees to induce capital managers to participate. Because there was a substantial demand for housing, the programs were well received and residential development expanded, increasing employment in all economic sectors. Manufacturers of hardware, supplies (e.g., heating, plumbing, and electrical), paints, furniture, equipment, and other goods saw business improve. The economy finally revived, inflation started to accelerate, and the cycle was repeated. When loan insurance and guarantee programs supplied inexpensive long-term capital, real estate prospered and the general economy expanded.

The situation today is very different from the conditions prevailing in the last quarter of the twentieth century. The economic downturn that began in the United States in 2007 has affected all sectors of the US and global economies, especially real estate. Since the real estate bubble burst, debate has raged about what governments can do–or should do–to ease the financial problems of property owners and stimulate real estate activity, thereby stimulating the larger national economy. Governments across the globe are facing similar problems, as the overheated real estate markets that provided significant growth in many economies in the first decade of the twenty-first century have cooled. In developing countries and countries making the transition from a state-controlled economy to a market economy, promoting homeownership has been seen as a way of stabilizing the economy and establishing a middle class. In many fast-growing global real estate markets, speculation replaced the orderly and controlled increase in homeownership that was intended. Even mature market economies in Western Europe suffered devastating losses in asset value as the credit crunch broadened globally and national economies slowed down or were threatened with austerity measures.

In a market economy, the larger economic cycle (see Figure 10.1) influences the real estate cycle, as do demographic cycles and business cycles. As the economy expands, competition for capital intensifies, the costs of goods and services increase, and inflation escalates. The central banking system (e.g., the US Federal Reserve System) then seeks to combat inflation by tightening money and credit until the economy slows down. The demand for funds subsides, interest rates decline, and economic conditions become stable enough for businesses to expand. When the frequency of the economic cycle accelerates and its range increases, business and money conditions change drastically and rapidly. This creates an unattractive economic environment for long-term investments.

Figure 10.1 Real Estate Cycles and Economic Cycles

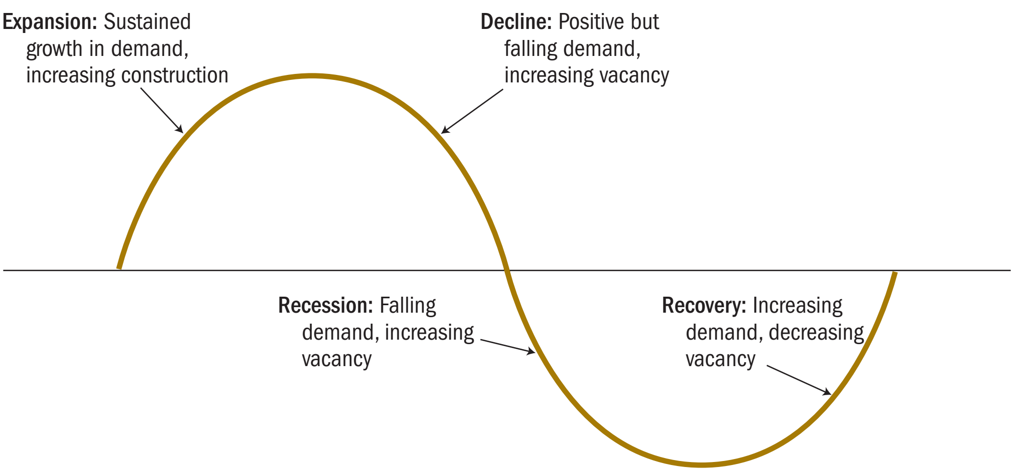


The position of a real estate market in its cycle (see Figure 10.2) is determined by several factors, including

- supply
- vacancy
- demand
- rents
- capitalization rates

Vacancy is a leading indicator. Demand, rents, and capitalization rates change in response to changes in vacancy rates.

Figure 10.2 Real Estate Cycle



Trends in real estate markets can be seen in the interaction of several related market statistics:

- vacancy rates
- rental growth rates
- price changes
- capitalization rates
- changes in supply

In general, if vacancy rates rise, rents will fall and capitalization rates will rise, although in the recent downturn capitalization rates fell because of artificially low interest rates. If vacancy rates fall, then rents will rise and capitalization rates will fall.

In the 1990s, what became known as the “new economy” promised to eliminate, or at least smooth, the traditional business cycle of expansion, contraction, recession, and recovery. Applying information technology to inventory control was supposed to ensure that production never got too far ahead of sales, improving the efficiency of the operations of manufacturing companies. The economic downturn in the United States at the end of the 1990s proved some of these claims to be overly optimistic, and the distressed real estate markets following the housing crisis illustrated the emphatic return of traditional market cycles to a generation of real estate professionals and investors who had grown accustomed to ever-increasing property prices.

The Life Cycle of Real Estate Markets

Real estate markets are dynamic, and appraisers describe this quality as a market's life cycle. The complementary land uses that make up neighborhoods and the homogeneous land uses within districts typically evolve through four stages:

1. Growth—a period during which the market area gains public favor and acceptance
2. Stability—a period of equilibrium without marked gains or losses
3. Decline—a period of diminishing demand
4. Revitalization—a period of renewal, redevelopment, modernization, and increasing demand

Transition often occurs in the revitalization stage, when a land use that is no longer financially feasible is discontinued in favor of a more productive use.

Although these stages can describe the life cycle of market areas in a general way, they should not be used as specific guides to market trends. No set number of years is assigned to any stage in the cycle. Many real estate markets remain stable for a long time, and decline is not necessarily imminent in all older areas. Unless decline is caused by a specific external influence—e.g., natural disaster, major economic event—it may proceed at an imperceptible rate and can be interrupted by a change in use or a revival of demand. A market has no set life expectancy, and the life cycle is not an inevitable progression. At any point in the cycle, a major change can interrupt the order of the stages. For example, a strong negative influence such as a major employer suddenly pulling out of a community or the closing of a military base can cause a real estate market that is growing to decline rather than stabilize.

After a period of decline, a real estate market may undergo a transition to other land uses, or its life cycle may begin again due to revitalization. Revitalization often results from organized rebuilding or restoration undertaken to preserve the architecture of significant structures. It may also be caused by a natural resurgence of demand. The rebirth of an older, inner-city neighborhood, for example, may simply be due to changing preferences and lifestyles.

Capital Markets

Activity in the capital markets illustrates the interaction of buyers and sellers trading long- or intermediate-term money instruments. Traditional real estate investment practices involve the use of two types

Change and Transition in Real Estate Markets

In the analysis of a real estate market, an appraiser recognizes the potential for change and tries to determine how an area may be changing. Appraisers consider trends in market growth and composition when analyzing patterns of change. They also investigate whether a market is in a state of transition from one type of land use to another, which, although related to the principle of change, is a separate concept.

In essence, transition is the result of change. For example, the arrival of a major new employer in a market may cause a change in demand for residential property, and that change in market conditions may then lead to the transition of formerly undeveloped land within the market to a more intensive use as the site of new homes or apartments.

Transition is often indicated by variations within the neighborhood or market area. New uses may indicate potential increases or decreases in property values. For example, a residential neighborhood in which some homes are well maintained and others are not well maintained may be undergoing either decline or revitalization. The introduction of different uses, such as residential apartments or offices, into a single-unit residential neighborhood may also indicate potential transition to a more intensive use.

Changes in one market area are usually influenced by changes in other, competing areas and in the larger region of influence. The growth of one market area may lead to the downfall of a competing market area. Suburban business centers may interfere with the success of a city's central business district. Newer residential areas may affect older areas. The added supply of new homes may cause residents to shift from old homes to new ones and place older homes on the market. This increase in supply may affect the market values of all homes in the area. If an area's location makes it attractive for conversion to more intensive land uses, the existing improvements in that area may be remodeled or torn down to make way for redevelopment.

of capital—debt and equity—and a typical venture is structured with a substantial mortgage amount and a smaller equity contribution. The most common capital market instruments are

- bonds
- stocks
- mortgages (including junior liens and home equity loans)
- deeds of trust and land contracts

Although stocks are capital market items, they are equity investments with no fixed maturities.

Appraisers and market analysts must keep abreast of shifts in monetary policy that invariably produce market changes and interpret how they may influence the financing arrangements discussed below.

Bonds

A bond is a capital market instrument with a fixed interest rate issued for a term of one year or more. The bond market is closely related to real estate investment activities. Real estate is normally bought with a smaller amount of equity capital and a substantial amount of medium- to long-term debt funds. Institutions with long-term capital to invest usually survey bond markets and then examine mortgage opportunities before making investment decisions to secure the best earnings for the risk involved by charging interest.

bond
A debt instrument issued for a period of one year or more for the purpose of raising borrowed capital. The federal government, states, counties, cities, corporations, and many types of special-purpose entities issue bonds. A bond is generally a promise to repay the principal on a specified date (maturity) and to make periodic interest payments.

Stocks

A stock is an ownership share in a company or corporation. A stock corporation is a common legal entity in which investors provide organizational capital by buying shares that represent ownership and a right to all proprietary benefits. These shares are subject to the prior claims of operating expenses and debt service on the capital raised by selling bonds, debentures, and other money market instruments. Shareholder benefits consist of any cash or stock dividends declared, augmented by share price appreciation or diminished by price depreciation.

Mortgages

A mortgage is a legal instrument for pledging a described property interest as collateral or security for the repayment of a loan under certain terms and conditions. Mortgage loans supply most of the capital employed in real estate investments.

The parties to a mortgage are usually free to contract in any fashion they desire, subject only to limitations of usury and public policy. Traditional mortgage loans are made for terms of 20 to 30 years and carry fixed interest rates. Other payment arrangements and schedules are also used, the most notable examples being variable-rate and balloon mortgages. Other types of mortgages categorized by their repayment characteristics are shown in Table 10.3.

A borrower may pledge a real property interest to more than one lender, thereby creating several liens. In these cases, the time sequence or order of the liens is important:

- The first loan contract executed and recorded is the *first mortgage*, which has priority over all subsequent transactions.
- Second and subsequent mortgages are sometimes referred to as *junior liens*. Because they involve more lending risk than first mortgages, higher rates of interest are charged for second and third mortgages, which typically have shorter terms.
- *Home equity loans* are another common type of junior lien. Home equity loans generally run for terms of about five years, shorter than second or third mortgages, and, if the payments made cover only the interest on the loan, the principal is repaid in a lump sum at the end of the loan term.
- *Home equity lines of credit* are similar to home equity loans, except that the borrower can access this type of loan at any time up to the loan amount without further loan approval. In terms of priority of repayment, a home equity line of credit is similar to a home equity loan, but some lines of credit are recourse loans for which borrowers are personally liable.

stock
The ownership shares of a company or corporation.

mortgage
A pledge of a described property interest as collateral or security for the repayment of a loan under certain terms and conditions.

Table 10.3 Repayment Characteristics of Mortgages

Type	Repayment Characteristics
Interest-only mortgage	A nonamortizing loan in which the lender receives interest only during the term of the loan and recovers the principal in a lump sum at the time of maturity.
Self-amortizing mortgage	A mortgage repaid in periodic, usually equal, installments that include repayment of part of the principal and the interest due on the unpaid balance. Although the payments are level, the amount of principal and interest varies with each payment. In the most common type of direct reduction mortgage, the interest component decreases with each payment while the principal or amortization component increases.
Adjustable variable-rate mortgage	Mortgage with an interest rate that may move up or down following a specified schedule or in accordance with the movements of a standard or index to which the interest rate is tied.
Wraparound mortgage	A mortgage subordinate to, but inclusive of, any existing mortgage on a property. Usually, a third-party lender refinances the property, assuming the existing mortgage and its debt service, which are wrapped around a new, junior mortgage. A wraparound lender gives the borrower the difference between the outstanding balance on the existing mortgage and the face amount of the new mortgage. Wraparound mortgages became widespread in periods of high mortgage rates and appreciating property values, but they have generally fallen into disuse with declining mortgage rates.
Participation mortgage	The lender receives a share of the income and sometimes the reversion from a property on which the lender has made a loan. Lenders may opt for this type of arrangement either as a hedge against inflation or as a means of increasing their total yield on the loan.
Shared appreciation mortgage	The borrower receives assistance in the form of capital when buying the real property in return for a portion of the property's future appreciation in value.
Convertible mortgage	The lender may choose to take an equity interest in the real estate in lieu of cash amortization payments by the borrower. In this way the mortgage interests of the lender may be converted into equity ownership at specified times during the life of the mortgage.
Graduated-payment mortgage	Designed to aid borrowers by matching mortgage payments to projected increases in income, this type of mortgage has periodic payments that start out low and gradually increase. Because the borrower's payments in the early years of the loan are not sufficient to pay the entire interest due or to amortize the mortgage, the borrower actually borrows the difference between the payments and the current interest due.
Zero-coupon mortgage	Debt secured by real estate with interest payments accruing rather than being paid by the borrower. In some circumstances, a rate of interest may be ascribed—e.g., for income taxation.
Reverse annuity mortgage (RAM)	A negative amortization mortgage that allows owners to use some or all of the equity they have accumulated in their property as retirement income while retaining ownership of the property. Typically, the loan increases as more money is borrowed and unpaid interest on the outstanding balance accumulates up to an agreed-upon amount, which is generally scheduled to coincide with the sale of the property.
Mezzanine loan	A form of secondary financing at a higher risk with a higher interest rate applicable to the secondary position; often supplementary financing for a real estate development project where stock in the development company serves as collateral rather than the property itself.

Mortgages can also be categorized based on how they are protected against the risk of default. The three major categories are

1. Guaranteed–e.g., Veterans Administration (VA) home mortgages
2. Insured–e.g., Federal Housing Administration (FHA) mortgages
3. Conventional

FHA mortgages are the most common type of insured mortgages, but other government bodies and private insurance companies offer loan insurance as well. Conventional mortgages are neither insured nor guaranteed.

In the event of default, a borrower may have personal liability if the mortgage was recourse debt, whereas the lender is only entitled to the proceeds of the foreclosure sale of the property if the mortgage was a nonrecourse loan. A personal guarantee from a borrower generally lowers the cost of financing because the risk to the lender is reduced.

The effects of competition for capital are clearly evident in mortgage markets. In a volatile economic climate, some investors may resist long-term positions and fixed-rate instruments because they provide little protection against inflation. In response to erratic conditions during the late 1970s and early 1980s, balloon mortgages and contracts such as variable-rate mortgages, adjustable-rate mortgages, renegotiable-rate mortgages, and rollover mortgages were created. These mortgage instruments provide for periodic adjustment of interest rates to keep yields competitive with those available in capital markets. For example, a property owner managing a rental property subject to a variable-rate mortgage may, if the dynamics of the rental market permit, arrange leasing programs that permit rapid rental adjustments to offset increases in mortgage payments caused by money market fluctuations.

Although these contracts may cover long periods, the payment requirements change at frequent intervals, so borrowers may find it difficult to budget for debt service. The prevalence of this type of contract in the middle of the first decade of the twenty-first century led to the subprime mortgage crisis and contributed to broader problems in the US economy.

nonrecourse loan
Debt agreement secured by real estate that provides that the lender has no claim against the debtor in the event of default, but can only recover the property.

recourse debt
A debt agreement secured by real property that gives the lender legal rights against the debtor beyond the right to property value; equivalent to a general obligation of the debtor.

deed of trust
A legal instrument similar to a mortgage document, except that three parties are involved in securing the debt: the borrower, a lender, and a trustee who holds property title when the deed of trust is executed and delivered. The trustee transfers title to the lender if the borrower defaults and to the borrower if the note is repaid.

Deeds of Trust and Land Contracts

A mortgage is a contract between a borrower (the mortgagor) and a lender (the mortgagee), but a deed of trust involves a third party. A *deed of trust* is defined as a legal instrument similar to a mortgage that, when executed and delivered, conveys or transfers property title to a trustee. In such an arrangement, a borrower conveys or transfers property to a trustee for the benefit of a lender. The borrower conveys title to the trustee but retains the right to use and occupy the property, which often eliminates the need for foreclosure proceedings against a defaulting debtor. In some states, deeds of trust are used in place of mortgage contracts.

Land contracts, frequently called *installment sale contracts* or *contracts for deed*, are instruments that provide for the future delivery of a property deed to a buyer after certain conditions are met. A seller finances the sale of a property by permitting the buyer to pay for it over a period of time, but the title is delivered only after all payments are made. In the event of default, the buyer normally forfeits all payments made and the seller may also elect to hold the buyer to the contract.

land contract
A contract in which a purchaser of real estate agrees to pay a small portion of the purchase price when the contract is signed and additional sums, at intervals and in amounts specified in the contract, until the total purchase price is paid and the seller delivers the deed; used primarily to protect the seller's interest in the unpaid balance because default can be exercised more quickly than it could be under a mortgage.

Monetary Policy

The US Federal Reserve System influences daily trading activity in the money market and the cost (i.e., interest rates) of money market funds by regulating the money supply as a key component of its application of monetary policy. The money market, in turn, greatly affects the real estate industry because its short-term financing vehicles are needed to fund real estate construction and development. This is one of many ways in which the availability and cost of money regulates the volume and pace of activity in the real estate industry. The distinction between the money market and capital markets is not sharply defined because both involve trading in funds for varying terms and both are sources of capital for all economic activities, including real estate.

There is a difference between money and other commodities on the supply side of the pricing formula. The demand for money is a product of the operation of economic forces. The supply of money available for lending is a function of the level of savings, which reflects personal, corporate, and governmental accumulation, both domestic and foreign.

Economics determines the amount of savings, but the quantity of US currency is subject to regulation by the Fed. The Fed has the power to regulate general interest rate levels, which strongly influence the discount rates and overall capitalization rates used in real estate valuation.[1] Housing affordability is greatly influenced by prevailing mortgage rates. For example, an increase of a single percentage point in the interest rate, from 6% to 7%, on a $200,000 fully amortized, 30-year mortgage would increase the monthly mortgage payment by $131, which may cause a significant number of households with a certain level of purchasing power to be priced out of the market for homeownership.

While the Fed determines monetary policy, the Treasury Department manages the government's financial activities by raising funds and paying bills. When income matches spending, the federal budget

1. In other countries, various central banks perform the same functions as the Fed, and they generally have the same powers.

is balanced. When the outflow of funds exceeds collections, a federal deficit results. Spending that is not covered by tax funds produces deficits, which are financed by the sale of public debt instruments such as government bonds, bills, and notes issued by the Treasury. When deficits are monetized by selling large amounts of debt, the Fed is expected, though not mandated, to cooperate by supplying the banking system

Central Banking Systems and Credit Regulation

The supply of any currency and the stability of a country's fiscal policy are regulated by the relevant central banking system. For example, in Canada, the Bank of Canada, headquartered in the nation's capital, Ottawa, monitors and manages the rate of money growth. Likewise the Banco de Mexico performs a similar function in that country. The central banking system in the European Union functions differently in that the European Central Bank in Germany establishes monetary policy for the Eurozone while the central banks of the member states are responsible for fiscal policy in their individual countries. (Countries in the European Union that have not adopted the Euro as their unit of currency have their own national central banks to administer monetary policy.) The mechanisms that central banks use to influence the supply of money generally consist of raising and lowering interest rates as well as more direct involvement in the market to ensure price stability and access to credit.

The US Federal Reserve System

The US Federal Reserve System is independent of the US Congress and the president. This independence distinguishes it from central banks in most other countries, which are government entities. Although the Fed is independent, it functions within the general structure of the US Government, operating in accordance with national economic policies.

The Federal Reserve regulates money and credit, which are the lifeblood of the real estate industry. Therefore, appraisers should be familiar with the Fed's day-to-day activities as they affect the supply of money and the level of interest rates. Because of the global nature of financial markets, the prevalence of instantaneous communications, and the securitization of realty interests, the monetary activities of the central bank can have an impact on real estate markets, just as they affect the markets for stocks and bonds.

The Fed uses three principal credit-regulation devices to accomplish the duties assigned to it by Congress:

1. Reserve requirements
2. The discount rate
3. The Federal Open Market Committee

Within statutory limits, the Federal Reserve Board can fix the amount of reserves that member banks must maintain. If the Fed wants to restrict the money supply, it increases deposit reserve obligations. If it wants to increase the supply, it lowers the obligations.

Banks in the Federal Reserve System can borrow from the Fed to meet reserve requirements and obtain funds for their customers even in periods of great demand. To get these loans, member banks agree to pay the Federal Reserve interest at its established discount rate. The Fed can deny loan requests when it believes that borrowing is not in the best interests of the national or regional economy.

The borrowing privilege is a vehicle for expanding the monetary supply. Curtailing that privilege limits or contracts credit. The federal discount rate helps determine the prime rate, the interest rate that a commercial bank charges for short-term loans to borrowers with high credit ratings. The federal discount rate is generally about two percentage points below the prime rate.

The Federal Open Market Committee (FOMC) is probably the most extensively used and most potent of the Federal Reserve's credit-regulating devices. The FOMC buys and sells US government securities in the open market, thereby exerting a powerful influence on the supply of money and the interest rate. In fact, through its daily operations, the FOMC maintains short-term money rates at selected target levels. In periods of economic crisis, the Fed supplies financial markets with necessary liquidity.

Financial market participants may be guided by the opinions of experts, called *Fed watchers*, who often correctly interpret and predict Fed policy by analyzing the committee's activities. Real estate investors and appraisers, whose success may also depend on interpreting and forecasting financial markets, may profit from the extensive information provided by Fed watchers.

with sufficient reserves to accommodate the debt sales program and still leave enough credit for the private sector.

Money Market Instruments

Although it is called a "market," the money market is not formally organized like the New York Stock Exchange. Rather, it is an over-the-counter operation that uses sophisticated communications and computer systems to provide traders with accurate, up-to-the-minute information on national and international transactions. The prices of financial instruments, which are established in a free and active money market, determine their investment yields. These yields consist of an instrument's face, or stated, interest rate plus any price discount earned or minus any price premium paid. The price or cost of money is properly called an *interest rate* because when a borrowing instrument is created, it carries that day's market interest level for the risk rating and maturity involved.

The money market, which deals in instruments with maturities of one year or less, is especially important to real estate development activities. For example, construction loans are short-term mortgages often with variable interest rates that are tied to market indexes. Borrowing costs in the market might be two to four percentage points above the prime rate, which is the short-term loan rate that commercial banks offer to favored customers. When the demand for short-term money is intense and the supply is limited, market interest rates escalate and construction funds become expensive. The high real estate carrying costs that result can destroy the economic feasibility of real estate developments and cause project failures and even bankruptcies.

The anticipated cost and availability of short-term funds are key considerations for developers, and their perceptions cause real estate activity to expand or contract. Appraisers must factor projected construction loan costs, which constitute a large portion of indirect costs, into their value indications in the cost approach. This is particularly important when appraising projects that will require more than one year to complete.

Money market instruments are offered and sold by the federal government, banks, corporations, and local governments. Various instruments are defined in Table 10.4.

Rate Relationships

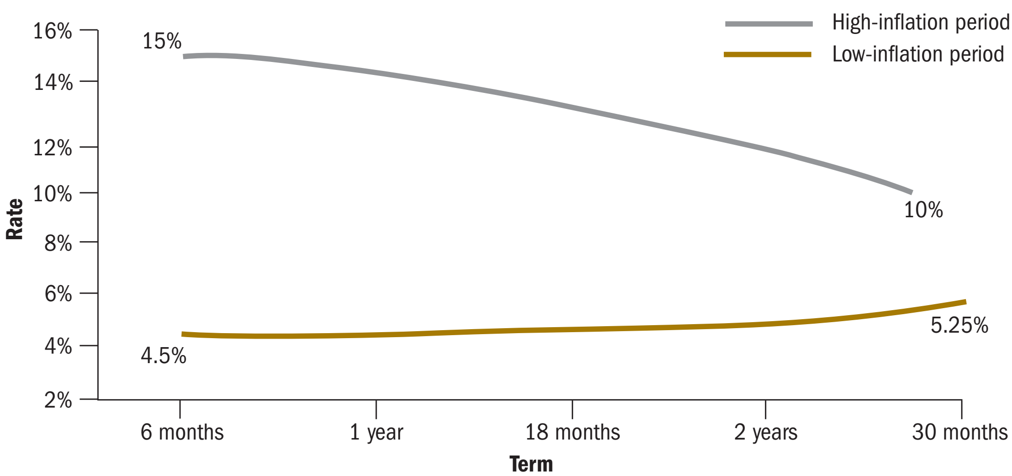
Observable relationships between various instruments in the financial markets stem from the differing interest rates, maturities, and investment risks of the various instruments. Normally an investor in a long-term instrument is believed to assume greater risk than an investor in a short-term instrument. Therefore, long-term instruments usually offer higher yields. This situation is graphically portrayed in what has come to be known as the *normal yield curve* (see Figure 10.3).

Sometimes the relationship is reversed. For example, if investors expect the economy to slow or even decline in the long term, the yield of long-term debt instruments (say, 30-year Treasuries) is lower than that

Table 10.4 Money Market Instruments

Instrument	Characteristics
Federal funds	Funds available at a Federal Reserve bank, including excess reserves of member banks and checks drawn to pay for purchases of government securities by the Federal Reserve Bank. Member banks may borrow these funds to meet Federal Reserve requirements.
Treasury bills or Treasury notes	Intermediate securities with maturities of 1 to 10 years.
Other government securities	Securities created and sold by government-sponsored agencies such as the Federal National Mortgage Corporation, the Federal Farm Credit System, the Federal Home Loan Bank, the World Bank, and the Federal Land Bank.
Repurchase agreements and reverse repurchase agreements	Short-term financing arrangements made by securities dealers, banks, and the Federal Reserve System in which a person who needs funds for a short period uses a portfolio of money market investments as collateral and sells an interest in the portfolio with the obligation to repurchase it, with interest, at a specified future time. A reverse repurchase agreement refers to the obligation of the security dealer, bank, or Federal Reserve System to relinquish control over the portfolio upon fulfillment of the terms by the borrower; also called *repos*.
Certificates of deposit (CDs)	A financial instrument that represents a time deposit with a banking organization.
Commercial paper	A corporation's promissory notes used to borrow short-term funds for current operations. Through trading, organizations with excess cash lend to those in need of money.
Bankers' acceptances	A bank's obligation or promise to pay; similar to commercial paper in that it is a marketable, short-term obligation.
Municipal notes	Short-term, federally tax-exempt obligations of local governments, e.g., villages, cities, counties, that are used to finance current operations until satisfactory long-term funds are obtained.
Eurodollars	Monies such as US dollars deposited outside their countries of origin and used in foreign money markets. The use of Eurodollars has a stabilizing effect on international exchange rates.

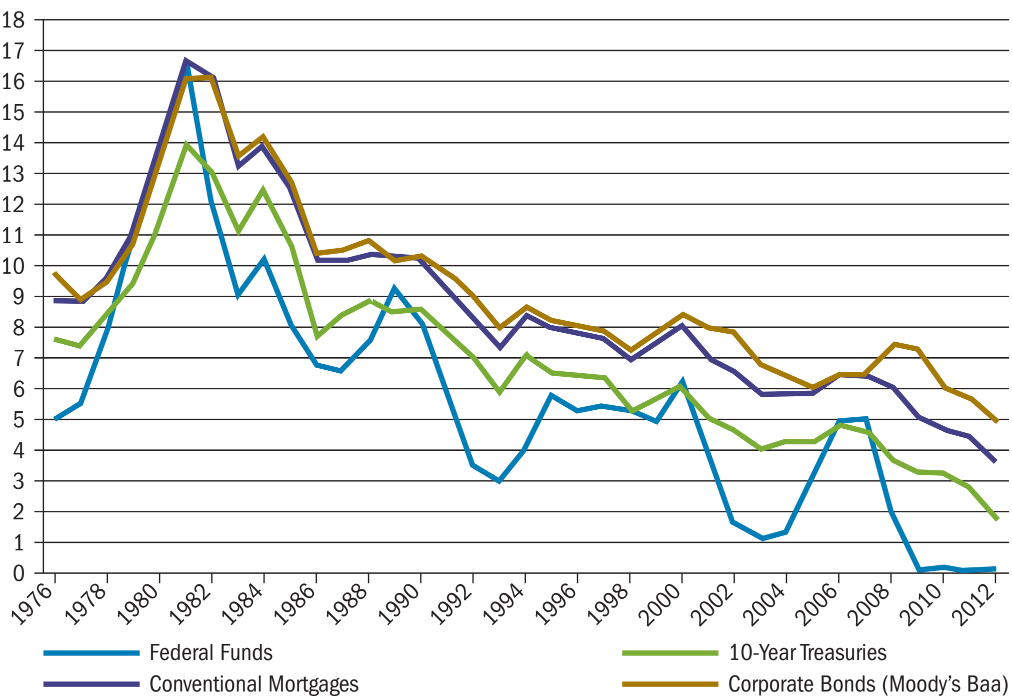
Figure 10.3 Normal Yield Curve



of short-term debt instruments of similar credit quality (say, 5- or 10-year Treasuries). An inverse (or "inverted") yield curve typically precedes a recession. In periods of high inflation investors may be reluctant to take long-term positions. They fear that escalating interest rates will erode their capital, so they try to keep their money in short-term instruments. The Federal Reserve, however, wants to combat inflation, so it causes short-term interest rates to rise. This action is intended to be temporary, lasting just long enough to dampen the inflationary expectations of investors. Consequently, in inflationary times short-term yields may be greater than long-term yields, and the yield curve is said to be inverted. On the other hand, if investors anticipate long-term interest rates will continue to fall in a weak economy, they would expect long-term yield rates to be lower than short-term yield rates, again resulting in an inverted yield curve.

Observing daily trading activity over a period of time may reveal relationships among the earning rates of various instruments traded in money and capital markets (see Figure 10.4). A key investment yield is indicated in the weekly auction of Treasury bills (see Figure 10.5). Because these instruments represent top credit quality and short maturity, their yields establish a base from which market participants measure all short-term money costs, including some real estate construction loan rates. Money market and capital market rate relationships are created by prime investment

Figure 10.4 Key Rate Trends (Annual)



Source: Federal Funds Statistical Release, H.15 Selected Interest Rates

Figure 10.5 Weekly Auction of Treasury Bills

Security Term	Issue Date	Maturity Date	Discount Rate	Investment Rate	Price per $100	CUSIP
13-WEEK	2/14/2013	5/16/2013	0.085	0.086	99.978514	912796AG4
26-WEEK	2/14/2013	8/15/2013	0.12	0.122	99.939333	912796AX7
4-WEEK	2/7/2013	3/7/2013	0.065	0.066	99.994944	9.13E+12
13-WEEK	2/7/2013	5/9/2013	0.07	0.071	99.982306	912796AF6
26-WEEK	2/7/2013	8/8/2013	0.11	0.112	99.944389	912796AV1
52-WEEK	2/7/2013	2/6/2014	0.145	0.147	99.853389	912796AR0
4-WEEK	1/31/2013	2/28/2013	0.035	0.035	99.997278	9127957H8
13-WEEK	1/31/2013	5/2/2013	0.075	0.076	99.981042	9127956L0
26-WEEK	1/31/2013	8/1/2013	0.11	0.112	99.944389	912796AU3
4-WEEK	1/24/2013	2/21/2013	0.06	0.061	99.995333	9127957G0
13-WEEK	1/24/2013	4/25/2013	0.075	0.076	99.981042	912796AB5
26-WEEK	1/24/2013	7/25/2013	0.095	0.096	99.951972	9127957A3
4-WEEK	1/17/2013	2/14/2013	0.095	0.096	99.992611	9127957F2
13-WEEK	1/17/2013	4/18/2013	0.075	0.076	99.981042	912796AA7
26-WEEK	1/17/2013	7/18/2013	0.105	0.107	99.946917	912796AT6
4-WEEK	1/10/2013	2/7/2013	0.055	0.056	99.995722	9127955Z0
13-WEEK	1/10/2013	4/11/2013	0.065	0.066	99.983569	912795Z95
26-WEEK	1/10/2013	7/11/2013	0.105	0.107	99.946917	912796AS8
52-WEEK	1/10/2013	1/9/2014	0.14	0.142	99.858444	912796AQ2
4-WEEK	1/3/2013	1/31/2013	0.075	0.076	99.994167	9127957D7
13-WEEK	1/3/2013	4/4/2013	0.075	0.076	99.981042	9127956F3
26-WEEK	1/3/2013	7/5/2013	0.12	0.122	99.939	912796AN9
4-WEEK	12/27/2012	1/24/2013	0.045	0.046	99.9965	9127957C9
13-WEEK	12/27/2012	3/28/2013	0.085	0.086	99.978514	912795Z61
26-WEEK	12/27/2012	6/27/2013	0.13	0.132	99.934278	9127956W6

Source: http://www.treasurydirect.gov/RI/OFBills (accessed on 11 February 2013)

considerations, which include borrowers' credit, loan maturity, monetary supply and demand conditions, and existing and anticipated inflation rates. All of these factors are important in rating the risk of various investments.

Understanding rate relationships can help appraisers correlate real estate investment risk with the risks associated with actively traded capital market instruments, providing support for market-derived discount and capitalization rates. The financial press contains abundant pricing and yield information to facilitate this process.

Sources of Capital for Real Estate

Equity and debt investors reveal their different aspirations through their market actions. The debt investor participates in bonds or mortgages, usually pursuing conservative paths in search of certain income and the repayment of principal. This type of investor expects a priority claim on investment earnings and often looks for security in the form of a lien on the assets involved. While a debt investor is relatively passive, an equity

Inflation

Inflation occurs when the general level of prices rises. The inflation rate is the rate of change in the price level as reflected in Consumer Price Indices (CPIs). Other useful measures of inflation include the wholesale price index and the GDP implicit price deflator.

Inflation and appreciation have similar effects on future dollars but different effects on yield rates. Inflation tends to increase yield rates (and most rates of return) because investors require a higher nominal rate of return to offset the loss in purchasing power due to inflation. Appreciation will not affect the yield rate unless the risk associated with the property has changed.

In oversupplied markets, real estate may not always keep up with inflation. In an inflationary environment, the value of real estate may tend to increase with the value of other investments such as stocks and bonds. Rents under annual leases can be adjusted upward periodically, while the interest and dividends paid on longer-term securities are more fixed. In undersupplied commercial markets, rent spikes are sometimes observed. These spikes allow market rents to catch up to levels that would have otherwise been achieved by annual inflationary increases in rents. Rent spikes are generally a function of demand.

real interest rate

A nominal interest rate that has been adjusted for expected inflation.

$$\text{Real Interest Rate} = \frac{1 + \text{Nominal Interest Rate}}{1 + \text{Expected Inflation Rate}} - 1$$

or

$$\text{Nominal Rate} - \text{Real Interest Rate} = \text{Inflation Premium}$$

The economic importance of inflation can be seen in the concept of "real" interest rates. Nominal interest rates, which are reported daily in the financial press, are said to be composites of the "real" cost of funds, or the real interest rate, and the premiums that investors demand to protect their currency value from being eroded by inflation. Thus, the nominal rate equals the real interest rate plus a premium for expected inflation. Economists suggest that the real interest rate has historically remained steady at 3% to 4%. Therefore, if the capital market were to show a nominal rate of 6% for 10-year US Treasury notes, the real interest rate concept would indicate an inflation premium of 2%.

$$\text{Nominal Rate} - \text{Real Interest Rate} = \text{Inflation Premium}^*$$
$$6\% - 4\% = 2\%$$

An appraiser can account for the effects of inflation in capitalization by expressing future benefits in constant dollars, which are adjusted to reflect constant purchasing power, as opposed to changing dollars, which are not adjusted. An appraiser can also express the yield rate as a real, uninflated rate of return on capital. In practice, however, appraisers usually project income and expenses in unadjusted, inflated dollars and express the discount rate as a nominal, or apparent, rate of return on capital that includes an allowance for inflation.

* In countries with low inflation like the United States, this formula is an adequate approximation. A more precise formula for computing the real interest rate is

$$\frac{1 + \text{Nominal Rate}}{1 + \text{Inflation Rate}} = 1 + \text{Real Interest Rate}$$

$$\frac{1 + 0.06}{1 + 0.02} = 1.03921\text{, rounded to } 1.04\text{, or a real interest rate of } 4\%$$

equity

The ownership claim on property. Property value is the total of debt and equity. Equity investors assume greater risk and their earnings are subordinate to operating expenses and debt service. They are compensated with dividends (cash flows) and possible appreciation in the value of their investments. Equity includes the residual claim to the assets, which is solely possessed by the owners.

REITs, partnerships, joint ventures, pension funds, insurance companies, hedge funds, and international equity capital are sources of equity investment.

investor is active. An equity investor is more willing to assume risk, and the funds used for equity investment are known as *venture capital.*

Homeowners and other owner-occupants of single-unit residential property are also major sources of capital. Homeowners invest equity, but their investment criteria differ from those of investors in income-producing property. An owner-occupant trades the potential of receiving rental income for the enjoyment of the amenities and tax benefits provided by the property during the ownership period and the financial benefit of the equity reversion, if any, when the house is eventually sold.

Equity

Equity investors realize that their earnings are subordinate to a project's operating expenses and debt service requirements. Equity income earnings are called *dividends.* One year's worth of income to an equity investment is an equity dividend. But equity dividends are only one part of the total return that the investor anticipates. Investors may also expect the value of their original investment to increase, remain stable, or decrease, depending on the type of property and market conditions. The total return the investor anticipates is called the *equity yield.* An equity dividend represents the cash flow component of the equity yield.

Real Estate Investment Trusts

Real estate investment trusts (REITs) have been successful in pooling the funds of small investors to acquire real estate investment positions that could not be handled by these investors individually. Buying shares of REIT stock is not the same as direct investment in a given property. REITs offer shareholders freedom from personal liability, the benefit of expert management, and readily transferable shares. To qualify for a tax pass-through, a REIT must pay dividends of at least 90% of its taxable income.[2] With complicated income-measuring practices, these trusts attempt to pay out almost all their net income and, therefore, are substantially restricted in establishing reserves for possible losses. The liquidity of these securities is an attractive feature.

When analyzing comparable sales, appraisers should consider whether a REIT paid a premium to add the property to its portfolio. REITs tend to purchase properties with the following characteristics:

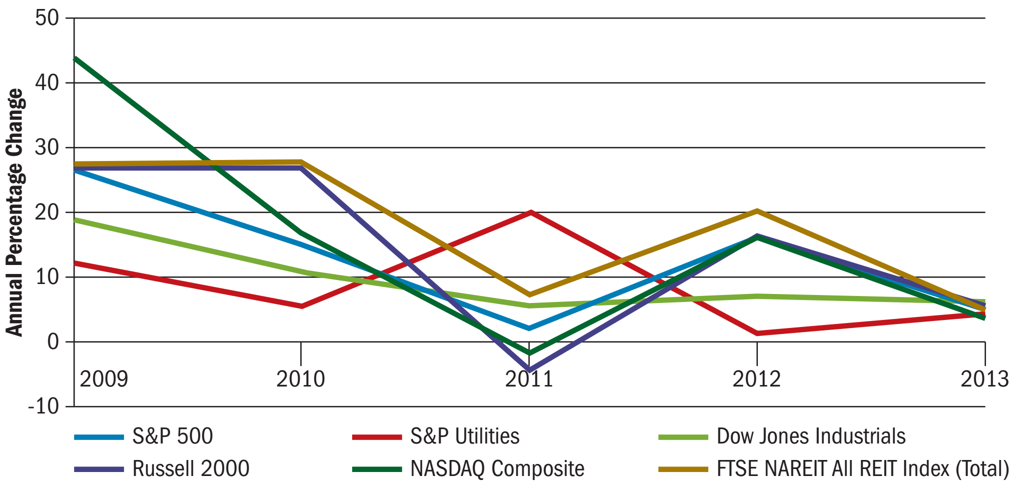
- superior locations in superior markets
- limited lease expiration exposure in any given year

2. The requirements for REITs to maintain their tax advantages are subject to change. The National Association of Real Estate Investment Trusts (NAREIT) provides up-to-date information on REIT regulations and trends through its website at www.nareit.org. See also Joseph L. Ferst and James R. MacCrate, "NAREIT and Tax Law Changes Will Foster Consistency in Accounting Practice and Disclosure Among REITs," *The Appraisal Journal* (January 2000): 14-19.

- improvements with minimal incurable obsolescence
- considerable value
- favorable management characteristics

While the stock market establishes the value of REITs, the income performance of these assets tracks that of real estate markets. REIT prices tend to be less volatile than the Standard & Poor's 500, and the correlation between large cap stocks and REITs has been declining since 1990. Increasingly, analysts and money managers are pointing to REITs as major diversification tools. Figure 10.6 illustrates the recent performance of REITs in comparison to other investments.

Figure 10.6 Comparison of Performance of REITs and Other Investments



Source: NAREIT

Partnerships

A partnership is a common vehicle for pooling real estate equity funds. It is a business arrangement in which two or more persons jointly own a business and share in its profits and losses.

A general partnership is an ownership arrangement in which all partners share in investment gains and losses and each is fully responsible for all liabilities. A general partner has complete liability for the acts of the other partners and is responsible for debts incurred by them. This is one major disadvantage of this type of business arrangement. The most attractive feature of a general partnership in a real estate investment is the ability to pass the tax-shelter benefits of depreciation, interest, and real estate taxes through to partners.

A limited partnership is an ownership arrangement consisting of general and limited partners. General partners manage the business and assume full liability for partnership debt, while limited partners are passive and liable only to the extent of their own capital contributions. Limited partnerships are popular because they permit an uneven distribution of tax-shelter benefits. Although limited partners' financial liability is restricted to their capital contributions, they may receive tax benefits in excess of that amount.

Joint Ventures

A joint venture is a combination of two or more entities that join to undertake a specific project. Although a joint venture often takes the form of a general or limited partnership, it differs from a partnership in that it is intended to be temporary and project-specific. The parties may later embark on other ventures, but each venture is the subject of a separate contractual agreement.

A joint venture arrangement is frequently used in large real estate projects. One party, usually a financial institution, supplies most of the required capital and the other party provides construction or management expertise. Life insurance companies and pension trusts have joined with entrepreneurial building organizations in joint ventures to develop large offices, shopping malls, and other major real estate projects.

Pension Funds

Private and government-operated pension funds are a huge source of investment capital. Usually the pension contributions of employers and employees are placed with a trustee, who is obliged to invest and reinvest the money prudently, accumulate funds, and pay designated plan benefits to retirees. The trustee may be a government body, a trust company, an insurance company, or an individual. In performing these duties, an individual trustee may employ the trust departments of commercial banks, insurance companies, and other financial institutions.[3]

Traditionally pension funds have been involved primarily in securities investments such as stocks and bonds. The development of pass-through securities by Ginnie Mae, however, has made it easier for pension funds to invest in mortgages, and they have made sizable investments. Pension trusts have also shown a willingness to invest in real estate equities by purchasing or participating in the real estate investments created by life insurance companies and commercial banks. Banks and life insurance companies acquire high-quality real estate equities, pool the investments in separate accounts, and supply the necessary portfolio management for a fee. Pension trusts commit funds to these accounts and share in all earnings, which consist of both income returns and sales profits. The real property holdings of a pension fund may be in a separate account or in a commingled fund with other investments.

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3. To protect American workers covered by pension and other benefit plans, Congress adopted the Employee Retirement Income Security Act (ERISA) in 1974 and later the Pension Protection Act of 2006. ERISA and its subsequent amendments establish a comprehensive legislative framework governing the investment, management, and administration of employee pension plans, profit-sharing plans, and welfare plans. ERISA also empowers government agencies to conduct audit programs in performing their duties. After more than three decades, the administrative structure and doctrine of ERISA continue to evolve as the courts and regulatory agencies make judgments concerning compliance by plan administrators and the claims due beneficiaries.

Life Insurance Companies

Life insurance companies have always invested heavily in real estate. Their activities include both mortgage lending (debt) and property ownership (equity investment). Life insurance companies usually acquire real estate positions that are long-term and relate well to their regular business, in which policy premiums are collected over extended periods. Their investment officers regard equities as attractive earning situations that offer growth potential and reasonable protection against the capital erosion caused by inflation.

Hedge Funds

A hedge fund is a type of private investment fund with a controlled pool of investors that is usually structured as a limited partnership or limited liability corporation and is managed privately. In contrast to conventional equity funds such as mutual funds, hedge funds are not subject to official banking rules. Traditionally, hedge funds have sought out short-term, often high-risk and high-leverage investment opportunities that public funds cannot pursue. Hedge funds entered the real estate marketplace prior to the financial crisis by targeting retailers with undervalued real estate assets that can be sold or leased back to the retailer. Since then, hedge funds have emerged as an alternative to the traditional capital sources that have tightened risk management controls since the financial crisis. Distressed properties with a potential financial upside and below-investment-grade real estate securities are the sorts of high-risk real estate investments that hedge funds are able to invest in.

International Equity Capital

Although foreign investors represent only a very small fraction of the total direct real estate investment in the United States, they supply needed equity capital to realty ventures when traditional sources of capital are reluctant to invest. The globalization of financial markets has eliminated some of the obstacles to foreign investment, although international exchange rates still have a significant effect on the relative purchasing power of different currencies.

International capital comes from a variety of sources, such as foreign individuals, financial institutions, and pension funds. Sovereign wealth funds have emerged as significant equity investors. A sovereign wealth fund is a state-owned public investment agency that manages a portfolio of foreign assets to improve the return on traditional foreign exchange reserves. Resource-rich countries have sought opportunities to protect their wealth from fluctuations in the prices of commodities like oil by investing in assets like real estate with more stable long-term financial prospects. In the past, sovereign wealth funds were known to pursue trophy properties, but since the financial crisis they have concentrated on distressed real estate assets, often investing through other funds rather than directly.

Overall, foreign investment in US businesses and housing declined in the early days of the recession but has bounced back. In 2012, foreign investment in US corporations and real estate rose 14% over 2010 levels, with most of the invested capital coming from Europe. The drop in US property prices drew both European and Asian buyers, who perceived the United States as a safe place to invest. Competition from emerging markets globally may be balanced by the declining value of the dollar. The United States continues to be a popular destination for foreign investment, although China and Brazil have gained ground significantly.

debt
One of two characteristic types of capital, the other being equity. The debt investor expects a priority claim on investment earnings and looks for security in the form of a lien on the assets involved and the promise to repay. Debt investors may participate in bonds or mortgages and receive fixed or variable interest on the investment with repayment of the principal upon maturity. In amortizing loans, some principal is paid periodically as well.

Debt

Because mortgage money is so important in real estate, investors, appraisers, and analysts must be familiar with the sources and costs of debt capital. The primary market of direct investors includes the traditional real estate lenders: commercial banks, community banks, life insurances companies, and others. The secondary mortgage market has historically been dominated by government-sponsored enterprises (GSEs) like Fannie Mae and Freddie Mac, although private entities have increased their participation through the purchase of securitized real estate debt.

Commercial Banks

Commercial banks are privately owned institutions that offer a variety of financial services to businesses and individuals. In keeping with their role as short-term lenders, commercial banks have traditionally supplied construction and development loans. For short-term, interim financing, developers are usually required to obtain commitments from long-term, permanent lenders, whereby the lenders agree to "take out" the "end loan" with the developer once the project has been completed. Large commercial banks have also become a principal source of takeout financing, i.e., long-term permanent mortgage loans and end loans, usually for commercial and industrial properties. In small communities, commercial banks such as Wells Fargo and Bank of America are also expected to supply their customers with home loans.

Community Banks

Community-based financial institutions are generally smaller than commercial banks (i.e., community banks have less than $1 billion in assets), but community banks hold a larger proportion of commercial real estate loans as a percentage of their balance sheets, often as much as 50%. Prior to the financial crisis, community banks were able to reduce their risk by selling much of their mortgage portfolios to government-sponsored entities in the secondary mortgage market or to larger, commercial banks. With consumer lending dominated by commercial banks in recent years, community banks have tended to focus on lending for construction and development and loans secured by multifamily properties, farmland, and nonresidential nonfarm properties.

Even though community banks did not hold the sort of securities associated with the financial crisis, they were still hard hit by the poor performance of commercial real estate loans in the following years. From 2008 to 2011, 85% of bank failures involved institutions with less than $1 billion in assets, which often concentrated on small business lending and were associated with local community development.[4]

Commercial banks are more prevalent in metropolitan areas than community banks. As a result, community banks have not been able to take advantage of the relatively stronger economic growth of metropolitan areas to grow as quickly as banks headquartered in those areas. However, structural changes in the US economy, which are shifting economic output from the areas that experienced high growth prior to the financial crisis, may allow community banks to grow at a similar rate as commercial banks in the near future.

Life Insurance Companies

The mortgage investments of life insurance companies cover the full range of realty types–e.g., residences, apartments, offices, shopping malls, hotels, and industrial properties. Because many life insurance companies have great financial resources, they have been important in mortgaging large, income-producing properties. Large companies prefer loans on commercial properties.

Mutual Savings Banks

Mutual savings banks are very similar to mutual savings and loan associations, promoting thrift and investing substantial amounts of savings in real estate mortgages. Generally they have broader investment powers than savings and loan associations did. Savings banks concentrate on mortgages, but they also invest in government bonds, corporate bonds, and, to a lesser degree, real estate and stock equity investments.

Junior Mortgage Originators

Junior mortgages can be used to raise substantial amounts of mortgage funds and to achieve various investment goals, such as creating additional leverage and facilitating sales of properties with first mortgages that cannot be refinanced. Junior mortgages involve greater risk than senior liens do and therefore command higher interest rates.

Secondary Mortgage Market

Government and private organizations stimulate home building through the secondary mortgage market. In this market, mortgagees sell packages of mortgages at prices consistent with existing money market rates. Selling mortgages frees up capital, creates liquidity,

secondary mortgage market
A market created by government and private agencies for the purchase and sale of existing mortgages, which provides greater liquidity for mortgages. Fannie Mae, Freddie Mac, and Ginnie Mae are the principal operators in the secondary mortgage market.

4. US Government Accountability Office, "Causes and Consequences of Recent Bank Failures," *Report to Congressional Committees* GAO-13-71 (January 2013).

Principal Operators in the Secondary Mortgage Market

In the United States, activity in the secondary mortgage market has historically been dominated by a handful of government and quasi-governmental agencies. Government-sponsored enterprises (GSEs) like Fannie Mae, Freddie Mac, and the other participants in the secondary mortgage market are regulated by the federal government. The various GSEs have different investment strategies and level of governmental involvement, but all help to make funds available for home buyers and renters.

Fannie Mae and Freddie Mac

The Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac) are quasi-governmental corporations that engage in certain business activities to ensure liquidity in the mortgage market:

- purchasing existing mortgages from banks, trust companies, mortgage companies, savings and loan associations, and insurance companies
- guaranteeing that the mortgages it holds will be paid on time
- pooling the mortgages into mortgage-backed securities
- either holding or selling the securities to other investors

In 2008, the federal government took conservatorship of Fannie Mae and Freddie Mac in an effort to stabilize the secondary mortgage market during the financial crisis. In a 2011 white paper on mortgage finance reform, the Obama administration proposed the eventual dissolution of the government-sponsored enterprises. The proposal would shift support of mortgage credit from government to private markets through increased guarantee-fee pricing as well as larger down payment requirements. The two GSEs and the Federal Housing Administration support more than 90% of new American home loans. The Treasury report proposed that the government's main roles should be consumer protection, "robust oversight" of lenders, and assistance to low- and middle-income American homeowners and renters. The proposal called for replacing Fannie and Freddie with a federal guarantee in one of three ways:

1. The FHA, Department of Agriculture, and the Department of Veterans Affairs would be the only agencies offering such guarantees.
2. The FHA and a federal government backstop would offer guarantees only in the event of economic stress.
3. The federal backstop would remain in place at all times, regardless of market conditions.

Various options remain for any eventual restructuring of the GSEs, such as taking the organizations out of conservatorship and back into private ownership as stockholder-owned corporations, splitting the two large GSEs into a larger number of smaller entities, absorbing the GSEs into the government again, and others.*

In 2013, the FHFA announced plans to form a new company that would consolidate back-office functions of the two GSEs. The long-term goals for Fannie Mae and Freddie Mac expressed by the FHFA leadership are to gradually contract the dominant presence of the GSEs in the marketplace and shrinking their operations, to build a new infrastructure for the secondary mortgage market, and to maintain current activities that promote market stability and liquidity and help prevent foreclosure.†

Ginnie Mae

The Government National Mortgage Association (GNMA) is a federally owned and financed corporation under the Department of Housing and Urban Development that subsidizes mortgages through its secondary mortgage market operations and issues mortgage-backed, federally insured securities. Its most important program is the mortgage-backed security program in which Ginnie Mae guarantees securities covered by pools of loans collected by mortgage originators.

Farmer Mac

The Federal Agricultural Mortgage Corporation is a federally chartered but privately owned corporation that serves the same function for rural properties as Fannie Mae does for urban and suburban properties. Its most important programs are the secondary mortgage market programs for agricultural real estate and rural housing.

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* See also N. Eric Weiss, *Fannie Mae's and Freddie Mac's Financial Status: Frequently Asked Questions*, CRS Report for Congress (Washington, D.C.: Congressional Research Service, 2012).

† Edward J. DeMarco, "FHFA's Conservatorship Priorities for 2013," Remarks as Prepared for Delivery, National Association for Business Economics 29th Annual Economic Policy Conference, Washington, D.C. (March 4, 2013).

and permits mortgagees to lend when they might otherwise lack funds.

Although most secondary mortgage market activity is generated by Fannie Mae, Freddie Mac, and Ginnie Mae, the private sector has also played a role. Banks and insurance companies with mortgage-originating capability often sell loan portfolios, or mortgage participations, to private or institutional investors. Some REITs have purchased mortgages from institutions, thereby supplying the sellers with the liquidity needed to continue their lending programs.

Securitization of Real Estate Investment Markets

Securities are investment instruments that convey partial ownerships (stocks) or establish debt obligations (bonds). By dividing a pool of properties into a series of ownerships through partnership, corporation, or trust entities, real estate securities create opportunity and allow more investors to be involved. Theoretically, securitization reduces risk to the individual investor because risk can be diffused through a greater number of smaller investments. Securitization usually ensures professional portfolio management as well as professional management of the assets that are securitized. Securitization also expands liquidity, which may not otherwise exist for the investments. The downside of securitization was observed in the financial crisis when investor confidence was crushed by defaults of the subprime loans that served as collateral for many real estate securities, spurring a flight of capital away from those investments in 2008.

The securitization process originally involved the sale of pools of commercial mortgages, known as *commercial mortgage-backed securities* (*CMBSs*), originated by commercial banks, insurance companies, and investment bankers to nontraditional mortgage investors. More recently, collateralization of CMBSs has taken other forms such as collateralized mortgage obligations (CMOs), real estate mortgage investment conduits (REMICs), and collateralized debt obligations (CDOs).

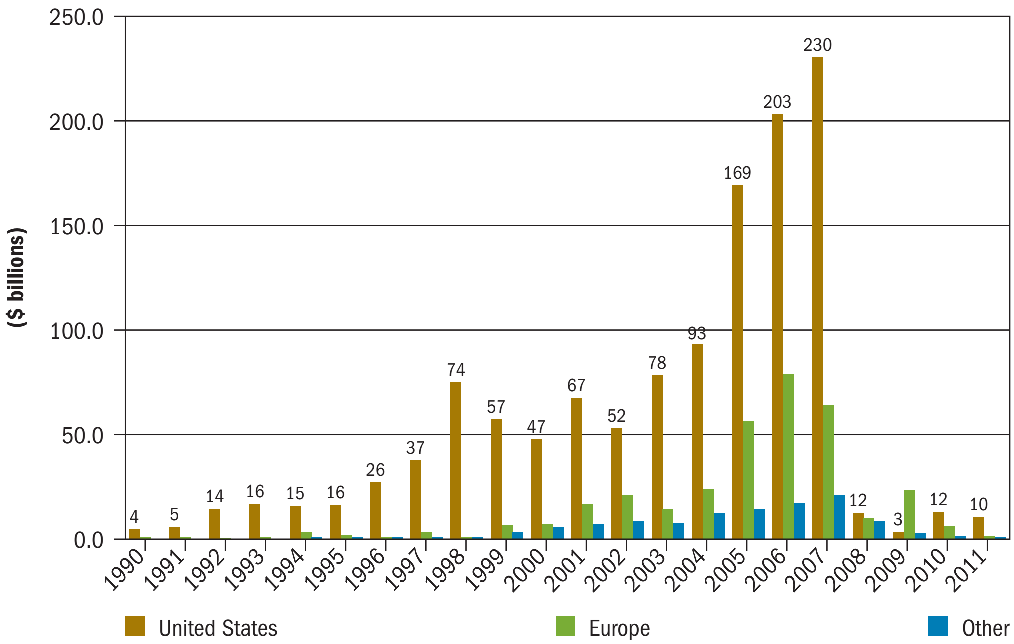
The emergence of CMOs as a major investment banking instrument was prompted by Ginnie Mae guarantee arrangements. CMOs are bonds issued and sold in the capital markets. They are attractive to investors because the debt involved is usually collateralized by Ginnie Mae certificates covering pools of residential mortgages. Prior to the financial crisis, this vehicle was a huge source of liquidity for the mortgage industry and helped monetize the mortgage element in real estate investment. (See Figure 10.7.)

The real estate mortgage investment conduit is a variation in the CMO field. A REMIC transforms the CMO from a pure debt (bond) vehicle into an equity-type investment. In a REMIC arrangement, the certificate represents a proportionate share of ownership in a pool of mortgages. The issuing organization, often an investment bank, avoids adding debt to its balance

security
An asset that is deposited or pledged as a guarantee of the payment or fulfillment of an obligation or debt.

The securitization of real estate interests through the trading of secondary mortgage market issues, CMOs, CDOs, REITs, and CMBSs links real estate capitalization and discount rates to financial market activity.

Figure 10.7 CMBS Issuance



Source: Commercial Mortgage Alert, www.crefc.org (accessed on 11 February 2013).

sheet by using the REMIC. The investor in a REMIC enjoys the benefit of a tax pass-through similar to that of a REIT, and thereby avoids the double taxation incurred by investors in corporations. CMOs of all types brought enormous amounts of capital into the mortgage field.

Collateralized debt obligations (CDOs) differ from CMOs in that the assets used as security are not mortgages. The collateral usually consists of loans and debt instruments, sometimes a mixed portfolio, divided into tranches of different risk levels and a decreasing priority of claims. Since the 1990s, CDOs have been a primary driver of the growth

Security vs. Real Estate

Although public market pricing has some advantages, investor-driven pricing does not necessarily reflect the value of the underlying real estate asset. There is wide variation among real estate securities, depending on the structure of the particular investment vehicle. For example, REITs are subject to stringent requirements as to the dividends paid to investors (expectations of higher or lower dividends can influence pricing) or to legal restrictions limiting the amount of property that can be sold in any given year. REITs can also employ investment leverage, which increases the potential return on the investment but can create difficulties for the investment in market downturns.

In the 1990s, the first property derivatives were developed as financial instruments that allowed owners to hedge risk in property portfolios and investors to participate in the real estate market without direct investment in specific properties. The pricing mechanism for derivatives is an underlying property index. During the financial crisis of 2008, the complexity and lack of transparency of the property derivative structure was criticized as obscuring the risks involved for individual investors and for the health of the market as a whole.

of the securitization of real estate globally, and they are often pointed to as a prime culprit in the subprime mortgage crisis. The vilified credit default swap is a credit derivative in which the buyer makes periodic payments to the seller and, in return, receives payment if an underlying financial instrument (often a CDO) defaults.

As part of the securitization process, ratings agencies like Standard & Poor's, Moody's, Duff & Phelps, and Fitch analyze a pool of loans and rate the offering in the same way that municipal and corporate bonds are rated. Ratings agencies were criticized following the financial crisis for inadequate scrutiny of the underlying subprime loans. The Dodd-Frank legislation gives the Securities and Exchange Commission regulatory power over the ratings agencies, which have responded with increased self-policing.

Debt and Equity Relationships

In the capital markets, when the risks associated with different investments are comparable, funds flow to the investment that offers the best prospective yield. Risks are related to rewards. If capital is to be attracted, competitive yields must be offered. The most persuasive indicators of competitive yield levels are found in money markets where billions of dollars of capital are traded daily, traders are sophisticated and well informed, and investments are often professionally rated for risk.[5]

In an unstable economic climate, appraisers are well advised to collect data on the capital markets to support the conclusions they have developed from real estate market data. The transactions in the financial markets reflect the discounting of economic futures by well-informed investors and provide useful insights for investment analysts.

The largest equity market is the trading of common stocks. Transactions are reported daily, and share prices and current dividend rates are revealed. Financial publications and online sources offer abundant information about corporate earnings and general conditions in commercial and industrial enterprises. This data provides the basis for risk rating of the securities issued by businesses. In the field of debt investments (bonds and debentures), the rating task is often performed by professionals such as Standard & Poor's, Moody's, Duff & Phelps, and Fitch Ratings. Their opinions are widely published. Other information is furnished by the securities analysts of major banking institutions, brokerage companies, and the investment banking industry. Their opinions are readily available to investors.

Analysts' reports and financial publications do not reveal prospective stock yields, but they do provide information from which investment indexes can be drawn. Because value is the present worth of future income and reversion combined, a key element of value is anticipated appreciation or depreciation. In the stock market, securities analysts are the best sources of the type of in-depth information on which the investment community

5. For publications and research from the ratings agencies on the performance of stocks and bonds, see www.standardandpoors.com, www.moodys.com, www.duffandphelps.com, and www.fitchratings.com.

bases its growth or depreciation forecasts. In this regard a securities analyst functions like a real estate appraiser, who arrives at an opinion of value by discounting market-supported income and reversion forecasts.

The second, larger component in real estate investment is the debt capital segment, or mortgage funds. Again, capital markets offer abundant information on investor yield requirements for a great variety of debt instruments with different maturities and risk ratings. In the bond and debenture markets, there are hundreds of thousands of daily transactions involving billions of dollars. Each transaction represents one investor's discounting of perceived future economic conditions. The entire volume of transactions presents an excellent picture of well-informed expectations of debt capital performance.

Investment Yields

There are differences in the investment yields produced by debt and equity instruments. With a debt instrument, the original lender is entitled to interest at a specified rate, either fixed or variable, and full payment of the loan amount at maturity. The arrangement may call for periodic payments of interest only and full repayment of the principal at maturity, as in the case of bonds, or it may require periodic payments that combine interest and debt reduction, as in most mortgage loans.

Types of Risk

Every real estate transaction contains an element of risk. A lender accepts the risk that a borrower may default on a loan. A landlord accepts the risk that tenants will not renew at the termination of a lease. Home buyers accept risks related to the quality and condition of unseen building elements and, on a larger level, the likelihood that property values in the neighborhood will go up or down in the future. Risk increases as the range of possible outcomes grows. The rate of return necessary to attract investment increases along with risk levels.

Various types of risk can affect an investment:

Market risk

Definition: Risk that net operating income will be affected by changes in the market—e.g., shifts in demand or supply or both

Influenced by:
- type of property
- location of property
- stage in cycle

Financial risk

Definition: Risk related to the use of debt to finance an investment (e.g., default, prepayment, contractual financing terms that cannot respond to interest rate changes)

Influenced by:
- amount of debt
- type of debt

Capital market risk

Definition: Risk that market value will be affected by changes in capital markets—e.g., mortgage yield rates, equity yield rates, overall yield rates (due to the changes in mortgage or equity yield rates), or overall and terminal capitalization rates (due to changes in overall yield rates)

Influenced by:
- changes in levels of interest rates
- changes in availability of capital (both mortgage and equity)
- rate of return for alternative investment opportunities

An equity investment has none of the contractual certainty or specificity of a debt position. The income or dividend earnings are simply the amount of a venture's income, if any, after operating expenses and debt service are paid. This cash flow can be positive or negative, depending on whether there is an excess or deficiency of income after all expenses. The reversion is simply the venture's market value at the end of the investment holding period–i.e., a future value. When entering into an investment, an investor considers the forecast dividend earnings and reversion in relation to the acquisition price. This relationship reflects the prospective equity yield. Upon termination of the investment, the dividends and reversion realized are related to the original amount of the investment to reflect the historic equity yield.

Leverage

The term *leverage* refers to how borrowed funds increase or decrease the equity return. The leverage an investor obtains by using borrowed funds to finance an investment is accompanied by risk. The investor seeks compensation for this risk by requiring a higher equity yield rate. In analyzing cash

Inflation (purchasing power risk)

Definition:	Risk that unexpected inflation will cause cash flow from operations and reversion to lose purchasing power
Influenced by:	· lease provisions that provide inflation protection

Liquidity (marketability) risk

Definition:	Difficulty of converting a real estate investment into cash at market value in a reasonable time
Influenced by:	· inefficiency of real estate market

Environmental risk

Definition:	Risk that the market value of a property will be affected by its physical environment
Influenced by:	· perceived health hazards
	· costs associated with dealing with potential environmental problems
	· acts of nature such as earthquakes and weather conditions

Legislative risk

Definition:	Risk that legal factors will affect the market value of a property
Influenced by:	· tax law changes
	· environmental regulations
	· change in land use regulations (zoning)
	· ability to navigate permitting process

Management risk

Definition:	Risk that the management cannot ensure that the property meets defined goals
Influenced by:	· competency of management
	· type of property (e.g., regional malls require more intensive management than warehouses)

Each of these types of risk can influence a property separately or in combinations. For example, a change in federal tax laws (legislative risk) may lead to changes in the required equity yield rate (capital market risk), or unexpected inflation (inflation risk) can cause mortgage interest rates to rise (capital market risk).

Comparable properties in the income capitalization approach should have the same degree of risk as the subject property because risk is a consideration in the selection of overall capitalization and yield rates.

flows, positive leverage is indicated when the overall capitalization rate is greater than the mortgage capitalization rate. The difference between the two rates directly benefits the equity owner, so the equity capitalization rate is higher than it would be if there were no mortgage. The same relationships hold for overall, equity, and mortgage yield rates. (See Table 10.5.)

Table 10.5 Types of Leverage

Leverage Is	Using Equity Capitalization Rates	Using Equity Yield Rates
Positive	If the overall capitalization rate is greater than the mortgage capitalization rate, then the equity capitalization rate is greater than the overall capitalization rate.	If the overall yield rate is greater than the mortgage yield rate, then the equity yield rate is greater than the overall yield rate.
Neutral	If the overall capitalization rate is equal to the mortgage capitalization rate, then the equity capitalization rate is equal to the overall capitalization rate.	If the overall yield rate is equal to the mortgage yield rate, then the equity yield rate is equal to the overall yield rate.
Negative	If the overall capitalization rate is less than the mortgage capitalization rate, then the equity capitalization rate is less than the overall capitalization rate.	If the overall yield rate is less than the mortgage yield rate, then the equity yield rate is less than the overall yield rate.

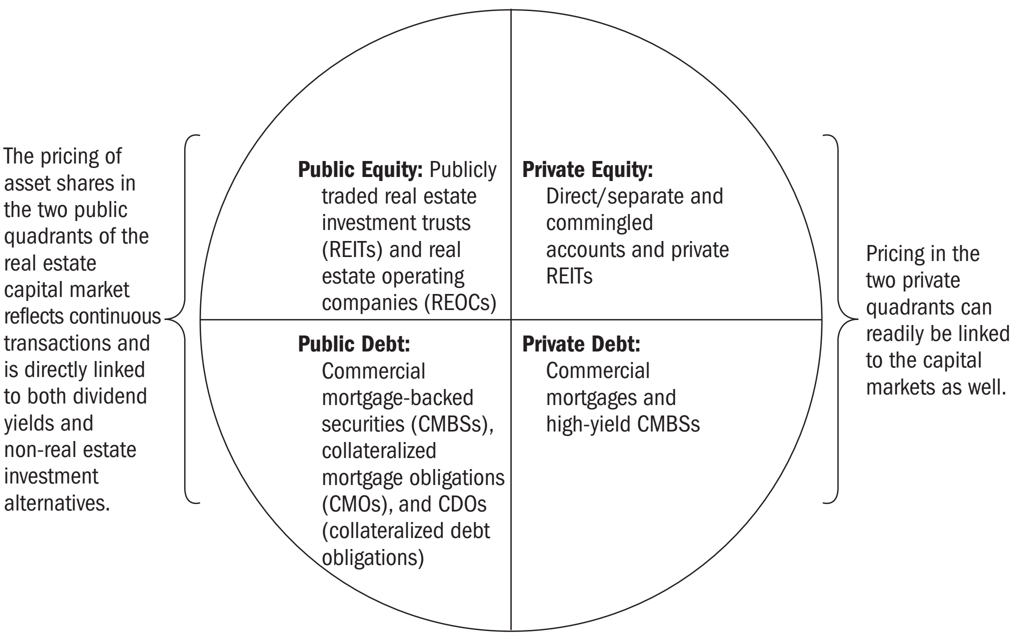
The analysis of leverage is important because positive or negative leverage can affect the level of risk associated with a real property investment and the yield required to satisfy an investor willing to assume the risk. The use of leverage magnifies fluctuations in cash flow, and enhanced variability translates into risk. If property performance falls below expectations and periods of insufficient cash flow are protracted, the investor may become strapped for cash to service the debt on the property, a situation many real estate investors encountered as prices of highly leveraged properties dropped following the financial crisis of 2008. If market conditions become illiquid, the investor may be unable to command a price for the property that allows for repayment of the debt.

Yields on Real Estate and Other Investments

For many years, appraisers and others involved in real estate investment have debated the degree to which returns on real estate may be analogous with, or even directly parallel to, yields on other forms of investment, real estate securities in particular. The securitization of real estate investment has been accompanied by the evolution of a four-quadrant capital market (as illustrated in Figure 10.8). This development has brought about a structural change in capital market financing for real estate. The pricing of publicly traded asset shares reflects a premium for liquidity. The pricing of asset shares in the private market quadrants is related to activity in the public markets.

There are both advantages and disadvantages associated with investor-driven pricing in contrast to real estate user-driven prices. Returns on certain real estate investments are closely related to the returns on non-real estate investment alternatives. Real estate is an economic sector, however, not just another asset class. The value of real estate depends on performance, not simply investor behavior.

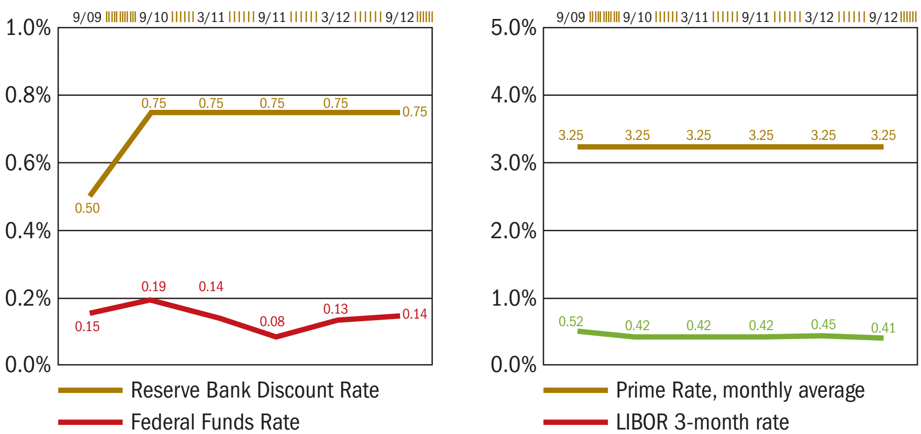
Figure 10.8 The Four-Quadrant Investment Capital Market for Real Estate



Gathering Macro-Level Data on Yield Levels

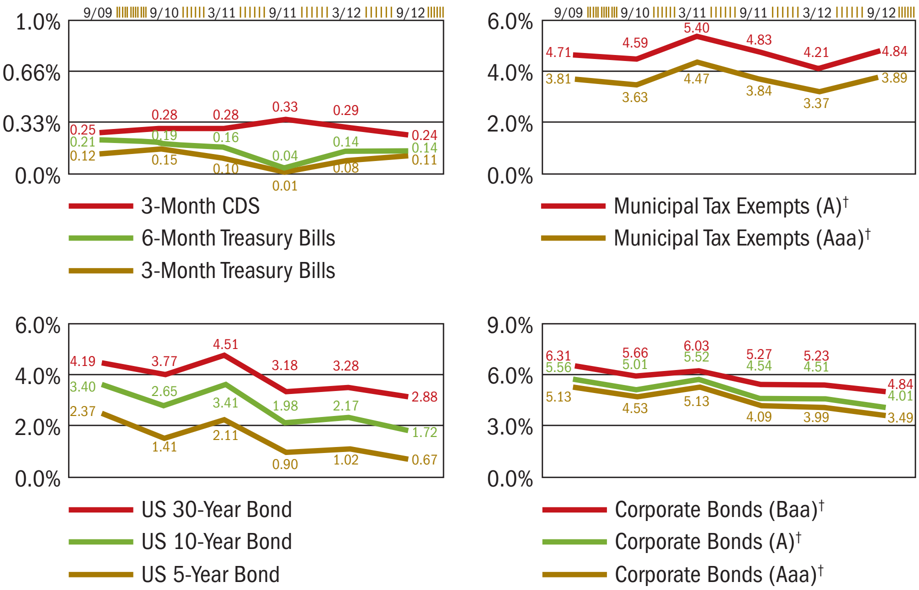
Information on various debt and equity instruments and their yield rates is readily available in daily newspapers, in trade publications, and from various online sources.

Market Rates



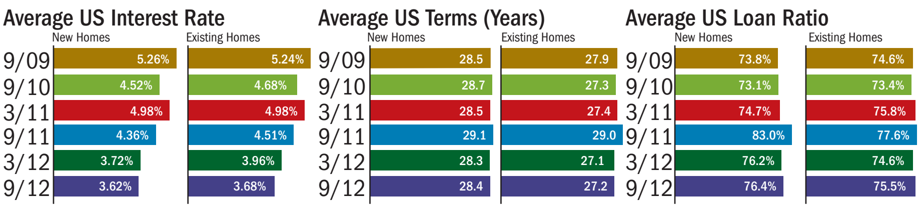
Source: *Valuation* (Fourth Quarter 2012): 41.

Market Rates and Bond Yields

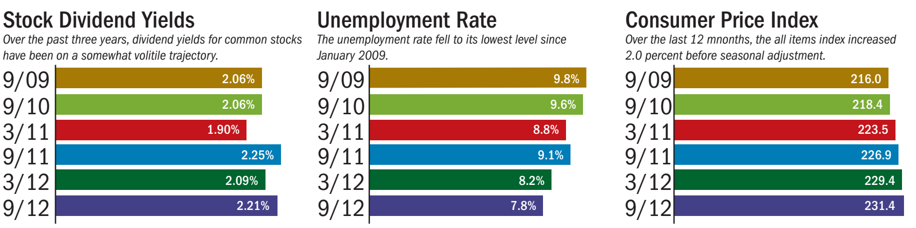


Source: Moody's Bond Record in *Valuation* (Fourth Quarter 2012): 42.

Conventional Home Mortgage Terms



Other Benchmarks



Source: *Valuation* (Fourth Quarter 2012): 43.

The yield levels of bonds are fixed by the contract between the buyer and seller of the bonds, but in real estate few of the elements needed to forecast yield and risk can be fixed in that manner. Comparing the yield spreads with some designated riskless rate that investors require for various assets in competitive markets indicates the levels of risk associated with a real estate investment. Given a range of yield rates, investors make judgments about the investment's uncertainties based on the characteristics of the property and the community in which it is located.

Neighborhoods, Districts, and Market Areas

Buyers and sellers of different property types interact in different areas for various reasons. Real estate markets are divided into categories based on property types and their appeal to different market participants. The markets for various categories of real estate are further divided into submarkets, which correspond to the preferences of buyers and users. Differentiating real estate markets into market segments facilitates their study.

All real estate markets are influenced by the attitudes, motivations, and interactions of buyers and sellers of real property, which in turn are subject to many social, economic, governmental, and environmental influences. Property values are also affected by the four factors of value: utility, scarcity, desire, and effective purchasing power. Real estate markets may be studied in terms of their geographic, competitive, and supply-and-demand characteristics, which relate to overall real estate market conditions.

The identification and interpretation of real estate markets are analytical processes. To answer questions about real estate markets and market segments, appraisers analyze the utility and scarcity of property as well as the desires and effective purchasing power of those who seek to acquire property rights. For example, many lender-owned residential properties that are available at desirable prices cannot be purchased by a typical owner-user because the owner-user would not be able to acquire the financing needed to make improvements that would make the property habitable or comfortable.

Characteristics of Real Estate Markets

Market Segmentation and Delineation

A real estate market consists of a group of individuals or firms that are in contact with one another for the purpose of conducting real estate transactions. Possible market participants include the following:

- buyers
- sellers
- landlords (lessors)
- tenants (lessees)
- lenders (mortgagees)
- borrowers (mortgagors)
- developers
- builders
- property managers
- owners
- investors
- brokers
- attorneys

Each market participant does not have to be in contact with every other participant. A person or firm is part of the market if that person or firm is in contact with another subset of market participants.

The actions of market participants are prompted by their expectations about the uses of a property and the benefits that property will offer its users. Market segmentation, therefore, differentiates the most probable users of a property from the general population by their consumer characteristics. The activity of individual market participants in a real estate market focuses on a real estate product and the service it provides. Product disaggregation, therefore, differentiates the subject property and competitive properties from other types of properties on the basis of their attributes or characteristics.

A market segment is delineated by identifying the market participants likely to be interested in the subject real estate and the type of real estate product or service it provides. Product disaggregation includes both the subject property and competitive and complementary properties. Thus, market analysis combines market segmentation and product disaggregation. The characteristics of a subject property and its market area that are investigated by an appraiser in the process of delineating the market are illustrated in Figure 11.1.

An appraiser should include only relevant data in analyzing the market and preparing the appraisal report. For example, an appraisal report for an apartment property should not include a detailed market

submarket

A division of a total market that reflects the preferences of a particular set of buyers and sellers.

market segmentation

The process by which submarkets within a larger market are identified and analyzed.

disaggregation

Grouping properties together based on similar attributes or characteristics.

Figure 11.1 Market Delineation Process

To identify a specific real estate market, an appraiser investigates the following factors:

1. Property type (e.g., single-unit residence, retail shopping center, office building).
2. Property features such as occupancy, customer base, quality of construction, and design and amenities.
   a. Occupancy—single-tenant or multitenant (residential, apartment, office, retail).
   b. Customer base—the most probable users. Data on population, employment, income, and activity patterns is analyzed. For residential markets, data is broken down according to the profile of the likely property owner or tenant. For commercial markets, data is segmented according to the likely users of the space. For retail markets, the clientele that the prospective tenants will draw represents the customer base. For office markets, the customer base reflects the space needs of prospective companies leasing office units.
   c. Quality of construction (class of building).
   d. Design and amenity features.
3. Market area—defined geographically or locationally. A market area may be local, regional, national, or international in scope. It may be urban, suburban, or rural. It may correspond to a district or neighborhood of a city. Retail and residential market areas are often delineated by specific time-distance relationships.
4. Available substitute properties—i.e., equally desirable properties competing with the subject in its market area, which may be local, regional, national, or international.
5. Complementary properties—i.e., other properties or property types that are complementary to the subject. The users of the subject property need to have access to complementary properties, which are also referred to as *support facilities*.

analysis of the retail and office property markets and fail to provide a thorough analysis of the apartment market. Another common error is failing to identify correctly whether the market for the property is local, regional, or national.

Specific real estate markets can be identified by property type, property features, market area, substitute properties, and complementary properties.

Defining Geographical Boundaries

The boundaries of market areas, neighborhoods, and districts identify the areas that influence a subject property's value. These boundaries may coincide with observable changes in land use or demographic characteristics. Physical features such as structure types, street patterns, terrain, vegetation, and lot sizes help to identify land use districts. Transportation arteries (highways, major streets, and railroads), bodies of water (rivers, lakes, and streams), and changing elevation (hills, mountains, cliffs, and valleys) can also be significant boundaries.[1]

To identify the boundaries of a market area, an appraiser

1. Examines the subject property. The process of defining a market area's boundaries must start with an analysis of the subject property.
2. Examines the area's physical characteristics. The appraiser should drive or walk around the area to develop a sense of place, noting the degree of similarity in land uses, structure types, architectural

1. In defining a district, variations in the relevant characteristics of properties may indicate that more limited boundaries should be established. For example, consider an urban area where many high-rise apartment buildings are constructed along a natural lakeshore and separated from other land uses by major transportation arteries. In this type of district, there may be great variations in apartment prices, sizes, views, parking availability, proximity to public transportation, and building ages. These variations suggest limited district boundaries that must be identified to reveal market and submarket characteristics.

styles, and maintenance and upkeep. Using a map, the appraiser can identify points where these characteristics change and note any physical barriers—e.g., major streets, hills, rivers, railroad tracks—that coincide with these points.

3. Determines preliminary boundaries on a map. The appraiser indicates lines on a map of the area to connect the points where physical characteristics change.
4. Determines how well the preliminary boundaries correspond to the demographic data. The market area boundaries are often overlaid on a map of geographical areas (e.g., zip codes, census tracts, block groups). The appraiser's observed market area and the areas for which data is available seldom match up perfectly. The information available for census tracts, zip code regions, and counties must be segmented to delineate pertinent submarkets.[2] Reliable data may also be available from local chambers of commerce, universities, and research organizations, often through online sources.

Market areas are defined by a combination of factors—e.g., physical features, the demographic and socioeconomic characteristics of the residents or tenants, the condition of the improvements (age, upkeep, ownership, and vacancy rates), and land use trends.

In unusual cases an appraiser might consider surveying area residents to identify relevant characteristics. Appraisers may also interview business people, brokers, and community representatives to establish how far they think the market area extends. Through experience, an appraiser learns to observe changes and recognize how market areas are perceived by their inhabitants.

Legal, political, and economic organizations collect data for standardized or statistically defined areas such as cities, counties, tax districts, census tracts, and special enumeration districts. Although this data may be relevant, it rarely conforms to the market area boundaries identified for property valuation. If such secondary data is used to help identify market area boundaries, the appraiser should verify and supplement the data with primary research.

Value Influences in Real Estate Markets

As mentioned in the previous chapter, the four forces that influence value (i.e., social, economic, governmental, and environmental forces) interact in the marketplace, creating unique combinations of factors. Careful study of general data related to a real estate market's character is a prerequisite to the more formal application of market analysis, highest and best use analysis, and the approaches to value.

Social Influences

An appraiser identifies relevant social characteristics and influences, focusing on the demographic characteristics that tend to influence prop-

2. Every 10 years the Bureau of the Census of the US Department of Commerce collects data on population and housing characteristics, employment, and earnings. For information on applying US census and other data to the analysis of market areas, see Stephen F. Fanning, *Market Analysis for Real Estate: Concepts and Applications in Valuation and Highest and Best Use* (Chicago: Appraisal Institute, 2005), Chapters 7 and 8, and the forthcoming new edition of that book.

erty values most in a community. Of course, comparing price levels in one market with prices in competing areas serves as an indication of the overall desirability of the areas.

In the analysis of a market area, relevant demographic characteristics include the following:

- population density, which is particularly important in central business districts and high-rise residential neighborhoods
- educational characteristics, skill levels, and employment categories, which are particularly important in industrial or high-technology districts
- age levels, which are particularly important in residential neighborhoods
- household size
- cost of living
- employment levels and types of unemployment (temporary, seasonal, or chronic)
- extent of crime

Although an appraiser can compile extensive demographic information, it is difficult, if not impossible, to identify the specific social preferences of the individuals who make up a given market and to measure how these preferences affect property value. From an appraiser's viewpoint, the social characteristics of a neighborhood are significant only when they are considered by the buying public and can be objectively and accurately analyzed. Although race, religion, and national origin are social characteristics, they have no relationship to real estate values. Appraisers must perform unbiased analyses of neighborhoods, districts, and market areas.[3]

Economic Influences

Economic influences and government policy have a major effect on both residential and commercial real estate markets. The general decline in the US economy since 2006 has severely lessened the demand for many types of real estate, while tightened lending requirements have drastically restricted the ability of potential home buyers and investors to qualify for loans. The importance of these factors cannot be overstated.

On a local level, economic considerations relate to the financial capacity of a market area's occupants and their ability to rent or own property, to maintain it in an attractive and desirable condition, and to renovate or rehabilitate it when needed.

The economic characteristics that an appraiser may consider include the following:

- mean and median household income levels
- per capita income

3. The Ethics Rule of the Uniform Standards of Professional Appraisal Practice states that "An appraiser must not use or rely on unsupported conclusions relating to characteristics such as race, color, religion, national origin, gender, marital status, familial status, age, receipt of public assistance income, handicap, or an unsupported conclusion that homogeneity of such characteristics is necessary to maximize value."

- income distribution for households
- consumer activity
- extent of owner occupancy
- property rent levels and trends
- property value levels and trends
- vacancy rates for various types of property
- amount of development and construction

The physical characteristics of the area and of individual properties may indicate the relative financial strength of area occupants and how this strength is reflected in local development and upkeep. Ownership and rental data can also provide clues to the financial capability of residents. The income levels revealed by recent census information, media surveys, and private studies may indicate the prices at which occupants can afford to rent or purchase property.

The presence of vacant lots or acreage suitable for development in an area may indicate future development or a lack of demand. Current construction trends affect the value of existing improvements. A careful study of these trends can help an appraiser forecast the future desirability of an area. Block-by-block information helps identify the direction of growth. A trend may be a local phenomenon or it may affect the entire metropolitan area. A change in the economic base on which a community depends (e.g., the addition or loss of a major employer) is frequently reflected in the rate of population growth or decline.

To analyze the economic characteristics of a market area, an appraiser expands the analysis to include economic trends over a multiyear period. Then the appraiser decides which economic variables contribute most to value differences among locations and compares the economic characteristics of competing market areas.

Governmental Influences

As mentioned previously, government action affects the economic climate for real estate investment. One significant legislative action on the national level was passage of the Dodd-Frank Wall Street Reform and Consumer Protection Act in July 2010. The act was created to regulate credit cards, financial instruments, loans, and mortgages and to increase the supervision of Wall Street investment firms, banks, hedge funds, insurance companies, and the Federal Reserve. The ramifications of the Dodd-Frank act are still playing out and will continue to affect the economy and real estate markets in the foreseeable future.

On the local level, governmental considerations relate to the laws, regulations, and property taxes that affect properties in the local market and the administration and enforcement of these constraints, such as zoning laws and building codes. The property tax burden associated with the benefits provided and the taxes charged for similar benefits in other areas may be significant.

The governmental characteristics an appraiser considers in the analysis of a market area include the following:

- property tax burden (including special assessments) relative to services provided, compared with other areas in the community
- policies regarding developmental growth
- local government development levies (impact fees)
- zoning, building, and housing codes
- quality of public services, such as fire and police protection, schools, and other governmental services
- environmental regulations

Divergent tax rates or impact fees may affect market value. Local taxes may favor or penalize certain property types. By examining the local structure of assessed values and tax rates, an appraiser can compare the tax burdens created by various forms of taxation and ascertain their apparent effect on the values of different types of real estate.

Local zoning ordinances regulate land use and the density of development. With varying degrees of success, communities regulate zoning to halt or slow growth. To encourage new development, they may expand capital improvement programs and construct sewage treatment facilities, fire stations, streets, and public recreational facilities. In the absence of zoning, the appraiser should determine if any private restrictions are in place that would protect long-term property values.[4]

Zoning may also be used to enforce a community's land use plan or comprehensive plan, which is usually based on growth projections and influenced by political considerations. The appraiser should be aware of the assumptions on which the land use plan is based and of the potential for revision. The appraiser also must consider the date that the plan was adopted and the plan's projection term. The more recently the land use plan was adopted, the more meaningful it will be.

Environmental concerns have prompted increased regulation of land development at state and local levels. Zoning ordinances and building codes impose additional costs on developers. To preserve environmental quality, developers are required to consider the impact large developments will have on an area's ecology and on the larger environmental system. Developers may be required to improve public roads, construct sewage treatment facilities, preserve natural terrain, or take other actions to conform to the recommendations of local, regional, or state planning agencies. These regulations can significantly increase the time required to complete a development and hence increase its final cost. The value of subdivision land is influenced by environmental regulations, which can affect costs and the amount of time required to develop and sell the sites.

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4. Private restrictions on land use may be established by private owners through provisions in deeds or plat recordings. These restrictions may specify lot and building sizes in a subdivision, permitted architectural styles, and property uses. Condominium bylaws also restrict property use. The appraiser should make certain that private restrictions do not limit property uses inordinately.

The creation or modification of the transportation system and the provision of services are government actions. An improvement in the transportation system can affect a site's accessibility and, thus, its value. Improved transportation routes often cause new areas to be developed. A municipality's willingness to provide public services to outlying areas can also affect the direction and amount of development. Similarly, a lack of transportation routes and limitations on the expansion of sewer service can restrict local growth.

Environmental Influences

Environmental considerations consist of any natural or man-made features that are contained in or affect the property's location, including the following:

- topographical features (terrain and vegetation)
- environmental features important to wildlife habitat
- navigable waterways
- open space
- nuisances and hazards emanating from nearby facilities such as shopping centers, factories, and schools—e.g., odors, noises, litter, vibrations, fog, smoke, and smog
- the adequacy of public utilities such as streetlights, water, sewers, and electricity
- general maintenance
- effective ages of properties
- changes in property use and land use patterns
- environmental liabilities—e.g., threat of landslides or flooding
- access to public transportation (and type of system, e.g., bus, rail), schools (and quality of schools), stores and service establishments, parks and recreational facilities, houses of worship, and workplaces

A market area's environmental characteristics cannot be judged on an absolute scale. Instead, they must be compared with the characteristics of competing areas.

Topographical features can have positive or negative effects on property values. The presence of a lake, river, or hill nearby can provide a scenic advantage, while excessive traffic, odors, smoke, dust, or noise from commercial or manufacturing enterprises can make a neighborhood less desirable. Environmental features important to wildlife habitat can cause regulators to restrict development. For example, the presence of spotted owls, an endangered species, in forested areas in the Northwest has led to bans on logging and development.

Gas, electricity, water, telephone, cable and Internet service, and storm and sanitary sewers are essential to meeting the accepted standard of living in most municipal areas. A deficiency in any of these services tends to decrease property values in a market area. The availability of utilities also affects the direction and timing of growth or development.

City Origins and Growth Patterns

Appraisers of urban and suburban property recognize that growth and change in a community can affect neighborhoods, districts, and other market areas differently. An appraiser must understand the factors that contribute to urban and suburban growth patterns to analyze the market area where the subject property is located and to determine how the area affects the quantity, quality, and durability of the subject property's future income or the amenities that create value.

The structure of land uses in an urban community usually reflects the settlement's origin. This is known as the *siting factor*. Some US cities were established at transportation centers such as seaports, river crossings, or the intersection of trade routes. Other cities were founded near power sources useful to manufacturing, and still others were located for defensive, commercial, or political reasons. As the national standard of living improved, climate and other natural advantages became siting factors responsible for the development of retirement areas, recreational resorts, and other specialized communities. From its initial site, a community grows outward in a pattern dictated by the nature and availability of developable land, the evolution of technology, and the government's ability and willingness to provide essential public services.*

Where land is scarce, communities often experience an increase in land use density. Development corridors channel new construction to usable land. New technology, building materials, and construction methods make it possible to construct high-rise buildings in cities without bedrock and those subject to earth tremors.

Transportation improvements and the proliferation of automobiles have also shaped modern cities. Improved transportation allows urban settlements to expand and serve larger markets. The pattern of city growth is influenced by the local transportation network. Growth usually radiates from the central business district along major transportation routes. Major freeway systems can cause widespread migration from the city's core.

* Various conceptual models of urban growth are used to describe land use patterns. These "social ecology" models include the concentric zone theory, the sector (wedge) theory, the multiple nuclei theory, and the radial (axial) corridor theory. For a more complete discussion of urban growth patterns, see Stephen F. Fanning, *Market Analysis for Real Estate: Concepts and Applications in Valuation and Highest and Best Use* (Chicago: Appraisal Institute, 2005), Chapter 5.

Location may refer to the siting of a property and the effect of siting on accessibility—e.g., the ease of access to a corner lot compared to an interior lot. It can also refer to the time-distance relationships, or linkages, between a property or market area and all other possible origins and destinations of people going to or coming from the property or market area. Usually all the properties in a well-defined market area have the same or similar locational relationships.

When current zoning does not restrict changes from the present land use or when a change in land use is evident, the appraiser may need to examine linkages in terms of both the current land use and the anticipated land use in the market area.

A market participant's idea of what makes an area desirable can be studied by analyzing comparable sales. The dollar and percentage differences among the sale prices of similar properties in different locations can provide the basis for this analysis.

Characteristics of Real Estate Districts

The value influences that affect different types of districts—e.g., residential districts, commercial districts, industrial districts—are the same as those affecting larger, more diverse market areas, but the emphasis and relative importance of the factors change with the type of district being analyzed.

The availability of public utilities, including sanitary sewers and municipal or well water, is one important factor that affects land value in all districts. Prevailing levels of real estate and personal property taxes also influence the desirability of districts and may be reflected in real estate values. Of course, the four forces that influence all real estate value–utility, scarcity, desire, and effective purchasing power–affect districts.

One-Unit Residential Districts

Homeownership has long symbolized economic prosperity, and the residents of an area dominated by owner-occupied single-unit homes often take an active role in maintaining or enhancing the value of their properties. Through formal homeowners associations, which often enforce conditions, covenants, and restrictions in a development, or voluntary associations such as crime watch groups and neighborhood block clubs, property owners attempt to ensure conformity of land uses within a residential district and thus safeguard the character, appeal, and value of neighboring homes.

Community spirit, which is evidenced in activities such as block parties and street fairs, and activist efforts, such as lobbying against undesirable rezoning or development, can make a residential area more stable or even reverse a trend toward declining property values.

In built-up urban areas, single-unit homes will usually be integrated into the complementary land uses that make up a residential neighborhood. In outlying suburban areas where developable green space has historically been relatively cheap, single-unit residential districts can cover large amounts of land, although the overbuilding prior to the financial crisis has forced many communities to consider efforts to increase residential density rather than promote residential development on large lots. In some metropolitan areas, suburban sprawl has become as much of a social problem as flight from central cities was in the 1960s and 1970s. The influence of commuting time on the value of residential districts in distant suburbs should be considered.

Just as the availability of labor and consumer purchasing power is essential to the economic health of commercial and industrial districts, proximity to employment opportunities significantly influences property values in a residential district. As employers relocate from central cities to areas closer to their employees' homes, former bedroom communities can develop thriving commercial districts. These districts can rival the central business district of the larger metropolitan area and may serve as an economic base for surrounding residential areas. Long-term migratory patterns within a metropolitan area can be analyzed to forecast possible growth trends.

The topographical and climatic features of land in a residential district are generally analyzed as possible amenities or potential hazards. Access to a body of water can increase a home's value if the location provides a scenic view, but the same lake or stream may reduce value if flooding

Figure 11.1 Characteristics of One-Unit Residential Districts

Defining characteristic	· Predominance of owner-occupied homes
Examples of subdistricts	· Custom-built subdivisions · Attached housing, e.g., condominiums, townhouses · Senior housing: congregate care and living · Rural housing
Value influences	· Access to workplaces · Transportation service · Access to shopping centers and cultural facilities · Proximity to and quality of schools · Reputation of area · Residential atmosphere and appearance · Protection from unwanted commercial and industrial intrusion · Proximity to open space, parks, lakes, rivers, and other natural features and to recreational facilities · Presence of vacant land likely to be developed to uses that could make the area more or less desirable · Private land use restrictions, e.g., conditions, covenants, and restrictions (CC&Rs) · Public land use restrictions, e.g., zoning restrictions

occurs frequently. Sometimes a river, lake, hill, park, or other natural feature may act as a buffer between a residential district and commercial or industrial areas and thereby reinforce the residential area's identity.

In recent years, the growth of the telecommuting work force has made rural and exurban areas far from urban and suburban employment centers into feasible residential communities by eliminating the commute. On a national level, the combination of telecommuters and the self-employed individuals working at home makes up a small percentage of the total workforce, but the number of home workers increased 23% between 1990 and 2000 and more than 40% between 2000 and 2009.[5] The impact of telecommuting on the supply of and demand for housing in a residential district can be significant, depending on the demographics of the area.

Multifamily Residential Districts

In large cities, multifamily residential districts usually cover an extensive area. In smaller cities such districts may be dispersed or limited in size. Units may be rented, i.e., apartments, or privately owned as cooperatives and condominiums. Multifamily districts are subject to many of the same influences that single-unit residential areas are, but certain influences may be more important in multifamily districts because of their higher density.

In some cities, publicly or privately published statistics on the supply of apartments, vacancy rates, and rent levels are available. When published statistics are not readily available, the appraiser will have to gather data through primary research.

Commercial Districts

A commercial district is a group of offices or stores. Included in this category are

- highway commercial districts–i.e., enterprises along a local business street or freeway service road and developments adjacent to a traffic intersection
- retail districts–e.g., regional, super-regional, and neighborhood shopping centers
- downtown central business districts (CBDs)

To analyze a commercial district, an appraiser identifies its trade area–i.e., the area the businesses serve. Because a commercial district's economic health depends on the vibrancy of the surrounding trade area, property values in a commercial district are affected by the type and character of nearby land uses and other factors that influence the values of surrounding properties.

5. See "Census Bureau Releases Information on Home Workers" press release and detailed tables (October 20, 2004), available at www.census.gov/acs/www/, and Brian McKenzie and Melanie Rapino, *Commuting in the United States: 2009* (Washington, D.C.: American Community Survey Reports, issued September 2011). See also Matthew Mariani, "Telecommuters," *Occupational Outlook Quarterly* (Fall 2000): 10-17; and William C. Wheaton, "Telecommuting: The Real Story" research paper (January 1999), available at www.twr.com.

Figure 11.2 Characteristics of Multifamily Residential Districts

Defining characteristic	· Generally a predominance of renter occupancy and higher density than single-unit residential districts
Examples of subdistricts	· Multistory/high-rise buildings · Garden apartments · Row houses · Townhouses · Cooperative apartments · Condominium apartments
Value influences	· Access to workplaces · Transportation service · Access to shopping centers, cultural facilities, and entertainment · Reputation of area · Residential atmosphere and appearance · Protection against unwanted commercial and industrial intrusion · Proximity to employment · Proximity to open space, parks, lakes, rivers, or other natural features · Supply of vacant apartment sites that are likely to be developed and could make present accommodations more or less desirable · Parking for tenants and guests · Vacancy and tenant turnover rate

Office Districts

Office districts can contain combinations of buildings ranging from small, low-rise structures to large, multistory buildings. The buildings in an office district may be owner-occupied structures or serve a variety of tenants. The offices may serve multinational corporations, local corporations, small service companies, and professionals.

Office districts include planned office parks and strip developments on or near major traffic arteries. Office parks, which are sometimes known as *business parks* or *business centers*, often have industrial users among their tenants because the parks offer good locations, easy access, attractive surroundings, and utility without the congestion and

Figure 11.3 Characteristics of Office Districts

Defining characteristic	·	Office uses with supporting retail services and other related services
Examples of subdistricts	·	Central business districts
	·	Suburban office parks
	·	Concentrations of office properties of a particular class, as defined by the market
	·	Office condominiums
Value influences	·	Significant locational considerations such as the time-distance from potential labor force, access, highway medians, and traffic signals
	·	Building configuration (floorplate size, ceiling height, etc.)
	·	Physical characteristics such as the visibility, attractiveness, quality of construction, and condition of properties
	·	Direction of observable growth
	·	Character and location of existing or anticipated competition
	·	Availability of land for expansion
	·	Pedestrian or vehicular traffic count
	·	Vacancy and rental rates

high rents of the CBD. Office parks increasingly provide facilities for service industries as well as retailers, restaurants, computer stores, branch banks, day care centers, and other businesses. Because office parks and industrial parks rely on surrounding areas to supply the labor force, they are often located near residential districts and their park-like appearance may be an advantage in the eyes of nearby residents.

Retail Districts

More than any other type of real estate, retail properties rely on the local trade area for their economic base. The customers for all but the largest destination shopping centers are drawn from the surrounding areas. The common types of retail property can be classified by the sizes of the trade areas they serve:

- Regional shopping centers and super-regional centers can serve hundreds of thousands of people in many communities along major transportation routes.
- Community shopping centers serve a neighborhood or group of neighborhoods within a defined radius.

Figure 11.4 Characteristics of Retail Districts

Defining characteristic	· Concentration of competing retail locations, often along a major street
Examples of subdistricts	· Regional and super-regional shopping centers · Community shopping centers · Neighborhood shopping centers · Specialty centers · Mixed-use centers, e.g., retail and office space
Value influences	· Quantity and quality of the purchasing power of the population likely to patronize a shopping area and any trends affecting that purchasing power (e.g., job growth) · Significant locational considerations such as the time-distance from potential customers, access, highway medians, and traffic signals · Physical characteristics such as the visibility, attractiveness, quality of construction, and condition of properties · Direction of observable growth · Character and location of existing or anticipated competition · Retailers' inventory, investments, leasehold improvements, and enterprise · Availability of land for expansion and customer parking · Pedestrian or vehicular traffic count · Availability of business financing, e.g., focused redevelopment plans (TIF districts), minority business support, other public or private programs · Location within a city or town or proximity to anchors and core groupings · Vacancy and rental rates

Table 11.1 Characteristics of Shopping Centers

Neighborhood Shopping Center	
Typical size	30,000 to 100,000 sq. ft.
Typical trade area	· Immediate neighborhood · Population of 3,000 to 40,000 · Radius of 3 miles · Driving time of 5 to 10 minutes
Leading tenant	Supermarket
Community Shopping Center	
Typical size	100,000 to 400,000 sq. ft.
Typical trade area	· Population of 40,000 to 150,000 · Radius of 3 to 6 miles · Driving time of 10 to 20 minutes
Leading tenant	Junior department store, large variety, discount, or department store
Regional Shopping Center	
Typical size	300,000 to 900,000 sq. ft. (one or more department stores of around 200,000 sq. ft. each plus small tenant space)
Typical trade area	· May include several neighborhood centers · Minimum population of 150,000 · Radius of 5 to 15 miles · Driving time of 20 minutes
Leading tenant	One or two full-line department stores
Super-Regional Center	
Typical size	600,000 to 2.0 million sq. ft. or more
Typical trade area	Trade areas are also extended by major transportation arteries and linkages, so the trade areas for some super-regional centers transcend state boundaries. · Minimum population of 300,000 · Radius of 5-25 miles · Driving time of 30 minutes or more
Leading tenant	Three or more full-line department stores
Specialty Centers	
Outlet center	· An aggregation of factory outlet stores · No specific anchor tenant
Off-price center	· Typically between the size of community centers and regional centers · Specializing in name-brand merchandise sold significantly below the price at full-line department stores · Formerly known as *discount center*
Power center	· Large community shopping center (more than 250,000 sq. ft.) with at least one super anchor store (e.g., discount department store, home improvement store) with more than 100,000 sq. ft. · Several smaller, category-specific anchor tenants (20,000 to 25,000 sq. ft.) · Small shop space not more than 10% to 15% of total gross leasable area · Trade area similar in size to regional shopping center
Off-price megamall	· Up to 2 million sq. ft. in size · Usually located on a major highway on the exurban fringe of a metropolitan area · Trade area of more than 25 miles
Urban entertainment center	· Combination of entertainment, dining, and retail uses in a pedestrian-oriented environment
Fashion center	· Concentration of fashion retailers · Usually no specific anchor tenant · Wide range of trade areas, i.e., similar to neighborhood, community, or regional shopping center depending on the target market sector as defined by quality, taste, and price · Often higher-quality finishes and materials, lower parking ratios, higher sales per customer
Festival center	· Tourist-oriented center in a large city; forerunner of urban entertainment center · Large proportion of specialty restaurants and food vendors
Lifestyle center	· National chain specialty stores plus upscale leisure amenities · Open-air centers of 150,000 to 500,000 square feet · Upscale projects near affluent areas

Sources: Anita Kramer, *Retail Development Handbook*, 4th ed. (Washington, D.C.: Urban Land Institute 2008); *Dollars and Cents of Shopping Centers/The Score 2008* (Urban Land Institute and International Council of Shopping Centers, 2008); James D. Vernor, Michael F. Amundson, Jeffrey A. Johnson, and Joseph S. Rabianski, *Shopping Center Appraisal and Analysis*, 2nd ed. (Chicago: Appraisal Institute, 2009).

- Neighborhood and strip retail centers serve their immediate neighborhoods.

trade area
The geographic area from which a retail facility consistently draws most of its customers (also called *market area*).

Specialty shopping centers, such as outlet malls, warehouse clubs, and power centers, serve a wide range of trade areas depending on the tenant makeup and demographic and psychographic target markets.

Although the appraiser focuses on the sales potential of a given retail trade area, various other considerations can complicate the analysis of value influences. Like certain central business districts, some retail districts may contain a destination shopping attraction. Multiplex movie theaters often anchor regional shopping centers in urban or suburban areas and serve as destinations for consumers from a wider trade area than a similar-sized shopping center would normally attract. On the other hand, the growth of online shopping and continued competition from catalog retailers has clearly weakened the sales potential of existing shopping centers. Although online retailing currently accounts for only 5% of non-auto sales, the market share of e-commerce is expected to double by 2017.[6]

When analyzing a group of local retail enterprises that are not located in a shopping center, an appraiser also examines the zoning policies that govern the supply of competing sites, the reasons for vacancies and business failures, and the level of rents compared with rent levels in new buildings.

Central Business Districts

A central business district (CBD) is traditionally the core, or downtown area, of a city where the major retail, financial, governmental, professional, recreational, and service activities of the community are concentrated. Over the past quarter of a century, some CBDs have not experienced the same level of growth and redevelopment that other commercial districts have, often because of a lack of developable land and restrictions on redevelopment by historic overlay districts. Historically, the development of suburban commercial centers has resulted in the corresponding decline of urban CBDs. Even in smaller cities and exurban towns, the development of commercial districts centered on a category-killer retailer outside the town center can have a negative impact on the economic viability of the area's traditional business core and the value of aging properties there.

central business district (CBD)
The core, or downtown area, of a city where the major retail, financial, governmental, professional, recreational, and service activities of the community are concentrated.

Appraisers should be aware of this trend but should also recognize that some CBDs have brighter prospects than others, possibly as a result of economic develop-

6. For discussions of online retailing's effect on the evolution of retail space, see Curtis D. Spencer and Steven Schellenberg, "Repositioning Retail and Warehouse Space for Tomorrow: Consequences of the New Borderless Marketplace," *Retail Property Insights*, vol. 19, no. 1 (2012): 15-19; and Andrew J. Nelson and Alan Billingsley, "The New Urban Frontier: Technological, Demographic, and Social Changes Are Refocusing Demand for Retail Space," *Retail Property Insights*, vol. 19, no. 3 (2012): 24-30. For additional discussion of retail market research and trade area delineation, see Joseph Rabianski, "Elements of Retail Market Research," *Real Estate Review*, vol. 27, no. 4 (Winter 1998): 52-55.

ment efforts or a concentration of companies in strong business sectors. The economic life cycle of CBDs is often scrutinized closely by analysts. Transportation facilities in most cities are oriented to the CBD. Through downtown development associations, many merchants have made efforts to revitalize CBDs with improved public transportation, larger parking areas, better access, and coordinated sales promotion programs.

The diverse enterprises located in CBDs usually reflect several types of land use, e.g., housing, retail stores, offices, financial institutions, and entertainment facilities. Housing has not always been considered an essential land use within a central business district, but the New Urbanism movement has long held that housing is a key driver in revitalizing or maintaining an area's viability.[7] Retail clothing stores may

Figure 11.5 Characteristics of Central Business Districts

Defining characteristic	· Located in a concentration of major retail, financial, governmental, professional, recreational, and service activities of a city
Examples of subdistricts	· Broad range of uses—office, hotel, retail, housing, and entertainment
Value influences	· Local population (residents and workers) · Transportation linkages · Pedestrian traffic · Municipal land use policies (e.g., density, ground coverage, parking, loading and unloading, signage ordinances) · Density and mix of uses · Vacancy and rental rates

7. Sheri Faircloth, Brian Kaiser, and Frederick A. Steinmann, "Residential Adaptive Reuse and In-fill Development," *Economic Development Journal* (Spring 2009): 40-47.

primarily serve office employees, and other retail establishments tend to locate where large numbers of people work, shop, and live. Financial institutions are often found in areas with other financial institutions. In major cities, entertainment and cultural facilities usually operate in or near CBDs to serve the greatest number of residents and out-of-town visitors. Different parts of the CBD attract different users, and the enterprises within a single general use category may be diverse. For example, office buildings in different parts of a CBD may house a wide variety of business and professional firms.

Appraisers should recognize that shifting functions within CBDs can lead to changes in land use and potential increases in real estate values. For example, the addition of entertainment uses to an area dominated by office uses may attract more restaurants, art galleries, and specialty shops to a downtown area. Since the 1990s, some major CBDs have promoted specific uses such as gaming to develop a reputation as destination locations. Many include prominent stores with well-known names and complementary entertainment or recreational facilities. Quite often, destination shopping is an outing that allows the entire family to participate in both shopping and entertainment activities.

To assess the viability of a CBD, an appraiser must consider the sales potential of various commercial products and services and determine whether establishments in the CBD can attract a share of the market. To evaluate the utility of a particular location within a CBD, the appraiser considers which use or mix of uses–e.g., office, hotel, retail, housing, entertainment–is most appropriate.

Industrial Districts

Industry is often the engine of economic growth in a community. Governmental and public-private economic development efforts are often targeted at manufacturing and other industrial concerns that may bring high-paying jobs to an area. Since the 1980s, major manufacturers have sought to control inventory costs by implementing just-in-time production (also known as *lean manufacturing*) techniques, and the suppliers who serve those companies have tended to cluster around their headquarters. More recently, businesses have begun to scrutinize the fragility of just-in-time distribution systems and the potential for unpredictable and catastrophic disruptions of the supply chain.[8]

Industrial districts range from those that contain heavy industry, such as steel plants, foundries, and chemical companies, to those that contain assembly, distribution, and other "clean" operations. In most urban areas, heavy industry and light industry districts are established by zoning ordinances, which may limit uses and place controls on air pollution, noise levels, and outdoor operations. In older manufacturing or warehouse districts, obsolete, multistory, elevator buildings are typical and parking and expansion areas are limited. Newer manufacturing districts and industrial parks usually consist of one-story buildings with

8. Barry Tarnef, "How Strong Are the Links in Your Supply Chain?" *World Trade 100* (September 2011): 18-20.

greater ceiling heights than were typical previously. Each industrial district has a value pattern that reflects the market's reaction to its location and the characteristics of its sites and improvements.

The environmental liabilities incurred by industrial properties are considerably more complex than those that affect other property

Figure 11.6 Characteristics of Industrial Districts

Defining characteristic	· Cluster of related industrial concerns, e.g., a manufacturer and its suppliers
Examples of subdistricts	· Manufacturing facilities · Research and development facilities/science parks · Warehouse/distribution facilities
Value influences	· Nature of the district (distribution, manufacturing, R&D, etc.) · Availability of labor and competitiveness of labor pool with offshore sites · Transportation facilities · Availability of raw materials · Distribution facilities · Political climate · Availability of utilities and energy · Effect of environmental controls · Governmental land use restrictions or lack of such restrictions · Vacancy and rental rates

types. Industrial properties may contain underground storage tanks for a broad range of chemicals and the presence of asbestos and PCBs may be widespread. Long-term contamination tends to be more severe in industrial districts than in commercial and residential districts, and cleanup costs can be high. (Environmental liabilities are discussed more fully in Chapter 12.)

Agricultural Districts

Agricultural districts can be as small as a portion of a township or as large as several counties. Most important value influences relate to individual properties rather than to entire agricultural districts because the individual properties may be far apart. Nevertheless, an agricultural district's physical features are usually representative of the individual farms within it and contribute to their desirability.

The importance of different value influences in an agricultural district depends on what is produced there. Agricultural production areas are served by thoroughfares that lead to marketing centers where farm products are sold, and proximity to other forms of transportation such as rivers and railroad lines can be even more important in some areas. Like an urban neighborhood, the farm community depends on government services such as roads and schools and on the availability of power sources (e.g., electricity, natural gas).

Infrastructure to support the particular land use dominant in a district is important in all districts, but it is particularly important in agricultural districts. The infrastructure for agriculture includes land uses such as

- equipment sales and repair
- livestock auctions
- outlets for seed, feed, fertilizer, herbicides, and similar products
- processors or intermediaries to buy, sell, or transport farm products
- government offices–e.g., Farm Service Agency, Soil Conservation Service
- colleges and universities with agricultural studies programs

For many years urban encroachment into agricultural districts and the erosion of the agricultural infrastructure have been concerns of property owners in rural areas because urban land uses generally do not complement agricultural uses. Governmental attempts to preserve agricultural land have had limited effectiveness because the causes of encroachment are so complex.

Environmental liabilities on agricultural properties may include dump sites, cattle vats, waste lagoons for confined feeding operations, fertilizers, pesticides, and underground storage tanks.

Specialty Districts

Individual properties are sometimes appropriate only for an existing special-purpose use. Similarly, if some specialized land use is predominant in a market area, that area may qualify as a specialty district, such as the following:

- medical district
- research and development park
- high technology park

Figure 11.7 Characteristics of Agricultural Districts

Defining characteristic	· Undeveloped land used for production of crops, timber, livestock, and other agricultural products
Examples of subdistricts	· Row crops · Orchards, groves, and nurseries · Grasslands · Livestock facilities · Dairies · Agribusiness · Timberland and sod farms · Natural resource land, e.g., mining facilities
Value influences	· Climate · Location · Topography · Soil types · Water rights · Conforming land uses in the market area · Size of agricultural operation · Transportation · Availability of farm labor, which is often captured in the analysis of conforming land uses · Conservation easements

- education district
- historic district

The value influences at work in these specialty districts may be similar to those affecting areas where traditional land uses dominate (in particular, office districts), but the emphasis may change depending on the activity that characterizes the specialty district. Also, most specialty districts have specific land use approval from local government, either by zoning designation or overlay.

Medical Districts

A medical district typically is centered around one or more regional acute care hospitals that have spawned a heavy concentration of al-

Table 11.2 Characteristics of Specialty Districts

Type	Characteristics/Value Influences
Medical district	· Potential for functional obsolescence of improvements · Proximity to hospitals and other medical offices · Quality of professional personnel · Availability of modern equipment · Demographics (i.e., proximity to residential districts with many seniors who are the primary consumers of medical services) · Linkages (e.g., public transportation) · Reliability of power sources/backup power systems · Waste disposal, particularly infectious materials
Research and development park	· Mix of office and industrial uses · Often sponsored and promoted by universities, which supply technical expertise and qualified employees, or by states, port districts, and private developers
High technology park	· Clustered around high-tech companies and near fiber optic cable corridors and highly skilled labor and universities · Sometimes receive favorable financing packages from local government and economic development corporations
Education district	· May contribute economically as well as socially and culturally to the surrounding community · Should be accessible to surrounding residential neighborhoods if student housing is needed · Access to public transportation important for institutions that appeal to commuters
Historic district	· May include residential, commercial, industrial, or other types of property alone or in combination with one another · Designated to preserve an area's architectural character or informally recognized by residents · Federally certified only after stringent requirements have been met, including substantial compliance with the criteria of the National Register of Historic Places · Private preservation restrictions such as preservation easements and historic facade easements can limit future uses within the district · Highest and best use and possible redevelopment may be restricted by extremely specific zoning

lied healthcare uses, potentially including other specialty hospitals, ambulatory surgical centers, clinics, long-term care facilities, medical offices, educational facilities, and substantial parking facilities to support these high-use structures in a campus setting. The creation of synergies through the concentration of physicians and other medical specialists is a chief reason why medical districts have evolved.

Medical districts can be found in densely populated urban areas and in spacious, park-like settings, although the general trend of suburbanization may be causing medical uses to spread out. Close proximity to regional highways is critical for fast access in emergencies, and for many of the same reasons regional shopping and office districts desire these locations. In urban and mature suburban medical districts, and where there is a very strong hospital operation, demand for land may be extraordinary, and nonmedical use may no longer represent the highest and best use of properties improved for nonmedical use.

The financial health and the condition of the physical plant of the hospital driving the demand for other medical land uses in the district are important to assess. Hospitals that are expanding create further demand on land in their vicinity. Should the hospital build a replacement facility elsewhere in the community, or simply cease operation, demand for the surrounding healthcare-related properties will be affected. To assess these risks, an appraiser can examine a hospital's financial condition using various public sources, including state health departments and hospital associations, and commercial sources such as the American Hospital Directory online service. In many states, hospital and other medical facilities (nursing facilities, ambulatory surgical centers) are required to have a certificate of need (CON) or determination of need (DON) prior to construction or acquisition of major medical equipment. As these state agencies often use analytics for long-range planning, they may offer insights into the future of a hospital district.

The desirability and value of medical properties are generally influenced by the same forces as other commercial and residential real estate, but there are unique factors affecting healthcare property values. Population changes, general economic and employment conditions, and political factors warrant examination. A large portion of the nation's healthcare expense is covered through the federal Medicare and federal and state Medicaid programs. Many other expenses are covered through employer-sponsored medical insurance. Sudden changes in these programs can a have significant impact on the viability of healthcare providers. Medicare is a social equalizer in some respects, as the payments to a hospital, physician, or other provider will be the same for that service within a given region regardless of the value of the property in which the service was performed. Also, many states regulate the supply of hospitals, nursing facilities, and ambulatory surgical centers.

Demographic factors are important. The elderly consume more healthcare services than other demographic groups, and most elderly Americans have excellent health insurance through Medicare or commercial alternatives. Low-paying Medicaid and uninsured populations are closely tied to low-income households, and areas with large concentrations of these households often have fewer medical services. The services that are available tend to be housed in older, less functional buildings. The quality of professional personnel and the availability of modern equipment are also important considerations.

Utilities are a particular concern in medical districts because power outages can have disastrous effects on hospitals. To increase reliability, most hospitals augment the electrical service available from the power grid with backup systems. The disposal of medical waste and potentially infectious materials has become highly controversial. Many hospitals incinerate their waste, while others have it shipped offshore.

Research and Development Parks

Characterized by a mix of office and industrial uses, research and development parks (also known as *science parks*) may contain the research and development departments of large drug, chemical, or computer companies, or they may cater to firms specializing in research activities. Research firms are usually small and specialize in identifying and developing new products, which are sold to other firms. Occasionally a small research firm will create, develop, and market a new product with considerable success, but then the nature of the firm must shift from research to marketing.

Research and development parks are often sponsored and promoted by universities, which provide a convenient source of technical expertise and qualified employees. Universities may sponsor a park to sell excess land, provide employment for students and faculty, and raise an area's level of economic activity.

Buildings in research and development parks have evolved from one-story, on-grade warehouses with high office build-out (i.e., 20%-35% office space) in the 1970s and 1980s to two- and three-story office (lab) buildings with a loading dock. These buildings now look more like office buildings than industrial buildings.

High-Technology Parks

Firms engaged in high-tech activities often locate near one another or in parks where technical expertise may be available from a nearby university or research facility. Electronics and computer firms have dominated high-technology parks, but firms involved with space equipment, drugs, cosmetics, and aviation may also have offices in these areas.

Sometimes local governments and economic development corporations will create designated technology corridors in the hopes of attracting high-tech companies. Real estate developments in technology incubator areas may benefit from favorable financing packages and receive subsidies or tax breaks.

Education Districts

Local schools, colleges, and universities may constitute a district if they have several buildings or facilities and are considered an integral part of the surrounding residential neighborhood. Education districts may contribute economically as well as socially and culturally to the surrounding community.

Colleges and universities often attract students from far away who bring income to the community and thus contribute to its economic base. In some towns and smaller cities, universities and colleges may provide most of the economic base.

Important land use linkages for education districts include

- access to the surrounding residential neighborhood, particularly high-density housing like apartments or single-family housing with zoning that allows multiple students per house
- access to nearby convenience shopping such as grocery stores, drug stores, and fast food restaurants
- access to public transportation for educational institutions that appeal to commuters

Historic Districts

Since 1931, when the first historic district zoning ordinance was passed in the United States, interest in preserving historically and architecturally significant properties has grown and given rise to a unique type of district.[9] The establishment of historic districts is one of the most widely applied and rapidly developing techniques for preserving cultural heritage. Overlay districts also can be used to preserve an area's architectural character.

Historic districts are federally certified only after stringent requirements have been met, including substantial compliance with the criteria of the National Register of Historic Places.[10] Once districts are federally certified, developers, investors, and renovation specialists can qualify for tax incentives such as the tax credits allowed under the Economic Recovery Tax Act of 1981 (which were subsequently reduced by the Tax Reform Act of 1986). Many states and even local tax assessment jurisdictions also provide incentives such as tax credits or property tax assessment relief to owners of contributing historic properties in designated historic districts.

Historic districts may include residential, commercial, industrial, or other types of property alone or in combination with one another. Appraisers of historic property must become thoroughly familiar with the criteria applicable to each district's designation status and how these criteria or available tax incentives are, or may be, applied to properties within district boundaries. Privately imposed historic restrictions such as preservation easements and historic façade easements can limit the future uses of a property and thereby influence value, in a manner different from the impact of federal, state, or local government designation of a historic district.

9. Russell V. Keune, ed., *The Historic Preservation Yearbook* (Bethesda, Md.: Adler & Adler, 1984), 461. See also Judith Reynolds, *Historic Properties: Preservation and the Valuation Process*, 3rd ed. (Chicago: Appraisal Institute, 2006); Paul K. Asabere and Forrest E. Huffman, "Historic Designation and Residential Market Value," *The Appraisal Journal* (July 1994): 396–410; Patrick Haughey and Victoria Basolo, "The Effect of Dual Local and National Register Historic District Designations on Single-Family Housing Prices in New Orleans," *The Appraisal Journal* (July 2000): 283-289; and Richard J. Roddewig, *Appraising Conservation and Historic Preservation Easements* (Chicago: Appraisal Institute, 2011).

10. Keune, 328.

Land and Site Description

Appraisal assignments may be undertaken to develop an opinion of the value of land only or the value of both land and improvements. In either case the appraiser must provide a detailed description and analysis of the land. Land can be raw or improved. Raw land can be undeveloped or put to an agricultural use. Land may be located in rural, suburban, or urban areas and may have the potential to be developed for residential, commercial, industrial, agricultural, or special-purpose use.

This chapter focuses on the description and analysis of the land component of real property. Because appraisers typically deal with land that has been improved to some degree, the term *site* is often more precise than *land*, and *site* is used predominantly in this chapter. The information needed to complete a full site description and analysis is noted and explained here and sources of this information are presented. Although this discussion relates primarily to the property being appraised, the same type of data is collected and examined in analyzing the comparable properties used in the appraisal.

A parcel of land can have various site improvements that enable the vacant parcel to support a specific purpose. A site can have both on-site and off-site improvements that make it suitable for its intended use or development. Off-site improvements may include utility

raw land
Land on which no improvements have been made; land in its natural state before grading, construction, subdivision, or the installation of utilities.

site
Land that is improved so that it is ready to be used for a specific purpose.

lines, access to roads, and water, drainage, and sewer systems. On-site improvements may include landscaping, site grading, access driveways, drainage improvements, accessory buildings, and support facilities.

In valuing any type of property, the appraiser must describe and analyze the site. Site description consists of comprehensive factual data, information on land use restrictions, a legal description, other title and record data, and information on pertinent physical characteristics. Site analysis goes further. It is a careful study of factual data in relation to the market area characteristics that create, enhance, or detract from the utility and marketability of specific land or a given site as compared with other sites that it competes with.

One primary objective of site analysis is to gather data that will indicate the highest and best use of the site as though vacant so that land value for a specific use can be estimated. (See Chapter 16 for a complete discussion of highest and best use.) Whether a site or raw land is being valued, the appraiser must determine and evaluate its highest and best use. When the highest and best use of land is for agriculture, the appraiser usually analyzes and values the land using sales comparison. If the land is to be developed for urban use, the appraiser may use a more sophisticated technique such as subdivision development analysis.

Legal Descriptions of Land

Land boundaries differentiate separate ownerships, and the land within one set of boundaries may be referred to as a *parcel*, *lot*, *plot*, or *tract*. These terms may be applied to all types of improved and unimproved land, and they are often used interchangeably by market participants. The appraiser, however, should use the terms consistently in the appraisal report to avoid confusing the client.

A *parcel* of land generally refers to a piece of land that can be identified by a common description and is held in one ownership. Every parcel of real estate is unique. To identify individual parcels, appraisers rely on legal descriptions, surveys, or other descriptive information typically provided by the client or found in public records. A legal description identifies a property in such a way that it cannot be confused with any other property. A legal description, though not required, is usually included or referenced in an appraisal report.

In the United States, three methods are commonly used in legal descriptions of real property:

- the metes and bounds system
- the rectangular survey system
- the lot and block system

An appraiser should be familiar with these forms of legal description and know which form or forms are common in the area where the appraisal is being conducted.

legal description
A description of land that identifies the real estate according to a system established or approved by law; an exact description that enables the real estate to be located and identified.

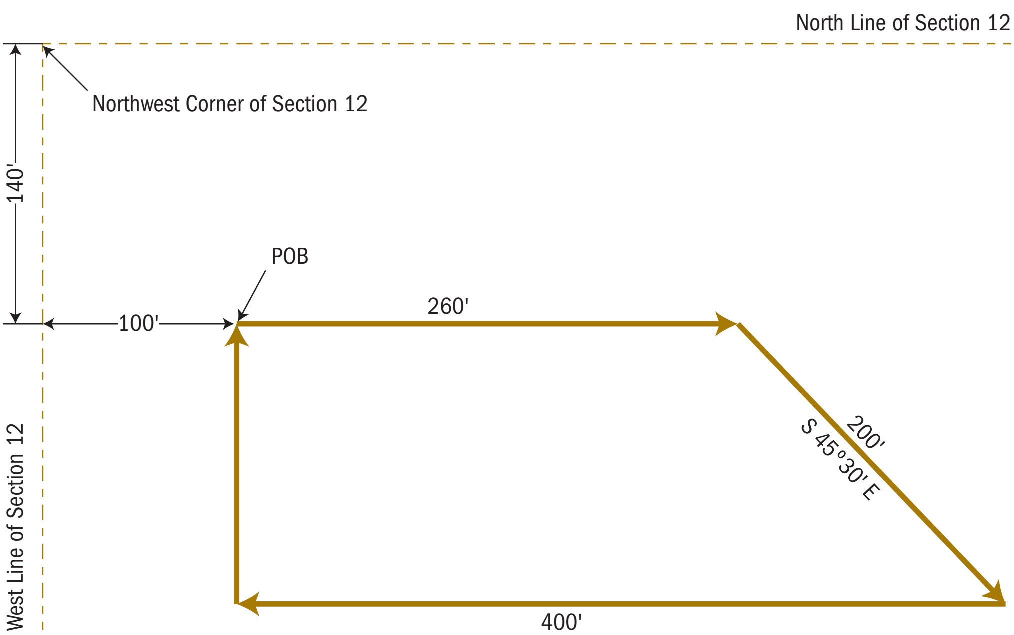
Metes and Bounds

metes and bounds system
A system for the legal description of land that refers to the parcel's boundaries, which are formed by the point of beginning (POB) and all intermediate points (bounds) and the courses or angular direction of each point (metes).

The oldest known method of surveying land is the metes and bounds system, in which land is measured and identified by describing its boundaries. A metes and bounds description of a parcel of real property describes the property's boundaries in terms of precise reference points. A metes and bounds description starts at the point of beginning (POB), a primary survey reference point that is tied to a benchmark or adjoining surveys, and moves along past several intermediate reference points before finally returning to the POB. The return to the POB is called *closing* and is necessary to ensure the survey's accuracy.

Surveyors in the field increasingly rely on modern "total stations" to collect data in digital form. The familiar surveyor's measuring instrument mounted on a tripod uses infrared technology and today is augmented by portable computer technology. The data is downloaded into the surveyor's office computer for plotting the property boundaries and computing the land area. Coordinate geometry software and global positioning system (GPS) technology allow for more accurate determinations of directions, distances, and areas. GPS technology is only limited by physical obstructions that prohibit receiving satellite transmissions, and its use in surveying will probably increase.

Figure 12.1 Metes and Bounds



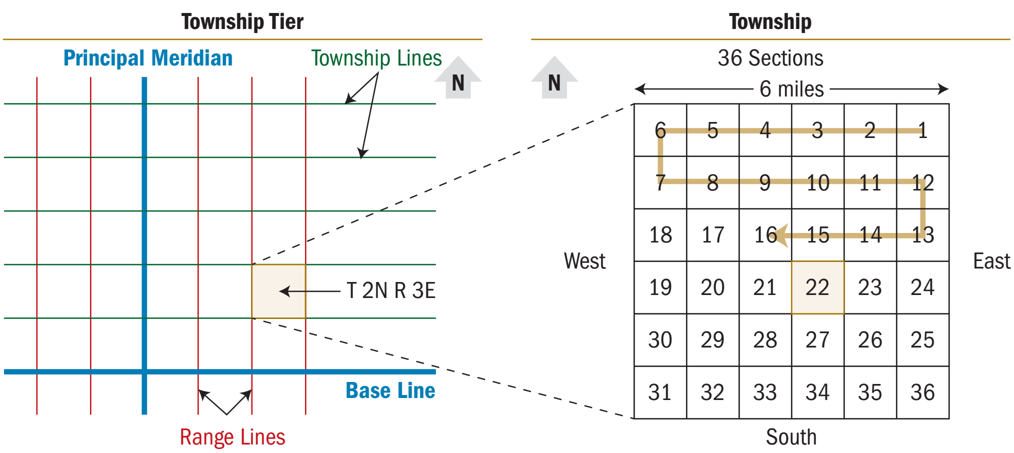
The metes and bounds system is the primary method for describing real property in 21 states. It is often used in other states as a corollary to the rectangular survey system, especially in describing unusual or odd-shaped parcels of land.

Rectangular Survey System

The rectangular survey system, which is also known as the *government survey system*, was established by the Land Ordinance of May 20, 1785. The rectangular survey system became the principal method of land description for most land north of the Ohio River or west of the Mississippi River.

The initial reference points for government surveys were established in the late eighteenth century. From each point specified, true east-west and north-south lines were drawn. The east-west lines are called *base lines* and the north-south lines are called *principal meridians*. In this system, each parcel of land is identified in terms of its relationship to a single base line and a single principal meridian.

Figure 12.2 The Rectangular Survey System



rectangular (government) survey system
A land survey system used in Florida, Alabama, Mississippi, and all states north of the Ohio River or west of the Mississippi River except Texas; divides land into townships approximately six miles square, each normally containing 36 one-square-mile sections of 640 acres, except where adjusted for the curvature of the earth.

base line
In the government survey system of land description, a line running due east and west through the initial point of a principal meridian from which township lines are established.

principal meridian
In land surveying, major north-south lines established as general reference points. There are about 25 principal meridians in the 48 contiguous states of the United States.

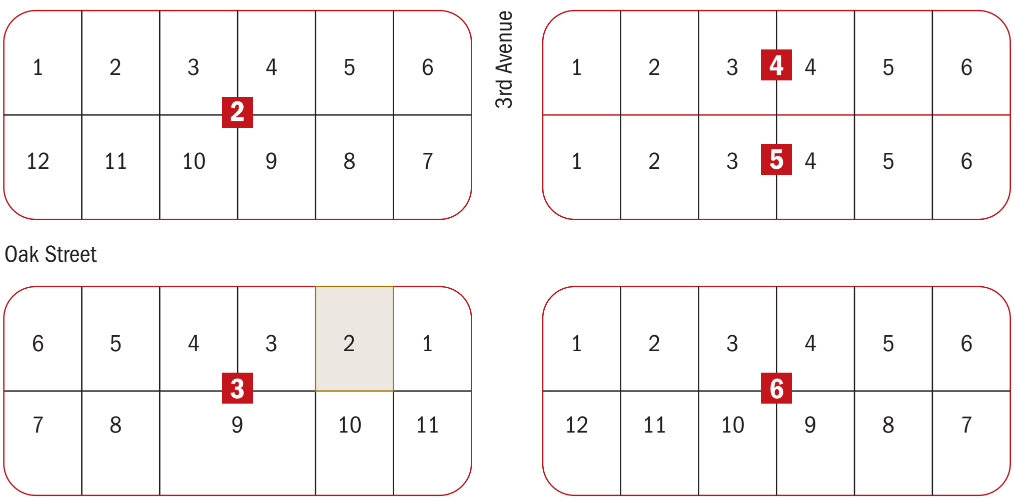
Lot and Block System

The lot and block system was developed as an outgrowth of the rectangular survey system and can be used to simplify the locational descriptions of small parcels. The system was established when developers subdivided land in the rectangular survey system and assigned lot numbers to individual sites within blocks. The maps of these subdivisions were then filed with the local government to establish a public record of their locations. Each block was identified precisely using a ground survey or established monuments.

lot and block system
A system for the legal description of land that refers to parcels' lot and block numbers, which appear on recorded maps and plats of subdivided land; may also be used for assessment maps.

Applying the lot and block system to old, unsurveyed communities helped to identify each owner's site or parcel of land. Typically a surveyor located the boundaries of streets on the ground and drew maps outlining the blocks. Then lot lines were established by agreement among property owners. A precise, measured description was established for each lot and each was given a number or letter that could be referred to in routine transactions. This information was recorded in public records and was known as a *recorded plat* of the defined area or subdivision. All this information is necessary to support the legal ownership of real property and its sale and financing.

Figure 12.3 **Lot 2 in Block 3**



Title and Record Data

Before making an on-site inspection, an appraiser should obtain an appropriate legal description and other property data from the client or from published sources and public documents. Most jurisdictions have a public office or depository for deeds where transactions are documented and made public. The accessibility of public records, which is legally known as *constructive notice*, ensures that interested individuals are able to research and, if necessary, contest deed transfers.

Sometimes public records do not contain all relevant information about a particular property. Although official documents are dependable sources of information, they may be incomplete or not suited to the appraiser's purposes. Useful support data can be found in land registration systems, land data banks, and assessors' maps.

Where to Find

Title and Record Data

Most county recorders' offices keep index books for land deeds and land mortgages from which the book and page number of a recorded deed may be found. In addition, official county plat books may be examined in the county auditor's office. Much of this data is now available online.

Ownership Information

If a partial interest in a property is to be appraised rather than the fee simple interest, the elements of title that are to be excluded should be indicated and carefully analyzed. An appraiser who is asked to develop an opinion of the value of a fractional ownership interest must understand the exact type of legal ownership to define the property rights to be appraised.

After defining the property rights being appraised, the appraiser must identify any excluded rights that may affect value. In addition, USPAP requires appraisers to analyze and report any prior sales occurring within a specified number of years.[1] The appraiser should also investigate the ownership of surface and subsurface rights through a title report, an abstract of title, or other documentary evidence of the property rights to be appraised. Title data indicates easements and restrictions, which may limit the use of the property, as well as special rights such as air rights, water rights, mineral rights, obligations for lateral support, and easements for common walls. Typically the appraiser is not an expert in title information but must rely on legal opinions, title research reports, and title data provided by other professionals. Easements, rights of way, and private and public restrictions affect property value.

Easements may provide for overhead and underground electrical transmission lines, underground sewers or tunnels, flowage, aviation routes, roads, walkways, and open space. Some easements or rights of way acquired by utility companies or public agencies may not have been used for many years, and the appraiser's physical inspection of the property may not disclose any evidence of such use. In certain jurisdictions, easements that are not used for a finite period of time may be automatically terminated. Use of a property for access without the owner's written permission may give the user a prescriptive easement

1. See Standards Rule 1-5 of the current edition of the Uniform Standards of Professional Appraisal Practice. Other standards such as the Uniform Appraisal Standards for Federal Land Acquisitions also apply in federal jurisdictions.

across the property. This type of easement usually must be used for several years without being contested or challenged by the property owner. Title insurance companies often overlook this easement unless it has been perfected in court. Nevertheless, the appraiser should search diligently for information pertaining to any limitations on ownership rights.

Private restrictions may have a material impact upon the value of property. Restrictions cited in the deed may limit the type of building or business that may be conducted on the property. A typical example is a restriction that prohibits the sale of alcohol or gasoline in a certain place. Others may limit further subdivision of a tract while others may proscribe certain uses (e.g., commercial or multifamily). Appraisers may occasionally encounter unusual restrictions driven by the eccentricities of prior owners. Restrictions generally apply for a specified number of years and run with the land. Appraisers should carefully consider the value impact, if any, of such restrictions.

Where to Find

Ownership Information

A property's legal owner and type of ownership can be found in the public records maintained by the county clerk and recorder. Local title or abstract companies may also provide useful information.

Zoning and Land Use Information

Land use and development are usually regulated by city or county government, but they are often subject to regional, state, and federal controls as well. In analyzing zoning and building codes, an appraiser considers all current regulations and the likelihood of a change in the code. Usually a zone calls for a general use (such as residential, commercial, or industrial) and then specifies a type or density of use. Zoning and other land use regulations often control the following:

- height and size of buildings
- lot coverage or floor area ratio (FAR)
- required landscaping or open space
- number of units allowed
- parking requirements
- sign requirements or limitations
- building setbacks
- plan lines for future street widenings
- other factors of importance to the highest and best use of the site

Most zoning ordinances identify and define the uses to which a property may be put without reservation or recourse to legal intervention. This is referred to as a *use by right*. They also describe the process for obtaining nonconforming use permits, variances, and zoning changes, if permitted. In areas subject to floods, earthquakes, and other natural hazards, special zoning and building regulations may impose restrictions on construction. In coastal and historic districts, zoning restrictions may govern building location and design.

Although the term *legally nonconforming land use* is often used to describe properties that do not conform to zoning and building codes, the term should only be applied to properties that do not conform to allowable land uses. Some properties include improvements that conform to land use regulations but do not meet building or developmental standards. For example, consider a property with a 30-foot setback in an area where the new zoning code specifies a minimum 40-foot setback. The land use is conforming, but the property does not conform to development standards. This is an important distinction because some lenders have rules about legally nonconforming uses.

Potential changes in government regulations must also be considered. If, for example, a building moratorium or cessation of land use applications is in effect for a stated period, a property's prospective highest and best use may have to be delayed. The appropriateness of the current zoning and the reasonable probability of a zoning change must be considered. Highest and best use recommendations may rely on the probability of a zoning change. One of the criteria for the highest and best use conclusion is that the use must be legally permissible. If the highest and best use of a site is predicated on a zoning change, the appraiser must investigate the probability that such a change will occur. The appraiser may interview planning and zoning staff and study patterns of zoning change to assess the likelihood of a change. After reviewing available public and private land use information, the appraiser may also prepare a forecast of land development for the area. If the zoning of the subject site is not compatible with the probable forecast uses, the probability of a change in the zoning is especially high. The appraiser should recognize, however, that a zoning change is never 100% certain and should alert the client to that fact if it is relevant to the purpose of the appraisal.

Where to Find

Zoning and Land Use Information

Although zoning ordinances and maps are public records that are available at zoning offices and online, an appraiser may need help from planning and zoning staff to understand the impact of zoning regulations. Often an appraiser must contact several agencies. Zoning and land use restrictions are not usually listed in the recorded title to a property, so confirmation from controlling agencies is necessary.

Assessment and Tax Information

Real property taxes in all jurisdictions are based on ad valorem assessments, at least in part. (Many areas have parcel taxes as well, which are not a function of assessed value.) Taxation levels are significant in considering a property's potential uses. From the present assessment, the current tax rate, and a review of previous tax rates, the appraiser can form a conclusion about future trends in property taxation. Assessed values may not be good indicators of the market value of individual properties because mass appraisals based on statistical methodology tend to equalize the application of taxes to achieve parity among assessment levels in a given district. Nevertheless, in some areas and for some property types, assessed value may approximate market value. The reliability of local assessments as indicators of market value varies from district to district.

Where to Find

Assessment and Tax Information

The records of the county assessor or tax collector can provide details concerning a property's assessed value and annual tax burden. Often, an appraiser obtains property information from the local assessor before conducting a physical inspection of the property.

Physical Characteristics of Land

In site description and analysis, an appraiser describes and interprets how the physical characteristics of the site influence value and how the physical improvements relate to the site and to neighboring properties. Important physical characteristics include

- site size and shape
- corner influence
- plottage potential
- excess land and surplus land
- topography
- utilities
- site improvements
- accessibility
- environment

Size and Shape

A size and shape description states a site's dimensions (street frontage, width, and depth) and lists any advantages or disadvantages caused by these physical characteristics. The appraiser describes the site and analyzes how its size and shape affect property value. Special attention is given to any characteristics that are unusual for the neighborhood. The effects of the size and shape of a property vary with its probable use. For example, an odd-shaped parcel may be appropriate for a dwelling but unacceptable for certain types of commercial or industrial use. A triangular lot may not have the same utility as a rectangular lot due to its size and shape.

The size of a parcel of land is measured and expressed in different units, depending on local custom and land use. Large tracts of land are

frontage
The measured length of a site that abuts a street, stream, railroad, or other feature.

corner influence
The effect on value produced by a property's location at or near the intersection of two streets; the increment of value or loss in value resulting from this location or proximity.

usually measured in acres. Smaller parcels are usually measured in square feet, although acreage may also be used. Dimensions are expressed in feet and tenths of feet, not inches, for easy calculation.

Frontage is the measured footage of a site that abuts a street, lake or river, railroad, or other feature recognized by the market. The frontage may or may not be the same as the width of the property because a property may be irregularly shaped or have frontage on more than one side.

Size differences can affect value and are considered in site analysis. Reducing sale prices to consistent units of comparison facilitates the analysis of comparable sites and can help identify trends in market behavior. Generally, as size increases, unit prices decrease. Conversely, as size decreases, unit prices increase. The functional utility or desirability of a site often varies depending on the types of uses to be placed on the parcel. Different prospective uses have ideal size and depth characteristics that influence value and highest and best use. An appraiser should recognize this fact when appraising sites of unusual size or shape. Value tendencies can be observed by studying market sales of lots of various sizes and their ability to support specific uses or intensities of development. In residential appraisal, a large triangular lot may not have any greater value because only one dwelling unit can be built on it according to zoning and subdivision regulations. The large undeveloped remainder would be surplus land, which is discussed below.

Corner Influence

Properties with frontage on two or more streets may have a higher or lower unit value than neighboring properties with frontage on only one street. The advantage of easier access to corner sites may be diminished by a loss of privacy or a loss of utility due to setback requirements. An appraiser must determine whether the local market considers a corner location to be favorable or unfavorable. This determination can change depending on the use (or uses) anticipated for the site.

In the layout of building improvements and the subdivision of large plots, corner lots have more flexibility and higher visibility than interior properties. A store on a corner may have the advantage of direct access from both streets and prominent corner visibility and exposure. Corner exposure may provide advantageous ingress and egress for a drive-in business. As examples, the best corner sites for gas stations, branch bank buildings, and drug stores are near the intersections of major highways with good exposure to traffic in all directions where the intersection is controlled by traffic lights in all directions. Secondary corner locations can be less desirable for those commercial uses because of the lack of traffic lights or access limitations such as right-in, right-out entrance configurations. The intersections of two local roads or a local road and a highway may not enjoy the competitive advantage that a corner lot at the intersection of more heavily trafficked thoroughfares would.

For residential properties, corner locations may have negative implications. Quiet, cul-de-sac sites in the interior of a subdivision may be more desirable and command higher prices. Residences on corner sites are exposed to more traffic noise and provide less security. Owners of corner sites may pay higher costs for front-footage sidewalks and assessments, and the side street setback may affect the permitted size of the building. Usually owners of residences on corner lots have to maintain a larger landscaped area which may, in fact, be public property.

Plottage Potential

Sometimes highest and best use results from assembling two or more parcels of land under one ownership. If the combined parcels have a greater unit value than they did separately, plottage value is created. Plottage is an increment of value that results when two or more sites are combined to produce a larger site with greater utility and probably a different highest and best use. For example, there may be great demand for one-acre lots in an industrial park where most of the platted lots are of one-half acre. By itself, a half-acre lot has a value of $1.00 per square foot. When combined with an adjacent half-acre lot, however, the value may increase to $1.50 per square foot. The value difference may be offset by the premium a developer often has to pay to combine adjacent properties. Sometimes the reverse may occur if the lots are very large and assemblage yields a lower value per square foot in the marketplace due to negative economies of scale. Plottage value may also apply to an existing site of a special size or shape that has greater utility than more conventional, smaller lots. Neighboring land uses and values are analyzed to determine whether an appraised property has plottage value.

Plottage is significant in appraising agricultural land. Properties of less-than-optimum size have lower unit values because they cannot support the modern equipment needed to produce maximum profits. In an urban area, plottage of commercial office and retail sites and of residential apartment sites may increase the unit values of the lots assembled.

Although the assemblage of land into a size that permits a higher and better use may increase the land's unit value (dollars per square foot or acre), the reverse may also occur. Land that must be divided or subdivided to achieve a higher and better use is commonly sold in bulk at a price less than the sum of the retail prices of its components. The lower unit price for the bulk sale reflects market allowances for risk, time, management, development costs, sales costs, profit, and other considerations associated with dividing and marketing the land.

assemblage
The combining of two or more parcels, usually but not necessarily contiguous, into one ownership or use; the process that creates plottage value.

plottage
The increment of value created when two or more sites are combined to produce greater utility.

Excess Land and Surplus Land

A given land use has an optimum parcel size, configuration, and land-to-building ratio. Any extra or remaining land not needed to support the specific use may have a different value than the land area needed to support that use. The portion of the property that represents an optimal site for the existing improvements will reflect a typical land-to-building ratio. Land area needed to support the existing use or ideal improvement can be identified and quantified by the appraiser. Any remaining land area is either excess or surplus land.

As an example, consider a residential property that consists of one single-unit home and two standard-size lots in a fully developed subdivision. If the house is situated within the boundaries of a single lot and the normal land area for properties in the neighborhood is a single lot, then the second, vacant lot would most likely be considered excess land. This excess land could be separated from the lot of the existing structure and the separated parcel could be developed with a new home. If land values in the neighborhood are $1.00 per square foot, then the excess land in this situation would probably add the full $1.00 per square foot to the value of the subject property (i.e., the house and the two lots). If, however, the typical land area for properties in the neighborhood is a double lot, then the same property would have neither excess land nor surplus land regardless of building placement.

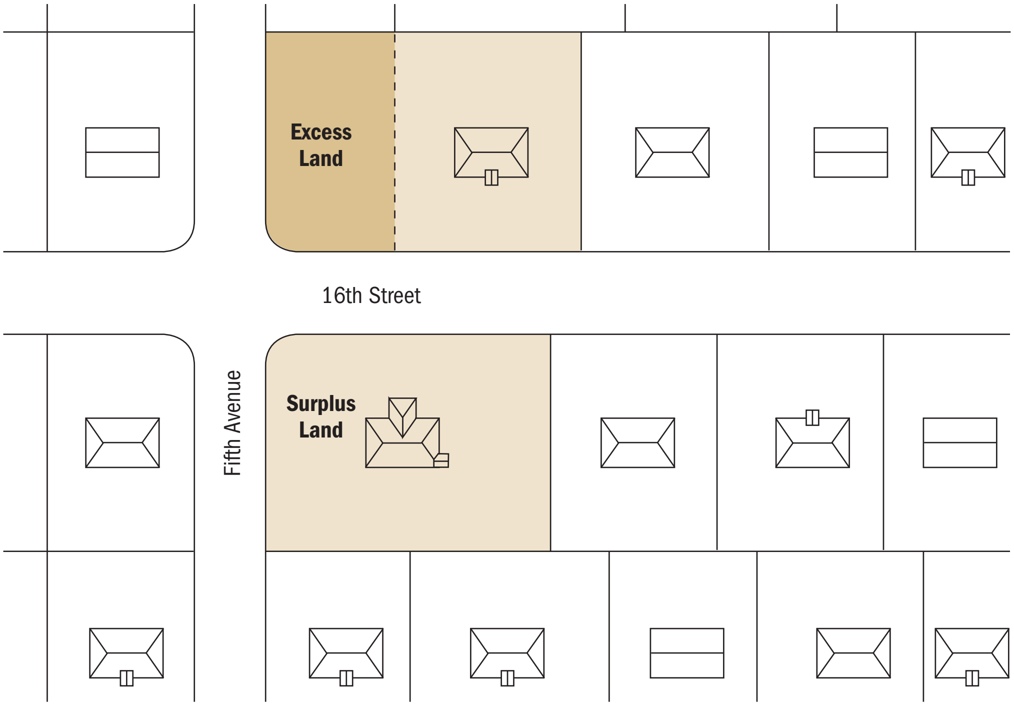
Now consider an industrial park where land-to-building ratios for warehouse properties range from 2.8-to-1 to 3.5-to-1 and land value is $2.00 per square foot. The subject property is a 20,000-sq.-ft. warehouse on a 100,000-sq.-ft. site, which results in a land-to-building ratio of 5-to-1, well above the market area norm. If the additional land not needed to support the highest and best use of the existing property is in the back portion of the site, lacking access to the street, that land would probably be considered surplus land because it could not be separated from the site and does not have an independent highest and best use. In this situation, the surplus land would probably still contribute positively to the value of the subject property (because the existing improvements could be expanded onto the surplus land or this additional area might be usable for parking or storage), but it may be worth less than the $2.00 per square foot price commanded by vacant land elsewhere in the industrial park.

excess land
Land that is not needed to serve or support the existing use. The highest and best use of the excess land may or may not be the same as the highest and best use of the improved parcel. Excess land has the potential to be sold separately and must be valued separately.

surplus land
Land that is not currently needed to support the existing use but cannot be separated from the property and sold off for another use. Surplus land does not have an independent highest and best use and may or may not contribute value to the improved parcel.

Excess land is often confused with surplus land in appraisal assignments. It is too often lumped in with the value of the entire property or ignored altogether. Excess land may be sold off separately from the rest of the property, so that the subject property in effect becomes two or more properties. Excess land may have

Figure 12.4 Excess Land and Surplus Land



a different highest and best use than the rest of the site, which must be addressed in the highest and best use analysis. Furthermore, excess land must be treated separately in the valuation process. An entirely different set of comparable data may be required and the value of excess land must be reported separately. Appraisers must exercise caution when adding the value of the excess land to the value of the rest of the property because the sum of the parts may or may not equal the whole.

Surplus land does not have a separate value, as it cannot be sold off separately. It is "extra" land that may or may not contribute value to the overall property. It does not have an independent highest and best use. It may have the same value per unit of comparison (e.g., value per square foot, value per acre) as the rest of the site, or it may contribute less value per unit of comparison.

Topography

Topographical studies provide information about land's contour, grading, natural drainage, geological characteristics, view, and general physical usefulness. Sites may differ in value due to these physical characteristics. Steep slopes often impede building construction. Natural drainage can be advantageous or, if a site is downstream from other properties or is a natural drainage basin for the area, it may have very limited usefulness. Adequate drainage systems can be developed at some

Topographical characteristics, grade, drainage, and the bearing capacity of the soil determine the suitability of a land parcel for an agricultural use or a proposed improvement.

cost to offset the topographic and drainage problems that would otherwise inhibit the development of such a site. Upland land area (i.e., land above the mean high water line) and land with good drainage can typically support more intensive uses.

In describing topography, an appraiser must employ the terminology used in the area. What is described as a *steep hill* in one part of the country may be considered a *moderate slope* in another. In some instances, descriptions of a property's topography may be taken from published sources such as topographic maps (see Figure 12.5).

Where to Find

Topographic Maps

The US Geological Survey's US topographical maps are available for free online at the USGS Store. Historical quadrangle maps can also be purchased from the USGS Store. For more information, visit http://nationalmap.gov/ustopo/.

Geodetic Survey Program

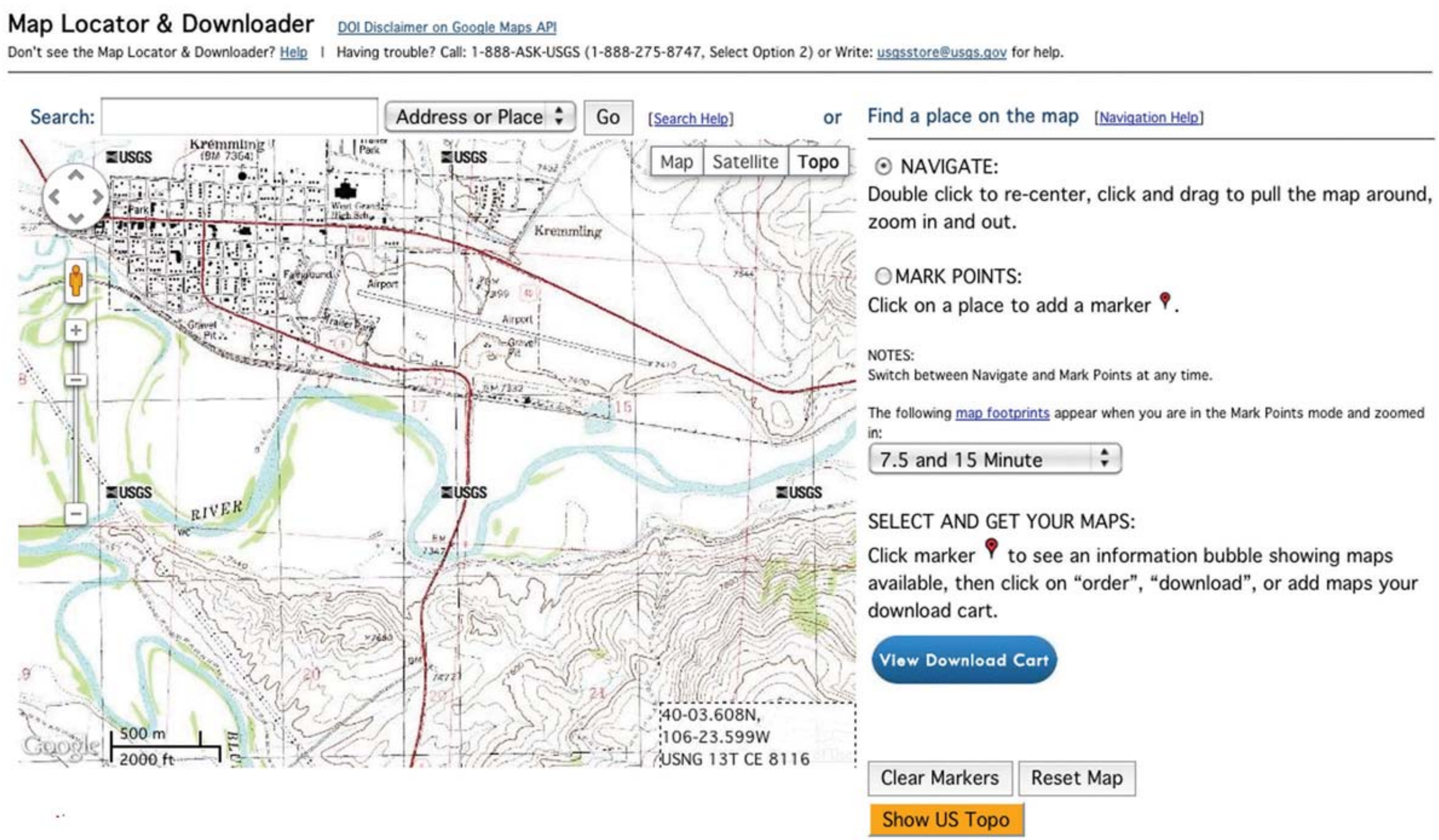
Topographic maps prepared under the direction of the US Geological Survey are referred to as *quadrangles* or *quads*. They provide information that is useful in land descriptions. Base lines, principal meridians, and township lines are shown along with topographic and man-made features. The topographic features commonly depicted on these maps include land elevations (represented by contour lines at specified intervals), rivers, lakes, intermittent streams and other bodies of water, poorly drained areas, and forest. The man-made features identified include improved and unimproved roads, highways, bridges, power transmission lines, underground pipelines, levees, railroads, airports, houses of worship, schools, and other buildings. Quadrangle maps also show National Forest and Bureau of Land Management (BLM) boundaries.

Geology and Soil Analysis

The geological conditions of a site–i.e., the composition of surface soil and subsoil–are important for both improved properties and agricultural land. A soil's suitability for building or for accommodating a septic system is important for all types of improved property, and it is a major consideration when the construction of large, heavy buildings is being contemplated. The need for special pilings or floating foundations has a major impact on the adaptability of a site for a particular use. Soil conditions affect the cost of development and therefore the property value.

Agronomists and soil scientists measure the agricultural qualities of soil and the capacity of soil for specific agricultural uses. Engineers trained in soil mechanics test for soil consistency and load-bearing capacity. Subsoil conditions are frequently known to local builders, developers, and others, but if there is any doubt about the soil's bearing capacity, the

Figure 12.5 Topographic Map



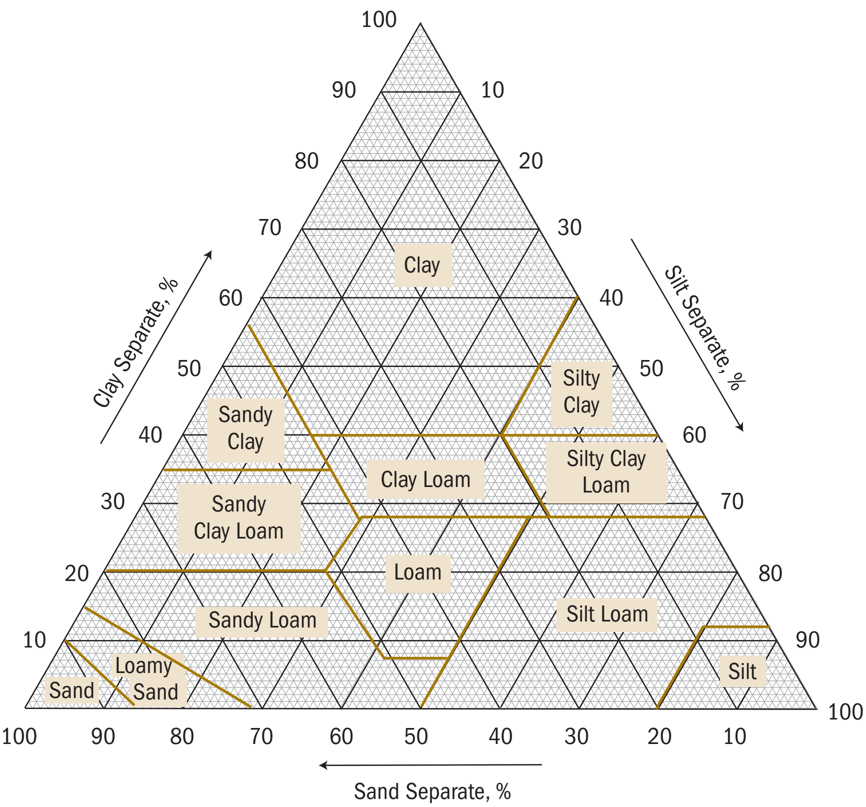
Source: US Geological Survey

client should be informed of the need for soil studies. All doubts must be resolved before the land's highest and best use can be successfully analyzed. A description of any extraordinary assumptions relating to unknown soil conditions must be included in the appraisal report.

Structural distress in improvements such as cracks in walls or the foundation may be evidence of geotechnical or soils problems. Estimating the cost to repair damage caused by a geotechnical issue like subsidence or slope creep will usually require the assistance of a geologist or structural engineer.[2] The perceived potential for subsidence or a more dramatic geological event such as a landslide can have an effect on the marketability of a site, i.e., the phenomenon of stigma discussed later in this chapter. Governmental geological surveys may indicate the location of past landslides.

As discussed in Chapter 7, the appraisal of mineral rights (i.e., the right to extract natural resources found on a site) is a highly specialized appraisal assignment, and the appraiser often must work with a

Figure 12.6 Soil Triangle



Source: US Department of Agriculture

2. See Randall Bell, *Real Estate Damages: Applied Economics and Detrimental Conditions*, 2nd ed. (Chicago: Appraisal Institute, 2008), 129-145, for more on geotechnical issues.

Where to Find

Soils Data

Soils surveys conducted by the US Department of Agriculture, along with state agricultural experiment stations and other federal and state agencies, are used to create soil maps for farmers and ranchers.

For more information, visit the Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/app/.

geologist or other expert in the mining industry. An accurate assessment of the physical characteristics of a deposit of natural resources is critical in estimating the economic potential of the land. Note that the economic potential of land used for agricultural purposes may be adversely affected by an extractive industry such as oil or gas drilling on or near the site. An appraisal of subsurface rights requires an understanding of the geological characteristics of the land as well as the workings of the relevant extractive industry and the investment market for properties with natural resources.

Floodplain and Wetlands Analysis

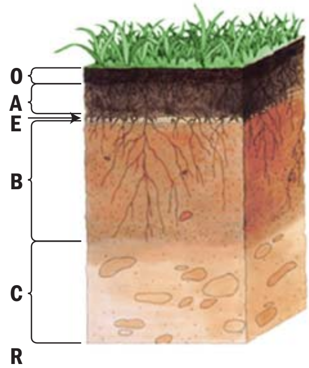
The appraiser should check floodplain maps prepared by local governments and review any available surveys or topographical data provided by the client. Proximity to any flood zones may be determined by studying maps published by the Federal Emergency Management Agency (FEMA). Each map panel is identified by a FEMA number and shows properties within the 100-year floodplain, floodways, or other districts (see Figure 12.10). These maps also provide base data for flood insurance rate maps (FIRMs).

The definition of what constitutes a wetland varies. Most laws describe wetlands in terms of three possible characteristics:

1. Soils
2. Hydrology
3. Vegetation

Section 404 of the Clean Water Act, the major federal environmental legislation regulating activities in wetlands, defines a wetland as land that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas, but classification may differ in various jurisdictions.

Figure 12.7 Soil Profile



In a soil profile, the three major horizons (i.e., layers of soil with characteristics produced by soil-forming processes) are

- **A:** the surface horizon
- **B:** the subsoil, i.e., the part of the soil that lies below plow depth
- **C:** the substratum

Additional layers may include

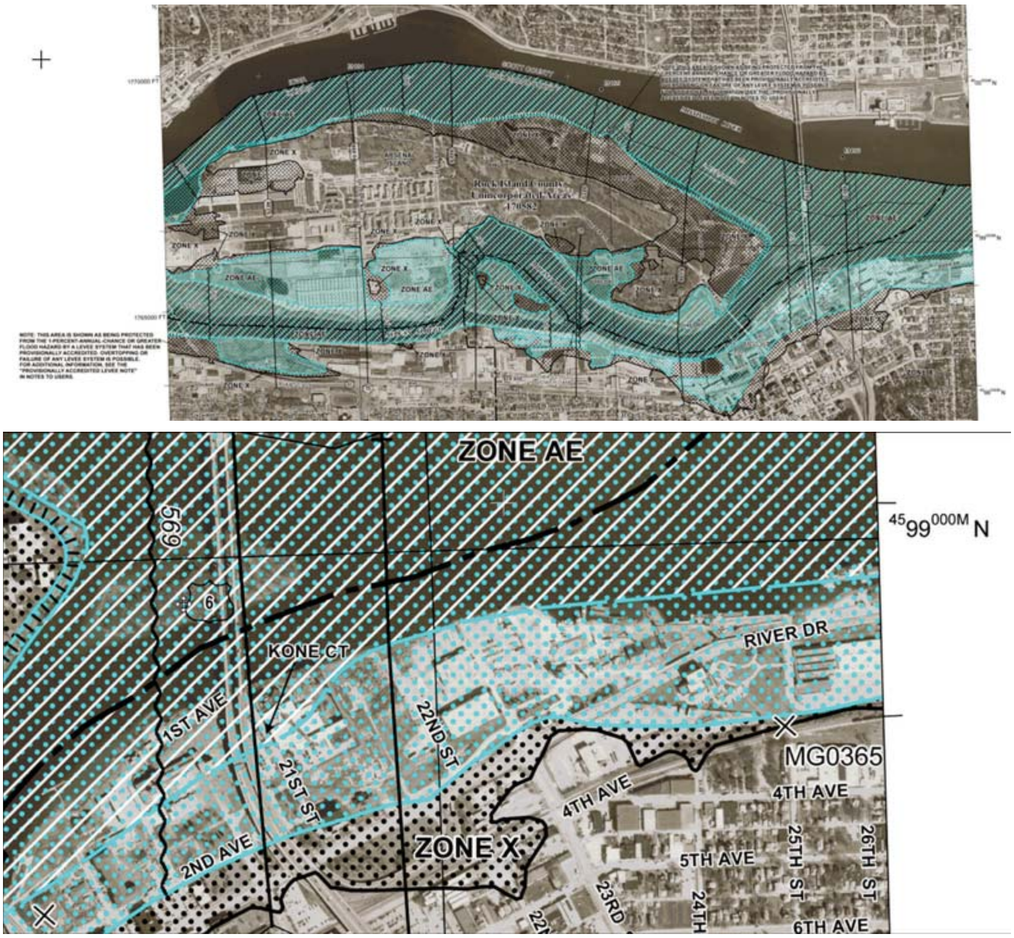
- **O:** an organic horizon on the surface
- **E:** a master horizon, usually between the A and B horizons, for soil with a significant loss of minerals
- **R:** hard bedrock, which is not soil

Source: http://pdfcast.net/soil-horizons-diagram.html

floodplain

The flat surfaces along the courses of rivers, streams, and other bodies of water that are subject to flooding.

Figure 12.8 Floodplain Map



Details of FEMA floodplain map (Rock Island County, Moline, Illinois, Panel 0120)

Figure 12.9 Components of a Floodplain

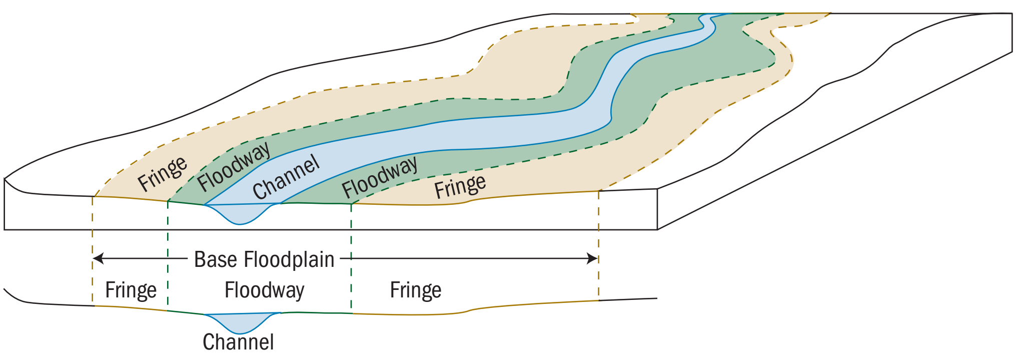


Figure 12.10 Wetlands Map

Detail from National Wetlands Mapper website (http://www.fws.gov/wetlands/Data/Mapper.html)

Where to Find

Floodplain Maps

To obtain FEMA floodplain maps, contact the Federal Emergency Management Agency Map Service Center at http://msc.fema.gov/. To order state kits and for customer service, contact the Map Service Center at 1-877-FEMA-MAP (336-2627).

Swamps, bogs, fens, marshes, and estuaries are subject to varying degrees of influence from local, state, and federal governments. In 2001 the US Supreme Court curtailed the power of the US Army Corps of Engineers (and, by extension, other federal authorities such as the US Environmental Protection Agency) to claim jurisdiction over certain wetlands using the Clean Water Act.[3] The court ruled that the act does not give the federal government jurisdiction over inland bodies of water that do not flow to the sea, such as landlocked ponds, wetlands, or mud flats, only navigable waterways or marshes that drain into navigable waters. To value wetlands, appraisers must understand the unique features of the land, the evolving laws protecting these areas, the niche market for such properties, and the proper application of the approaches to value.

3. *Solid Waste Agency of Northern Cook County v. US Army Corps of Engineers*, 531 U.S. 1 (2001).

Utilities

An appraiser investigates all the utilities and services available to a site. Off-site utilities may be publicly or privately operated, or there may be a need for on-site utility systems such as septic tanks and private water wells. The major utilities to be considered are

- sanitary sewers
- domestic water (i.e., potable water, for human consumption)
- types of raw or recycled water for commercial, industrial, and agricultural uses
- natural gas
- electricity
- storm drainage
- telephone service
- cable television
- Internet service

Although market analysis describes in general the utility systems that are available in an area, a site analysis should provide a detailed description of the utilities that are available to the appraised site. The location and capacity of the utilities should be determined and any unusually high connection fees should be noted. Atypically high or low service costs should also be identified and analyzed. It is not sufficient simply to establish which utilities are available. Any limitations resulting from a lack of utilities are important in highest and best use analysis, and all available, alternative sources of utility service should be investigated.

The rates for utility service and the burden of any bonded indebtedness or other special utility costs should also be considered. Of particular concern to residential, commercial, and industrial users are

- quality and quantity of water and its cost
- costs and dependability of energy sources
- adequacy of sewer facilities
- any special utility costs or surcharges that might apply to certain businesses

> The cost of installing utilities is considered in the highest and best use conclusion and may be reflected directly or indirectly in the analysis, depending on the selection of comparable sales used in the valuation.

Where to Find

Data on Utilities

Accurate information on public utilities can be obtained from

- local utility companies or agencies
- local public works departments
- providers of on-site water and sewage disposal systems
- city/county planning departments

- impact of special improvement districts (SIDs) on tax rate and repayment methods (special assessment)

Site Improvements

In a site description, an appraiser describes off-site and on-site improvements. Then the appraiser analyzes how the site improvements affect value. On-site improvements include grading, landscaping, fences, curbs, gutters, paving, drainage and irrigation systems, walks, and other improvements to the land. Off-site improvements include access roads, utility hookups, remote water retention ponds, and sewer and drainage lines. The value of off-site improvements is typically considered in the site valuation process.

The location of existing buildings on a site must also be described and analyzed. Many appraisers make approximate plot plan drawings that show the placement of major buildings in relation to lot lines, access points, and parking or driveway areas. Land-to-building ratios and overall site configuration are usually important to a site's appeal and ability to support specific uses. The space allotted for parking influences a site's value for business and commercial use, so the parking space-to-building ratio in a commercial and industrial property must be analyzed. Zoning codes or planned unit developments (PUDs) will specify the minimum number of spaces required, but the market ultimately decides how much parking is needed.

The appraiser considers any on-site improvements that add to or detract from a property's optimal use or highest and best use. For example, a lot zoned for multifamily residential use may be improved with an 18-unit apartment building that is too valuable to demolish. If the site as though vacant could accommodate a 24-unit building but the location of the present structure blocks the ability to add additional units, the appraiser may conclude that the site is underimproved and not developed to its highest and best use as if vacant.

Accessibility

Site analysis focuses on the time-distance relationships, or linkages, between the subject site and other sites that serve as common origins and destinations. An appraiser describes and analyzes all forms of access to and from the property and the neighborhood. In most cases, adequate parking area and the location and condition of streets, alleys, connector roads, freeways, and highways are important to land use. Industrial properties are influenced by rail and freeway access and the location of docking facilities. Industrial, commercial, and residential areas are all affected by the location of airports, freeways, public transportation, and railroad service.

Traffic volume may be either advantageous or disadvantageous to a site, depending on other conditions that affect its highest and best use. High-volume local traffic in commercial areas is usually an asset. Heavy through traffic may hurt retail stores, except those that serve regional travelers. Heavy traffic within residential areas is usually detrimental for single-unit residential neighborhoods, but high-traffic streets that provide access to a subdivision or development are advantageous.

The noise, dust, and fumes that come from a heavily traveled artery or freeway are not desirable for most low-density residential lots. On the other hand, the advertising value of locations on major arteries can benefit offices and shopping centers, unless congestion restricts the free flow of traffic. The visibility of a commercial property from the street is an advertising asset. This asset is most valuable when the driving customer can easily exit the flow of traffic and enter the property.

Median strips, turning restrictions, one-way streets, and access restrictions can limit the potential uses of a parcel. In site analysis the appraiser should test the probable uses of the site in relation to the flow of traffic. Planned changes in access should be verified with the appropriate authority and considered in the appraisal.

Where to Find

Traffic Volume Data

The volume of traffic passing a property is determined by a traffic count, which can usually be obtained from local or state departments of transportation. Traffic counts indicate average daily traffic, peak hours, and direction. Observing the speed and turning movements of actual vehicles helps an appraiser judge how traffic affects a property's highest and best use.

Environment

Appraisers also analyze land use in light of environmental conditions. Environmental considerations include factors such as

- local climate
- availability of adequate and satisfactory water supply
- patterns of drainage
- quality of air
- presence of wildlife or endangered species habitats
- location of earthquake faults and known slide or avalanche zones
- proximity to streams, wetlands, rivers, lakes, or oceans

Air and water pollution are by-products of increased population and urbanization. Public concern over pollution has prompted political action and legislation to protect the environment. In areas subject to extreme air pollution, regulations may exclude certain industries and limit the volume of traffic. Such restrictions affect land use in these jurisdictions. Pollution rights have also become a salable commodity.[4] In locations near natural water sources, industrial uses may be prohibited while recreational uses are promoted. Environmental and climatic advantages and constraints must be analyzed to determine the proper land use for a site. Future land uses must be compatible with the local environment.

4. The Clean Air Act of 1990 regulated the tonnage of acid-rain emissions that smokestack industries may release in proportion to plant size. Industries that do not use their full legal allowance can transfer or sell their pollution rights to other industries. Since 1993 pollution rights have been sold on both the Chicago Board of Trade and in the off-exchange pollution rights market.

A site in a specific location may be influenced by its exposure to sun, wind, or other environmental factors. A very windy location can be disastrous to a resort but beneficial to a wind farm. The sunny side of the street is not always the most desirable for retail shops. In hot climates, the shady side of the street often receives more pedestrian traffic and greater sales, thus producing higher rents and higher land values. Ski resorts almost always have slopes facing north for snow retention and buildings facing south to receive the sun.

Analysis of a site's environment focuses on the interrelationships between the appraised site and neighboring properties. The effects of any hazards or nuisances caused by neighboring properties must be considered. Of particular importance are safety concerns–e.g., the safety of employees and customers, of occupants and visitors, or of children going to and from school.

A site's value is also influenced by nearby amenities and developments on adjoining sites, such as parks, fine buildings, and compatible commercial buildings. The types of structures surrounding the property being appraised and the activities of those who use them can greatly influence site value.

Some types of sites located in or near critical environmental features such as wetlands, groundwater recharge areas, or habitat for rare or endangered species may be subject to special land use or environmental regulations that can affect values.

Contamination and Environmental Risk Issues

The presence of various types of contaminants on, adjacent to, or simply near a site that raise environmental issues is more commonly encountered in the appraisal process now than in the past. Some situations that can affect the value of land and improved properties include

- soil contamination due to an abandoned industrial plant,
- groundwater contamination due to a leaking underground storage tank (LUST) at a gas station or dry cleaner in a neighborhood shopping center
- pesticide runoff from farmland into rivers and streams
- air contamination from smoke, vapors, or odors

Contaminants and hazardous substances such as asbestos, PCBs, dioxin, TCEs, radon, petroleum hydrocarborns, arsenic, lead, and other heavy metals, when present in amounts that exceed federal or state regulatory limits, can create cost, use, and risk issues that may reduce the market value of an unimproved or improved property.

Appraisers are not expected to have the knowledge or experience needed to detect the presence of contaminants or to measure their quantities or remediation costs. That is a job for environmental engineers and remediation specialists. But appraisers can gain the competence and skills needed to provide an opinion of the effect of the contamination on market prices and values by properly considering and relying on the reports and data prepared by environmental specialists.

The consideration of environmental contamination in the appraisal process has been specifically addressed in Advisory Opinion 9: The Appraisal of Real Property That May Be Impacted by Environmental Contamination, as revised by the Appraisal Standards Board in 2002. In addition to defining key terms, definitions, and concepts, AO-9 establishes a framework for dealing with the cost, use, and risk issues raised, including consideration of ten important property characteristics to be considered during an appraisal assignment.

The framework in AO-9 identifies five key steps in an appraisal assignment involving contamination. First, the appraiser determines if the property is a source site, a non-source site, an adjacent site, or a proximate site. That distinction is especially important to a determination of who is responsible for investigation and remediation costs and whether that responsibility accompanies ownership of the property being appraised. A complex network of regulations defines the environmental responsibilities and potential liabilities of source site owners, investors, and tenants, and these responsibilities and liabilities can adversely affect the value of real property interests. Second, the appraiser considers the type of contaminant and applicable regulatory requirements (e.g, permitted or accidental discharge, level of required cleanup), migration (e.g., soil contamination confined to a source site, groundwater contamination spreading off site), and remediation (e.g., soil removal, installation of a cap, groundwater pumping, vapor removal) characteristics. Third, the appraiser must determine the status of the property in the "remedia-

Stigma

Stigma is an adverse public perception regarding a property, commonly the identification of a property with a condition such as environmental contamination or a violent crime, that penalizes the marketability of the property and may also result in a diminution in value. The detrimental perception of a particular site may be short-term or long-term, depending on the source of the stigma and changing market reactions to the nature of the event. Marketing times for properties affected by stigma tend to be longer than comparable properties without stigma. The three significant factors in the analysis of stigma are

- the real or imagined cause of the stigma
- the duration of the effect of the stigma
- the geographical extent of the influence of the stigma

Environmental contamination such as a leaking underground storage tank is one of the most common causes of stigma, but many other physical, economic, and legal characteristics of a site have the potential to create a market perception that lowers value. In recent years, the effect of foreclosures in a market area on the marketability and market value of foreclosed properties and similar area properties has been examined as a source of stigma.

Measuring the effect of stigma on value can be difficult because the damage caused by stigma is not simply the cost to repair a defect. Focus groups, surveys, statistical analyses, case study comparisons, and other tools have been used in this analysis. Numerous studies have been conducted, and extensive appraisal literature exists indicating that stigma may be temporary in nature and the effects of stigma dissipate over time. Stigma has been defined in many ways in court decisions, in professional standards, and in appraisal literature.

Specialized Terms and Definitions Related to Environmental Contamination

Advisory Opinion 9, originally adopted in 1992 and substantially revised in 2002, defines the following key terms for use by appraisers who may be involved in the valuation of properties affected by environmental issues:

diminution in value (property value diminution)	The difference between the unimpaired and impaired values of the property being appraised. This difference can be due to the increased risk or costs (or both) attributable to the property's environmental condition.
environmental contamination	Adverse environmental conditions resulting from the release of hazardous substances into the air, surface water, groundwater, or soil. Generally, the concentrations of these substances would exceed regulatory limits established by the appropriate federal, state, or local agencies.
environmental risk	The additional or incremental risk of investing in, financing, buying, or owning property attributable to its environmental condition. This risk is derived from perceived uncertainties concerning: (1) the nature and extent of the contamination, (2) estimates of future remediation costs and their timing, (3) potential for changes in regulatory requirements, (4) liabilities for cleanup (buyer, seller, third party), (5) potential for off-site impacts, and (6) other environmental risk factors, as may be relevant.
environmental stigma	An adverse effect on property value produced by the market's perception of increased environmental risk due to contamination (see **environmental risk** above).
impaired value	The market value of the property being appraised with full consideration of the effects of its environmental condition and the presence of environmental contamination on, adjacent to, or proximate to the property. Conceptually, this could be considered the "as-is" value of a contaminated property.
remediation cost	The cost to clean up (or remediate) a contaminated property to the appropriate regulatory standards. These costs can be for the cleanup of on-site contamination as well as mitigation of off-site impacts due to migrating contamination.
remediation lifecycle	A cycle consisting of three stages of cleanup of a contaminated site: before remediation or cleanup, during remediation, and after remediation. A contaminated property's remediation lifecycle stage is an important determinant of the risk associated with environmental contamination. Environmental risk can be expected to vary with the remediation lifecycle stage of the property.
source, non-source, adjacent, and proximate sites	Source sites are the sites on which contamination is, or has been, generated. Non-source sites are sites onto which contamination, generated from a source site, has migrated. An adjacent site is not contaminated, but shares a common property line with a source site. Proximate sites are not contaminated and not adjacent to a source site, but are in close proximity to the source site.
unimpaired value	The market value of a contaminated property developed under the hypothetical condition that the property is not contaminated.

Further reading: Orell Anderson, "Environmental Contamination: An Analysis in the Context of the DC Matrix," *The Appraisal Journal* (July 2001): 322-332.

tion lifecycle" as of the date of value. The effect of contamination and environmental risk on property prices and values changes over time; it typically decreases as a site works its way through the discovery and investigation, remediation, and post-remediation stages. Contamination may also be mitigated by natural attenuation even in cases where no actual remediation efforts have been undertaken. Fourth, the appraiser must consider the cost, use, and risk effects as of the relevant date and point in that remediation lifecycle as they relate to the type of property (source, non-source, adjacent, or proximate sites). Fifth, and finally, the appraiser estimates the impaired ("as is") value. In most assignments the appraiser is also asked to compare the impaired value to the unimpaired value under the hypothetical condition that the contamination is not present.

The initial focus in the 1980s and 1990s was on techniques for appraising source sites, for example, contaminated or remediated former steel mills or manufacturing plants with on-site contamination and

Specialized Methods and Techniques for Determining the Effects of Environmental Contamination on Prices and Values

Over the past 25 years, the appraisal profession has developed a set of recognized and generally accepted specialized techniques for estimating the effect of contamination and environmental risks on prices, markets, and values as discussed in the peer-reviewed appraisal literature and courses of the appraisal profession. All of these specialized methods are based on the three traditional approaches to value (sales comparison approach, income capitalization approach, and cost approach). These methods involve one or more of the following:

1. Paired data analysis of sales of impacted or potentially impacted properties
2. Analysis of environmental case studies
3. Multiple regression analysis of property sales in a potentially impacted area or in proximity to a source site
4. Adjustment of income and yield capitalization rates on income-producing properties to reflect environmental risk premiums estimated through market research

In paired data analysis, prices paid for properties that sold in an impacted area are compared to prices paid for otherwise similar properties that sold outside the impacted area in order to estimate the effect of the location on the sale price. Of course, no two properties are exactly alike, so market-supported adjustments may have to be made for differences between the properties other than location. More than one pairing is typically necessary to understand the effect of the location in the impacted area on the prices paid.

Environmental case studies are typically useful when a source site is being appraised or in a situation involving an impacted neighborhood or area where there are insufficient sales to understand the effect of the environmental issue on prices and values. Sales in another case study location involving a similar environmental situation are studied to estimate how the marketplace there responded to similar environmental issues. Typically that involves comparing sale prices in the impacted case study area to sale prices in a nearby similar, but unaffected, control area. The case study environmental situation is then compared to that of the impacted area using the relevant property characteristics identified in AO-9. Great care must be exercised when using paired data, case studies, and interviews because of the special conditions and characteristics of contaminated properties. Also, surveys need to be properly developed.

When properly specified and developed, a multiple regression model can be used to determine if the environmental situation is affecting sale prices. The model can be designed to interpret the effect of issues such as remediation status, location in a contaminated area, distance from a source site, and other factors. Of course, model specification must also include the nonenvironmental independent variable factors (e.g., site size, age of improvements, date of sale, zoning, school district) that influence sale prices. Having a database that includes a sufficient number of sales to make the outcome of the model statistically significant is actual or potential off-site migration due to surface water runoff, contaminated groundwater, or even windblown dust and vapor. Finding comparable sales of such source properties (sometimes called *brownfields*) was often difficult because many significantly contaminated source sites did not sell until investigation had been completed, parties legally responsible for remediation costs had been identified, remediation plans had been approved by environmental agencies, and cleanup costs had been determined with some degree of accuracy. Today, sales of source sites can be found and analyzed more readily. There may also be indemnification obligations by one or more parties.

In recent years, attention has turned to techniques for estimating the value of non-source, adjacent, and proximate sites. Sales of these types of properties can be found in large numbers by researching markets around sites involved in documented state or federal environmental investigations and approved remediation programs. These transactions will usually provide sufficient basis for valuing or analyzing a site that

especially important. If the regression modeling is done as part of a mass appraisal assignment, the regression modeling must comply with Standard 6 of USPAP.

Sale prices for income-producing properties can be studied to estimate if their direct capitalization or yield capitalization rates have been affected by the contamination investigation, remediation, or post-remediation circumstances, and any appropriate upward adjustment can be made to the unimpaired rate for the property being appraised.

Given the remediation lifecycle recognized by AO-9, gathering and analyzing market data that matches up well with the appraised property's remediation lifecycle stage on the date of value is critical because the effect of the contamination situation on prices and values can change as the investigation, remediation, and post-remediation monitoring move forward.

Paired data analysis, case studies, or market studies of capitalization and yield rates developed by others and found in published appraisal literature can be a useful starting point in such an analysis. However, relying on published articles as a basis for a value opinion is not a recognized appraisal technique in the absence of independent investigation and verification of the accuracy of the market data and conclusions.

Informal or formal surveys of buyers, sellers, lenders, brokers, appraisers, and others involved in actual sales of property affected by contamination and environmental risk may also provide useful information.

For further information, see the following references:

- Thomas O. Jackson, "Appraisal Standards and Contaminated Property Valuation," *The Appraisal Journal* (April 2003): 127-133.
- Thomas O. Jackson, "Methods and Techniques for Contaminated Property Valuation," *The Appraisal Journal* (October 2003): 311-320.
- Thomas Jackson and Randall Bell, "The Analysis of Environmental Case Studies," *The Appraisal Journal* (January 2002): 86-95.
- James Flynn, Donald G. MacGregor, Wayne Hunsperger, C.K. Mertz, and Stephen M. Johnson, "A Survey Approach for Demonstrating Stigma Effects in Property Value Litigation," *The Appraisal Journal* (Winter 2004): 35-44.
- Randall Bell, "Chapter 8: Environmental and Biomedical Conditions," in *Real Estate Damages: Applied Economics and Detrimental Conditions,* 2nd ed. (Chicago: Appraisal Institute, 2008): 147-181.
- Richard J. Roddewig, editor, *Valuing Contaminated Property: An Appraisal Institute Anthology* (Chicago: Appraisal Institute, 2002) and the forthcoming new volume of that publication.
- The seminar *Analyzing the Effects of Environmental Contamination on Real Property* (Chicago: Appraisal Institute, 2010).

may be affected by environmental contamination. The details of the sales transaction will require a great deal of confirmation.

There are well established and generally recognized and accepted analytical techniques and methods to determine how the cost, use, and risk factors referenced in AO-9 affect property prices, values, and markets. Appraisers must avoid substituting their judgment for that of the marketplace. All of the techniques require consideration of market data in arriving at the impaired values. Contamination does not always have an adverse effect on value. The influence of environmental impairment on real property must always be found in the marketplace.

Special Characteristics of Rural, Agricultural, or Resource Land

Rural or agricultural resource lands have specific characteristics that appraisers should investigate to describe these properties adequately.

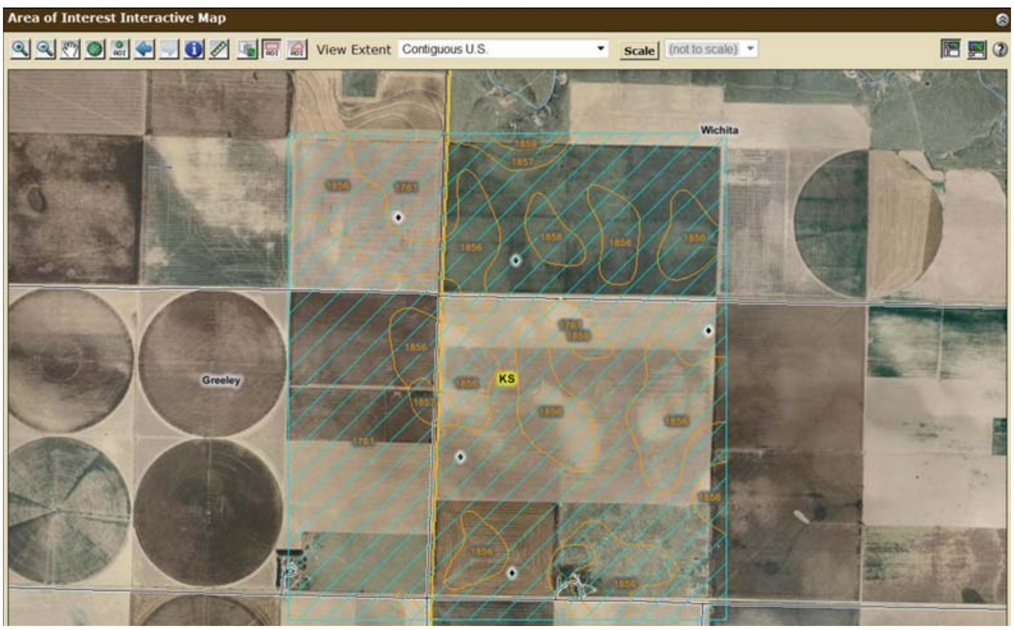
Soil

Precise soil surveys that indicate the soils found on properties, appropriate crops, and expected production are often available (see Figure 12.11). These surveys are useful in comparing agricultural properties.

Water Rights, Drainage, and Irrigation

The legal right to water is as important to the value of a property as the physical source of the water. Although water rights vary greatly through-

Figure 12.11 Soil Survey Map



Detail of output from USDA Web Soil Survey map out the United States, state laws, as administered by the state department of natural resources or another government agency, have the greatest influence on access to water. Evidence of water rights may be in the form of a contract with the Water and Power Resources Service (formerly the US Bureau of Reclamation) or a public utility water distributor. Water rights may also be given by an individual state certificate or decree, by shares of stock in an irrigation company, or by location in an organized irrigation district. The long-term dependability and cost of adequate drainage and water supplies should be analyzed. (Evaluating on-site drainage and irrigation may require special expertise.) For an appraisal of irrigated properties, it is always necessary to know whether the water rights are appurtenant to the land or transferable separately from the land. If water rights do not transfer with the land, the property's value may decline significantly and its highest and best use may be changed.

Climate

General climatic conditions and growing seasons can affect crop production and selection and, therefore, land value.

Potential Crops

The crops grown on a property are related not only to climate, soil, and irrigation, but also to the availability of labor, transportation, and access to the markets that make, transport, and sell the products produced from crops.

Environmental Controls

Cropping patterns are influenced by regulations on herbicides, insecticides, fertilizers, air and water pollution, and wildlife protection. Lead-based paint, underground storage tanks, asbestos in farm buildings, and cattle vats are common environmental liabilities.

Mineral Rights

The presence of precious metals, oil and gas, sand and gravel, quarry red rock such as building stone, clay deposits, or gemstones on a plot of land can affect its value. As with water rights, the legal right to extract all minerals contained in or below the surface of a property is as important as ownership of the land itself. Mineral rights may be granted with surface rights or without surface entry because the mineral estate is the dominant tenant in most states. Various lease and ownership relationships may be in effect and should be investigated. These considerations are often complicated by advances in technology and directional drilling techniques.

Because subsurface minerals can never be fully and absolutely quantified until they are extracted, and their extent and quality are subject to many variations, appraisers should recognize the risks and uncertainties associated with mineral properties. It is also important to remember that the activity of mineral extraction is a business activity and that real property interests must be separated from those of a business.

Unapparent Environmental Hazards

Although the environmental liabilities associated with industrial plants are well known, many of the same liabilities may be present in other properties. Investors and analysts cannot assume that green rural properties that appear clean are actually free of environmental liabilities. In the 1940s and 1950s, farmers commonly used cattle vats–i.e., trenches filled with fuel oil through which cattle were led to rid them of mites and small insects. The fuel oil was often treated with DDT and other pesticides. When this practice fell into disuse, the trenches were simply filled in. Farms often have aging underground storage tanks that held gasoline used to fuel farm vehicles. Farmland may also be contaminated by the accumulation of fertilizers and pesticides. Old railroad beds can constitute an environmental hazard because railroad ties were commonly soaked in creosote-filled trenches dug on site when tracks were laid. Timberlands are not free of contaminants either. Old turpentine stills are often found in areas where forests were once harvested.

Other Considerations

The location of wildlife habitats, the distances from populated areas, and the potential for recreational land uses are among the many other considerations to be analyzed in appraising agricultural land. Special tax provisions, such as reduced taxes on agricultural or resource properties, should also be studied.[5]

5. For a thorough discussion of the methods used to describe and analyze the significant characteristics of land used for agricultural production, see American Society of Farm Managers and Rural Appraisers and Appraisal Institute, *The Appraisal of Rural Property*, 2nd ed. (Denver and Chicago, 2000).

Building Description

An important part of every appraisal is the description of the type, quality, and condition of the building or buildings on the site and the analysis of the structure's design. The process of analyzing the building improvements encompasses three interrelated tasks:

- site visit
- building description
- description and analysis of architectural style and functional utility

In the valuation process, the appraiser gathers much of the information needed to describe and analyze the improvements by personally visiting the site of the the real estate. Careless or inadequate inspection of the physical characteristics and features of the subject and comparable properties can create difficulties for an appraiser in later phases of the appraisal. For example, if a structural problem is overlooked, the conclusions of the three approaches to value could be meaningless. The goal of the site visit is identifying the site and building characteristics that create value.

Accurate building descriptions are essential to all valuation assignments even in cases where the existing improvements do not represent the property's highest and best use. In the description and analysis of the site and improvements, the appraiser should address all pertinent property strengths and weaknesses, expand on any problem areas, and interpret the significance of the data to lay a foundation for the discussion of highest and best use. The appraiser needs a thorough understanding of the physical characteristics of the subject property to identify and select suitable comparables. A thorough building description helps the appraiser identify the extent and quality of building improvements, calculate their cost, and identify physical deterioration and functional obsolescence. Therefore, the accuracy of building descriptions directly affects the opinion of value produced by applying the three approaches to value. If the scope of work of the assignment does not require a site visit, the site and building description may not be accurate, so the appraisal report must clearly and conspicuously disclose the extraordinary assumption that the site and building characteristics are as described even though the appraiser has not confirmed that information through a site visit.

Architectural style and functional utility are interrelated, and their combined effect on property value must be analyzed by appraisers. Architectural style is the character of a building's form and ornamentation. Functional utility is the ability of a property or building to be useful and to perform the function for which it is intended, according to current market tastes and standards. Functional utility also relates to the efficiency of a building's use in terms of architectural style, design and layout, traffic patterns, and the size and type of rooms. Both architectural style and functional utility influence the lives of individuals by providing or withholding beauty, comfort, security, convenience, light, and air. They may also encourage reasonable maintenance expenditures, preserve valuable traditions, or indicate the need for change.

Considerations of style and functional utility are integral to an appraisal because they relate directly to the utility and desirability of the property in the marketplace. They are noted along with other physical characteristics during the site visit. By using comparable data, an appraiser can analyze how style and function influence a property's market value. Style and functional utility are examined in terms of (1) the use for which a particular improvement was designed, (2) its actual or contemplated use, and (3) its most productive use. These three uses may or may not be the same.

The ultimate goals of the analysis of the improvements are

- proper identification of the important building components for the appraisal analysis, i.e., what site and building characteristics create value
- sound judgment of the quality and condition of improvements and components
- convincing support for conclusions in market analysis, highest and best use analysis, and the application of the approaches to value

This chapter focuses on the structural elements and features that an appraiser will rate in the quality and condition survey, which lays the groundwork for the analyses that follow building description in the valuation process.

Site Visit

Sometimes consumers equate appraisal with the inspection of the subject real estate, but visiting the site is just one of the many tasks performed in an appraisal. Professional property inspectors are specialized contractors with expertise in uncovering defects in the structure and materials of various types of properties. Although appraisers must be familiar with the property inspection process, an appraiser observes the components and characteristics of the subject property that will influence value in the marketplace.

The importance of a site visit should not be underestimated. Much of the primary data an appraiser collects comes from the process of visiting the site and observing the site and improvements. The real estate being appraised must be understood in the context of its immediate surroundings and the effect of other nearby improvements and land uses. Comparison of the subject and comparables is crucial for the sales comparison and income capitalization approaches, and estimating building costs in the cost approach is impossible without an accurate inventory of the building components in the subject. In addition, the comparison of the quality and condition of building components can be essential in making adjustments.

In some situations, the improvements may have been demolished by natural forces, as a result of demolition, or due to eminent domain actions. In these instances, appraisers must ensure that they have an adequate understanding of the condition of the improvements as they existed on the effective date of valuation. When an appraiser does not know the condition of a property as of the effective date, the appraisal is subject to an extraordinary assumption that the property condition on that date was as the appraiser described it in the appraisal report.

Many appraisers learn how to inspect a property through on-the-job training. Increased scrutiny from state licensing officials and clients serves to remind appraisers of their professional obligation to understand construction methods and materials, to judge the condition and serviceability of building materials and components, and to assess functionality. The site visit can be one of the longest periods of face-to-face interaction between the appraiser and the client or property owner, so fundamental mistakes in the performance of the site visit and in interactions with the client can be embarrassing and even costly, damaging the relationship between the appraiser and the client and jeopardizing any future business between them. Failure to disclose defects in an improvement (because those defects were missed during the site visit) or to verify information gathered through other means are flaws of an appraisal report that can result in litigation against an appraiser.

Sometimes an appraiser will not have the expertise necessary to judge the quality and condition of specialized equipment or atypical building materials and may have to rely on the judgment of other professionals.[1] For a complex property, such as a manufacturing plant

1. The Competency Rule of the Uniform Standards of Professional Appraisal Practice may apply to certain complex property inspection situations. Advisory Opinion 2 discusses what constitutes a minimum inspection of the subject property. See also Guide Notes 4: Reliance on Reports Prepared by Others in the Standard of Professional Practice of the Appraisal Institute.

containing sophisticated equipment and mechanical systems, blueprints provided by the developer or owner can be helpful.

Building Description

In the valuation process, an appraiser describes the design, layout, and construction details of the subject improvements, which include the structural components, materials, energy efficiency, and mechanical systems of each building under investigation. The appraiser also determines building size and the function, condition, and serviceability of each element described.

It is also important that the appraiser describe items that are not building improvements, such as personal property items. Personal property such as window treatments and appliances may or may not be included in an appraisal. Usually, only real property is valued, but sometimes a lender client may consider items of personal property part of the collateral for a loan and ask the appraiser to allocate a value to these items. In some instances, special analysis may be required to determine whether items of machinery and equipment are personal property or fixtures.

The building description provides the basis for comparing the subject property's improvements with improvements that are considered typical in the subject property's market and with the ideal improvements as determined in highest and best use analysis.

To analyze the quality and condition of improvements, appraisers need a general understanding of the building construction process and the operation of essential building systems.[2] The typical construction materials and techniques used in a region can change over time for a variety of reasons:

- New building technologies evolve.
- The prices of materials fluctuate significantly.
- Rising or falling energy prices make a particular building material more desirable.
- The dictates of fashion affect the demand for a certain building material or feature.

building description
The analysis of a building's design, layout, construction details, size, condition, and other characteristics that provides the basis for comparing the subject property's improvements with the improvements typically accepted in the subject property's market.

With experience and through observation of market trends, appraisers will gain insight into how building components are perceived and valued in a particular market. The growth of green or high-performing buildings is a good example of the changes that occur in all types of building uses.

Elements of a Building Description

An appraiser prepares a building description by considering a variety of specific information in sequence. Primary concerns include

1. The type of use represented by the existing building
2. The codes and regulations affecting this use

2. For an up-to-date and easy-to-read guide to construction materials and techniques, see Francis D.K. Ching, *Building Construction Illustrated*, 4th ed. (New York: John Wiley & Sons, Inc., 2008).

3. Building size, plan, and construction
4. Details of the building's exterior and interior and its equipment and mechanical systems (both those included in the original construction and in subsequent improvements)

An appraiser must view a building objectively and analytically, paying careful attention to all components that ultimately contribute to the determination of the building's highest and best use as improved and any alternative uses to be considered in the assignment. The sheer number of components listed in a comprehensive building description should not be a factor in the application of the approaches to value. The market's reaction to the presence or absence of structural components in a property is a more important consideration than the simple fact that those components do or do not exist.

Green buildings offer a challenge to appraisers because their unique features result in lower utility and water costs and often have special tax advantages or incentives that offset the gross cost of these features. The market's reaction to green features may not be supportable in the sales comparison approach because of limited sales in a given market. In these cases, the income capitalization and cost approaches may produce a more credible value conclusion.

Some improvements feature unique or specialized design, materials, or construction features that distinguish them and may limit their marketability. A chemical plant or a wharf facility, for example, may also have special locational characteristics that complement the unique features of the improvements. Property improvements with features that differ from the features of other properties with broader marketability are not necessarily without value, but more specialized analyses may be necessary. Furthermore, some properties may have special importance or value to their owners or users (use value) that does not reflect the value the property may have in its market (market value). Appraisers must take care to value property in accordance with the disclosed scope of work and the definition of value applied in the assignment.

green building
The practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life cycle from siting to design, construction, operation, maintenance, renovation, and demolition. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort.

Use Classification

Land uses can be divided into any number of types, depending on market norms and personal preferences. Traditionally, most appraisers have divided land uses into these major groups:

- residential
- office
- retail
- industrial
- mixed use

- agricultural
- other specialized uses

Each of these groups can be broken down into increasingly specific subgroups.

Systems of use classification may vary from market to market. For example, in some markets hotels and motels are considered a major property classification, whereas in other markets they are considered a subset of commercial properties. Appraisers should be familiar with the types of property defined by the market they are working in and employ a system of use classification that their clients will understand.

Zoning regulations establish the permitted uses of real estate. Existing and potential land uses must be checked against zoning regulations to determine if they are conforming or nonconforming uses. When the present use does not conform to current zoning regulations, the appraiser should consider how this fact might affect property value.

Building Codes and Ordinances

In addition to any use restrictions imposed by zoning, the planning and construction of buildings are restricted by various laws, codes, and regulations enacted at all levels of government to protect the health, safety, and welfare of the public. Many states have codes that control the kinds of buildings that are built there. Federal regulations are established to ensure occupational health and safety, environmental protection, pollution control, and consumer protection. Municipal building codes establish requirements for the construction and occupancy of buildings, and the codes also contain specifications for building materials, methods of construction, and mechanical systems. These codes also establish standards of performance and address considerations such as structural strength, fire resistance, and adequate light and ventilation. Many newer building codes are incorporating green features, especially energy-efficient features to conserve resources.

Building codes establish one form of standard, but the ordinances enacted for their application often vary from the codes themselves or place special terms or conditions on how the codes will be applied in a given jurisdiction. Note that national building codes do not always translate into local ordinances.

Size

Determining the size of a building may seem like the easiest step in preparing a building description, but it can be a formidable task for an appraiser who is not prepared for its inherent difficulties. The methods and techniques used to calculate building size vary regionally, differ among property types, and may reflect biases that significantly affect opinions of value. The appraiser must know the measurement techniques used in the area where the building is located as well as those used to describe properties elsewhere. Failure to apply measurement techniques and report building dimensions consistently within an assignment can impair the quality of the appraisal.

Systems for measuring residential and non-residential properties vary. Gross building area is measured for all property types other than one-unit residential properties. Gross living area and gross leasable area are other common measurements.

Distinctions between gross building area, gross living area, usable area, and rentable or leasable area need to be clearly understood. Because the measurement of such areas varies based on local market practices, knowledge of such practices is important.

An appraiser uses the system of measurement commonly employed in the area and includes a description of the system in the appraisal report. Gross building area is usually calculated. Measurements taken from plans should be checked against actual building measurements because alterations and additions are often made after plans are prepared. The areas of attached porches, freestanding garages, and other minor buildings are always calculated separately.

Standards for measuring residential property have been developed by several federal agencies, including the FHA, the VA, Fannie Mae, and Freddie Mac (see Table 13.1). Because there is a close relationship between these agencies and the mortgage market industry, these standards have been used in millions of appraisals. Another widely accepted measurement standard for residential properties is *Square Footage–Method for Calculating: ANSI Z765-2002*, developed by the National Association of Home Builders (NAHB) Research Center with the American National Standards Institute (ANSI).

Office buildings present special problems for appraisers because they are measured differently in different regions. The Building Own-

Table 13.1 Building Measurement Standards

Gross living area (GLA)	
Definition	Total area of finished, above-grade residential space; calculated by measuring the outside perimeter of the structure and includes only finished, habitable, above-grade living space. (Finished basements and attic areas are not generally included in total gross living area. Local practices, however, may differ.)
Use	Used by federal agencies to measure one-unit residential properties.
Gross building area (GBA)	
Definition	Total floor area of a building, excluding unenclosed areas, measured from the exterior of the walls; includes both the superstructure floor area and the substructure or basement area.
Use	Used by federal agencies to measure multifamily properties; also the common standard of measurement for industrial buildings.
Gross leasable area (GLA)	
Definition	Total floor area designed for the occupancy and exclusive use of tenants, including basements and mezzanines; measured from the center of joint partitioning to the outside wall surfaces.
Use	Commonly used to measure shopping centers.

Note that the acronym *GLA* can stand for two different area measurements. Residential appraisers use GLA for *gross living area*; non-residential appraisers use it to refer to *gross leasable area*.

ers and Managers Association International (BOMA) has established a method for measuring office building floor area. This widely used method is described in BOMA's publication *Office Buildings: Standard Methods of Measurement* (ANSI/BOMA Z65.1–2010), which was most recently updated in 2010 as part of a major revision to BOMA's suite of standards.[3] The description of an office building should include measurements of

- gross building area
- finished building area
- leasable building area

Some methods of office measurement allocate a pro rata portion of the restrooms, elevator lobbies, and corridors to each tenant. One variation also includes a pro rata portion of the ground floor main lobby in each tenant's leased area. Office building management may measure single-tenant and multitenant floors in the same building in different ways. Because these measurements vary with occupancy, the appraiser must apply a consistent method in calculating the floor-by-floor leasable area of a building.

The appraiser should not accept a statement about the size of a subject or comparable property without knowing the basis for the calculation. Unverified size information can cause the resulting opinion of value to be erroneous or misleading.

Format

A complete building description includes information about the details and condition of a building's exterior, interior, equipment, and mechanical systems. If the building is commissioned or certified green or energy efficient, the details of the certification should be described.

Although there is no prescribed method for describing all buildings, the outline in Figure 13.1 may be used to establish a format for building descriptions and can be adapted to the special needs of particular assignments. For green or energy-efficient residential buildings, the Residential Green and Energy Efficient Addendum (see Figure 13.2) is an optional addendum for the 1004 form widely used for mortgage lending purposes and for the AI 100 Summary Report.

A building description includes a description of the exterior, the interior, and the equipment and mechanical systems.

Other formats can be useful in different circumstances, depending on the type of property concerned and the nature of the appraisal assignment. The level of detail required in the building description varies according to the assignment's scope of work.

3. The BOMA suite of measurement standards includes *Industrial Buildings: Standard Methods of Measurement* (ANSI/BOMA Z65.2–2009), *Gross Areas of a Building: Standard Methods of Measurement* (ANSI/BOMA Z65.3–2009), *Multi-Unit Residential Buildings: Standard Methods of Measurement* (ANSI/BOMA Z65.4–2010), *Retail Buildings: Standard Methods of Measurement* (ANSI/BOMA Z65.5–2010), and *Mixed-Use Properties: Standard Methods of Measurement* (ANSI/BOMA Z65.6–2012).

Figure 13.1 Elements of a Building Description

A. Substructure
   1. Footings
   2. Slabs
   3. Piles
   4. Columns
   5. Piers
   6. Beams
   7. Foundation walls
B. Superstructure
   1. Framing
   2. Insulation
      a. Home Energy Rating System (HERS)
      b. Other third-party rating system
   3. Ventilation
   4. Exterior walls
   5. Exterior doors
   6. Windows, storm windows, and screens
   7. Facade
   8. Roof and drain system
   9. Chimneys, stacks, and vents
   10. Special features
C. Interior description
   1. Interior walls, partitions, and doors
   2. Division of space
      a. Storage areas
      b. Stairs, ramps, elevators, escalators, and hoists
   3. Interior supports
      a. Beams, columns, and trusses
      b. Flooring system (subflooring)
      c. Ceilings
   4. Painting, decorating, and finishing
      a. Basements
      b. Floor coverings
      c. Walls, partitions, and ceilings
      d. Molding and baseboards
      e. Fireplaces
   5. Protection against decay and insect damage
   6. Miscellaneous and special features
   7. Personal property
      a. Furniture
      b. Fixtures
      c. Trade fixtures
      d. Equipment
D. Mechanical systems
   1. Plumbing system
      a. Piping
      b. Fixtures
      c. Hot water system
   2. Heating, ventilation, and air-conditioning systems
      a. Heating systems
         1) Warm or hot air
         2) Hot water
         3) Steam
         4) Electric
      b. Air-conditioning and ventilation systems
   3. Electrical systems
   4. Miscellaneous equipment
      a. Fire protection
      b. Elevators, escalators, and speed ramps
      c. Signals, alarms, and call systems
      d. Loading facilities
      e. Attached equipment (process-related)

Description of Exterior Materials and Design

An exterior description provides information on the following:

- substructure–foundation
- framing
- insulation
- ventilation
- exterior walls, doors, and windows
- roofs and drains

Building envelope refers to the walls, foundation, roof, doors, and windows or those components that separate the interior conditioned space from the exterior unconditioned space. Green or energy-efficient buildings may have a rating for the tightness of the envelope.

Figure 13.2

Client File #:		Appraisal File #:	

AI Reports®

Form 820.04*

Residential Green and Energy Efficient Addendum

Client:		
Subject Property:		
City:	State:	Zip:

Additional resources to aid in the valuation of green properties and the completion of this form can be found at http://www.appraisalinstitute.org/education/green_energy_addendum.aspx

The appraiser hereby certifies that the information provided within this addendum:

- has been considered in the appraiser's development of the appraisal of the subject property only for the client and intended user(s) identified in the appraisal report and only for the intended use stated in the report.
- is not provided by the appraiser for any other purpose and should not be relied upon by parties other than those identified by the appraiser as the client or intended user(s) in the report.
- is the result of the appraiser's routine inspection of and inquiries about the subject property's green and energy efficient features. Extraordinary assumption: Data provided herein is assumed to be accurate and if found to be in error could alter the appraiser's opinions or conclusions.
- is not made as a representation or as a warranty as to the efficiency, quality, function, operability, reliability or cost savings of the reported items or of the subject property in general, and this addendum should not be relied upon for such assessments.

Green Building: The practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's lifecycle from siting to design, construction, operation, maintenance, renovation, and deconstruction. This practice expands and complements the classic building design concerns of economy, utility, durability, and comfort.[1] High Performance building and green building are often used interchangeably.

Six Elements of Green Building: A green building has attributes that fall into the six elements of green building known as (1) site, (2) water, (3) energy, (4) materials, (5) indoor air quality, and (6) maintenance and operation. A Green Building will be energy efficient but an energy efficient building is not synonymous with Green Building.

Green Features

The following items are considered within the appraised value of the subject property:

Certification	Year Certified:	Certifying Organization: ☐ Home Innovation Research Labs (ICC-700) ☐ USGBC (LEED) ☐ Other:	☐ Verification Reviewed on site	☐ Certification attached to this report
Rating	Score:	☐ LEED Certified: ☐ LEED Silver ☐ LEED Gold ☐ LEED Platinum ☐ ICC-700 *National Green Building Standard* Certified: ☐ Bronze ☐ Silver ☐ Gold ☐ Emerald Green Certifying Organization URL (website)		
Additions	Explain any additions or changes made to the structure since it was certified: Do changes require recertification to verify rating is still applicable? ☐ Yes ☐ No			
Comments Attach the rating worksheet that provides the ratings for each element to provide a better understanding of the features. The worksheet will assist in comparing the subject to sales rated by different organizations.	If a property is built green but not formally certified, it still deserves proper description and analysis to value the features. The market analysis is of the structure's physical, economic, and locational attributes and not an analysis of its label alone.			

The objective of this Addendum is to standardize the communication of the high performing features of residential properties. Identifying the features not found on the 1004 form provides a basis for comparable selection and analysis of the features. Builders, contractors, homeowners, and third party verifiers are encouraged to complete this Addendum and present to appraisers, agents, lenders, and homeowners.

[1] U.S. Environmental Protection Agency at www.epa.gov/greenbuildings/pubs/about.htm.

*NOTICE: The Appraisal Institute publishes this form for use by appraisers where the appraiser deems use of the form appropriate. Depending on the assignment, the appraiser may need to provide additional data, analysis and work product not called for in this form. The Appraisal Institute plays no role in completing the form and disclaims any responsibility for the data, analysis or any other work product provided by the individual appraiser(s).

AI Reports® AI-820.04 Residential Green and Energy Efficient Addendum January 2013

- chimneys
- special features

Substructure

Substructure usually refers to a building's entire foundational structure, which is below grade and includes such foundation supports as footings, slabs, piles, columns, piers, and beams. To evaluate the quality and condition of footings (and other items of concealed construction throughout a building), which are visible only when a building is under construction, an appraiser must look for evidence of structural problems. Footings that are improperly designed and constructed often cause settling and wall cracks.

Superstructure

Superstructure usually refers to the portion of the building above grade. In multipurpose buildings, however, components such as parking garages that are above grade but not used for habitable space are often considered part of the substructure.

Framing

The structural frame is the load-bearing skeleton of a building to which the exterior and interior walls are attached. The structural frames of most houses in the United States are made of wood. Many commercial and industrial buildings have steel or concrete frames.

A wood framing system that is defective can cause walls to crack, exterior walls to bulge, windows to stick, and doors to open or close improperly. Steel framing is usually less expensive than precast or reinforced concrete, and it is easier and faster to erect. Steel framing has one major disadvantage, however. Unless it is encased in heat-resistant, fireproof material such as plaster or concrete, the steel may buckle and bend in a fire, pulling adjacent structural members out of position and greatly increasing fire damage to the building. Reinforced and precast concrete framing is the most expensive and difficult to construct, but it is highly resistant to fire damage.

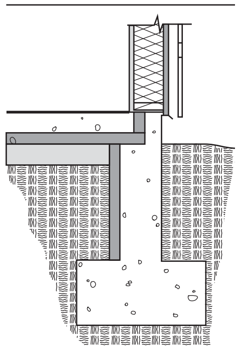
Insulation

Insulation not only helps economize on fuel and ensure the comfort of occupants in both warm and cold climates, but it also reduces noise transmission and impedes the spread of fire. The ability of an insulation material to resist the flow of heat is measured in R values. R value is derived by measuring the British thermal units (Btu) that are transmitted in one hour through one layer of the insulation. The higher the R value, the better the insulation. There is no universal standard for the amount of insulation required in a structure because the amount varies with the climate and the type of building. For example, overceiling or underroof insulation with an R value of 13 might be satisfactory in a mild climate if there is gas or oil heat and no air-conditioning. In cold or hot climates and in structures with electric heat or air-conditioning, insulation with an

Substructure: A building's entire foundational structure, which is below grade and provides a support base or footings on which the superstructure rests.

Footings

Type	Perimetric base
Materials	Concrete
Characteristics/Use	Most common type of footing; a concrete base rests on undisturbed earth below the frost line and distributes the load of the walls over the subgrade.



Type	Plain footing
Materials	Concrete
Characteristics/Use	Unreinforced and designed to carry light loads.
Type	Reinforced footing
Materials	Concrete and steel
Characteristics/Use	Contain steel to increase their strength.
Type	Column
Materials	Concrete
Characteristics/Use	Long, relatively slender pillars.
Type	Spread footing
Materials	Concrete
Characteristics/Use	Frequently used where the soil has poor load-bearing capacity.

Foundations

Type	Slab on ground
Materials	Poured concrete
	Concrete or cinder block walls on concrete footings
	Cut stone or stone and brick (in older buildings)
Characteristics/Use	Most common type of foundation.
Type	Mat and raft (floating foundation)
Materials	Concrete slab heavily reinforced with steel
Characteristics/Use	Used over soils that have poor load-bearing capacity. Steel reinforcing makes the entire foundation function as a unit.

Piles

Type	Columnar units
Materials	Concrete
	Metal
	Wood
Characteristics/Use	Piles serve as substitutes for footings, transmitting loads through soil with poor load-bearing capacity to lower levels where the soil's load-bearing capacity is adequate.

Columns, Piers, and Beams

Materials	Concrete
	Steel
Characteristics/Use	Foundation supports that can be used separately or in combination.

Superstructure: The portion of a building that is above grade.

Framing

Type	Platform
Materials	Wood
Characteristics/Use	Vertical framing members (studs) are cut to the ceiling height of one floor, horizontal plates are laid on top, then more studs are cut for the next floor.
Type	Post-and-beam
Materials	Wood
Characteristics/Use	Heavier and larger framing members support widely spaced beams. Fewer interior load-bearing walls.
Type	Precast concrete
Characteristics/Use	Prefabricated walls and floors are "tilted up" at the construction site.
Type	Steel framing
Characteristics/Use	For functional, single-story industrial plants with large bays between columns. Usually less expensive than precast or reinforced concrete and easier and faster to erect.
Type	Solid masonry exterior walls with steel beam or reinforced concrete interior framing (newer buildings) or interior framing of wood beams and posts (older buildings)

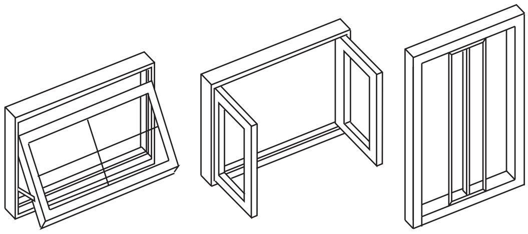
Insulation

Type	Loose-fill
Materials	Mineral wool (rock, slag, or glass wool) or cellulosic fiber (recycled newsprint, wood chips, or other organic fibers)
Characteristics/Use	Poured or blown by a machine into a building's structural cavities.
Type	Flexible
Characteristics/Use	Generally used where it is not practical to install loose-fill insulation or where the foil or kraft paper facing is needed as a vapor barrier.

Type	Rigid
Materials	Structural wall insulation Fiberboard Structural deck insulation Rigid board insulation
Type	Reflective
Materials	Foil
Characteristics/Use	Used to reflect heat transferred by radiation.
Type	Foamed-in-place
Materials	Polyurethane
Exterior Walls	
Type	Load-bearing
Materials	Solid masonry (cement block, brick, or a combination) Poured concrete Pre-stressed concrete Steel beams covered with siding material Wood framing
Characteristics/Use	May be strengthened with masonry pilasters attached to the exterior of the wall.
Type	Nonload-bearing
Materials	Porcelain enamel Steel Aluminum Precast aggregate concrete Glass Corrugated iron, tilt-up precast concrete asbestos board, fiberglass and metal sandwich panels for industrial buildings
Characteristics/Use	Commonly used in larger buildings; attached to the framing system.
Exterior Doors	
Type	Standard
Materials	Wood Metal Glass
Characteristics/Use	Exterior doors are usually solid. Hollow exterior doors are generally a sign of poor-quality construction.
Type	Large truck doors (commercial and industrial buildings)
Materials	Steel
Types/Components	Special-purpose doors with automatic door openers
Materials	Wood Metal Glass

Windows

Types	Single- and double-hung Casement Horizontal sliding Clerestory Fixed Awning Center pivot Jalousie
Materials	Glass with wood or vinyl framing (usually for houses) or aluminum or steel framing (often in residential, commercial, and industrial buildings)
Characteristics/Use	Windows should be tightly sealed, with caulking at the joints and between the wall and the window. The use of insulated glass, multiple glazing, and storm sashes helps keep cold air out and heat in. In most parts of the country, screens are needed for all windows that open. Most screens have aluminum frames, and in residences screens are often combined with storm windows.



Facade

Types	Multifamily Retail Industrial, office, etc.
Materials	Masonry veneer or contrasting siding Glass or other decorative material More elaborate facade than exterior of walls
Characteristics/Use	In modern industry and commerce, public image is important. An attractive store, warehouse, industrial plant, or office building has both advertising and public relations value to the occupant. Ornamentation, identifying signs, lighting, and landscaping all contribute to a building's aesthetics.

By Tim1965 (Own work) [CC-BY-SA-3.0 (http://creativecommons.org/licenses/by-sa/3.0) or GFDL (http://www.gnu.org/copyleft/fdl.html)], via Wikimedia Commons

Asbestos in Buildings

Asbestos is a nonflammable, natural mineral material that separates into fibers. Asbestos-containing materials (ACMs) were widely used in structures built between 1945 and 1970 as thermal and acoustical insulation or for fireproofing and soundproofing. Other ACMs were used in siding and roofing shingles. Although ACMs have not been used in construction in many years, they can still be found in millions of homes and commercial buildings.

Asbestos fibers pose a threat to human health when they are distributed in the air. The potential of any ACM to release fibers depends on its degree of friability—i.e., how easily it is crumbled or pulverized. Dry, sprayed-on thermal insulation over structural steel is highly friable. Densely packed, nonfibrous ACMs such as vinyl asbestos floor covering and pipe insulation are not considered friable under normal conditions. Nevertheless, these materials will become friable if they are broken, sawed, or drilled.

Encapsulation or enclosure of asbestos can be an effective solution. The Environmental Protection Agency (EPA) has guidelines for the removal of asbestos when a building is being demolished or renovated, but these regulations have been difficult to enforce.

The EPA regulates asbestos under the authority provided by the Clean Air Act and the Toxic Substances Control Act. The National Emissions Standards for Hazardous Air Pollutants (NESHAP), which were drawn up as part of the Clean Air Act, apply to asbestos emissions in manufacturing, waste disposal, building demolition, and renovation. The Asbestos Hazard Emergency Response Act (AHERA), which was amended to the Toxic Substances Control Act in 1986, empowered the EPA to regulate asbestos in public schools and to enact regulations for asbestos removal.

One market's reaction to the effect asbestos has on the value of income-producing properties may differ from the reaction of other markets. There is little evidence, however, that investors are willing to sell properties at sharp discounts, or any discount at all, because of the problem.

For more information on federal regulations concerning asbestos, see Chapter 2 of Warren G. Miller (primary author), *Managing Environmental Mandates for Multifamily Housing: 1997/A Compendium of Federal Laws and Regulations* (Washington, D.C.: Urban Land Institute, National Apartment Association, and National Multi Housing Council, 1996), 9–38, and updates to that publication available at www.uli.org. See also the Environmental Protection Agency's Web site at www.epa.gov/asbestos/index.htm. For additional discussion of the influence of asbestos on real estate value, see Jeffrey D. Fisher, George H. Tse, and K.S. Maurice, "Effects of Asbestos on Commercial Real Estate: A Survey of MAI Appraisers," *The Appraisal Journal* (October 1993): 587–599; Robert Simons, "How Clean is Clean?" *The Appraisal Journal* (July 1994): 424–438; and Daniel F. Ryan, "A Lender's View of Hazardous Substances . . . And Appraiser Responsibility," *Real Estate Appraiser & Analyst* (Fall 1989): 10–12.

R value of 24 might be necessary. There has been a growing trend to superinsulate structures using insulation with much higher R values. Green or energy-efficient buildings may have ratings supplied by a third-party certifier. Residential properties will have a HERS Index that provides the energy efficiency of the structure; the lower the rating, the more energy efficient the home. The standard code-built house has a HERS Index of 100 in many areas. Appraisers can research the local building code to find the HERS Index for the community.[4] Green or energy-efficient homes will have an index much lower than the standard 100.

Ventilation

All buildings need ventilation to reduce heat buildup beyond tolerances in closed-off areas such as attics and spaces behind walls. Ventilation also prevents the condensation of water, which collects in unventilated spaces and causes building materials to rot and decay. When conden-

4. See www.resnet.us/.

sation seeps into insulation it reduces its R rating. Ventilation can be accomplished with holes that range from one inch to several feet in diameter. These holes should be covered with screening to keep out vermin. Also, ventilation can be increased by using fans.

Construction professionals can improve indoor air quality in green buildings by improving ventilation and minimizing off-gassing products. These goals can be achieved by using non-VOC (volatile organic compound) products and finishes and by installing simple ventilation methods, linked fan systems, or whole-building ventilation systems. Air filtration systems, such as high-efficiency particulate air (HEPA) filters, are effective in removing impurities from the air. Many air filtration devices can also be added to existing forced-air heating and cooling systems. For green or energy-efficient buildings, reviewing the building documentation will provide details on the indoor air quality.

Exterior Walls and Doors

Exterior walls are either load-bearing or non-load-bearing. When the quality of the exterior walls is below the standard for buildings in the same market, the property may suffer a loss in value. The presence or absence of energy-conserving material such as weatherstripping around doors should also be noted. Door shoes, weatherproof thresholds, and sweeps will prevent air from leaking.

Mold and Sick Building Syndrome

Many building materials—wood, drywall, insulation, carpet, textiles—contain the cellulose that various species of fungi, commonly known as *mold*, feed on. The long-term effects of mold on the integrity of these building materials can cause physical deterioration. In past years the potential toxicity of the byproducts of mold growth had been exaggerated. Nevertheless, this remains a concern and may affect value even if it does not affect occupants' health. This perceived problem has generated lawsuits, mainstream media coverage, and governmental scrutiny like the attention once associated with asbestos-containing materials.

Repair of degraded building materials is usually straightforward, but the remediation of mold infestations affecting indoor air quality can be a complex process, involving specialized enclosure and removal operations. The Environmental Protection Agency has drafted voluntary guidelines for indoor air quality and remediation standards, but because of the geographical diversity of mold species, specific national regulations defining acceptable levels of mold exposure are not practical.

A more broadly defined problem than the presence of mold is sick building syndrome, which is most often the result of poor air circulation and is not necessarily associated with mold. In cases of sick building syndrome, 20% or more of a building's occupants suffer persistent physical irritation such as headaches or respiratory problems when in the building but not when outside the building, according to the Environmental Protection Agency. The rise of sick building syndrome is commonly attributed to the energy crisis of the 1970s. The tighter building envelopes used at that time increased energy efficiency by reducing heating and cooling costs, but an unintended side effect was a lack of air exchange, keeping possible contaminants circulating inside the building longer.

The American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) has taken the lead in developing standards that are now followed by most construction professionals. Diagnosing poor ventilation and implementing a remediation plan are difficult tasks generally performed by engineering professionals rather than appraisers.

For more information on mold, see Michael V. Sanders, "Mold: What Appraisers Should Know," *Valuation Insights & Perspectives* (Third Quarter 2005): 42-43. For more information on sick building syndrome, see Krisanda Guidry, "Sick Commercial Buildings: What Appraisers Need To Know," *The Appraisal Journal* (January 2002): 28-33.

Windows, Storm Windows, and Screens

In describing a building, the appraiser notes the type of window, its material or manufacture, and any energy-saving features. Because windows are a major source of heat and cooling loss, their design and installation is important. In commercial and industrial buildings, double- or triple-glazed windows are generally installed, and occasionally casement windows may be used.

Facade

Many houses, stores, office buildings, and industrial buildings have a facade, or front, that differs from the design and construction of the rest of the building. Special facades may cost extra and thus affect the property's value.

Roof and Drainage System

A roof is designed and constructed to support its own weight and the pressure of snow, ice, wind, and rain. The roof covering prevents moisture from entering the structure. The water that falls on a roof must be directed to the ground or into a drainage system. Even so-called "flat" roofs may be slightly pitched to direct water to drains and gutters.

Most roof coverings need to be replaced several times during a building's life, so a roof's condition and age are investigated to determine its remaining useful life.

Chimneys, Stacks, and Vents

Exhaust systems range from simple metal vents and flues to complex masonry fireplaces, industrial chimneys, and ventilation systems. The efficiency of any fuel-burning heating system depends on its chimney, stack, or vent. Chimneys and stacks with cracked bricks, loose mortar joints, or other leaks may be serious fire and health hazards.

Special Features

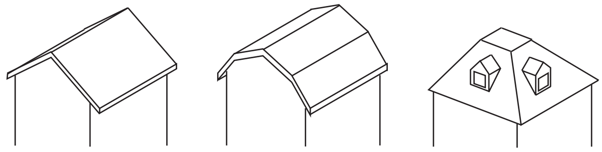
Special features that must be carefully described and considered in the valuation process might include

- artwork that is attached to the real estate and is not personal property
- ornamentation
- exterior elevators
- solar and wind equipment
- unique window installation
- special masonry work and exterior materials
- items required for the commercial or industrial use of buildings

Unique building features can present a valuation problem. The appraiser must decide if the items increase the property's market value or are valuable only to the current user. In the latter case, the items may add use value but little or no market value. If such items are expensive to remove, they may not appeal to a prospective buyer and the property could therefore lose value.

Superstructure: The portion of a building that is above grade.

Roof



Types	Flat Lean-to (saltbox) Gable Gambrel Hip Mansard Monitor Sawtooth
Materials	Wood trusses, joists or horizontal beams, joists and rafters, or posts and beams in residential construction. Steel or wood trusses, glued wood beams, or steel or concrete frame with wood joists or purlins or with steel bar joists in commercial and industrial construction.
Characteristics/Use	Flat roofs are used extensively in industrial and commercial buildings but are less common in residences. Lean-to roofs, often called *shed roofs*, are used on saltbox houses, and gambrel roofs are popular for barns and Cape Ann and Dutch Colonial houses. Monitor and sawtooth roofs are sometimes used in industrial construction.

Drain System

Components	Gutters and downspouts
Materials	Galvanized steel Aluminum Copper
Characteristics/Use	Channel water from roofs to prevent damage and protect the appearance of walls when roof overhangs are not provided.
Components	Gutters or eave troughs
Materials	Galvanized steel Aluminum Copper
Characteristics/Use	Catch rainwater at the edge of the roof and carry it to downspouts or leaders.
Components	Downspouts or leaders
Materials	Galvanized steel Aluminum Copper
Characteristics/Use	Vertical pipes that carry the water to the ground or into sewers, dry wells, drain tiles, or splash pans.
Components	Roof drains (in large buildings)
Materials	Galvanized steel Aluminum Copper
Characteristics/Use	Connected to storm drains by pipes in the building.

Roof Covering

Materials	Asphalt shingles (prevalent in residential construction) Wood, asbestos, fiberglass, or cement shingles or shakes Metal

	Clay tile
	Slate
	Built-up layers of felt or composition material covered with tar and then gravel or another surfacing material (most common on flat roofs of commercial and industrial buildings)
	Single-membrane roof assembly
	Green roof system
Characteristics/Use	Joints in roofs are created where two different roof slopes meet or where the roof meets adjoining walls or projections such as chimneys, pipes, and ventilation ducts. All joints must be flashed. Flashing is usually accomplished by nailing strips of galvanized metal, aluminum, or tin across or under the point, applying a waterproofing compound or cement, and securing the roofing material over the edges to hold it permanently in place.
Roof Sheathing	
Materials	Plywood
	Steel roof deck
	Lightweight precast concrete slabs
	Reinforced concrete slabs
	Insulated sheathing in large sheets
Chimneys, Stacks, and Vents	
Materials	Brick
	Metal
Characteristics/Use	Should be structurally safe, durable, and smoke-tight; should also be able to withstand the action of flue gases.

Green Building and Sustainability

In the twenty-first century, widespread public concern over the environment and the use of natural resources has focused attention on the built environment and the products of industry. The concept of sustainability has different meanings for different constituencies. Sustainability has particular resonance in the real estate industry because of the size and impact of the industry on national and global economies. The United Nation's definition of sustainability is "a development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Green building is the most widely recognized method for creating and fostering sustainable real estate. The terms *green* and *high performance* are used interchangeably in many markets. Because the term *green* is defined differently, appraisers must ensure they understand how the term is being used to avoid making incorrect assumptions.

Many high-performing buildings have a paper trail that can be invaluable to appraisers in adequately describing the subject and choosing appropriate comparable sales. A commissioned building will have a checklist used by the rater. The checklist is extremely useful in documenting the subject property details.

Not all green properties will try to obtain LEED certification, but if the building being valued is seeking certification, an appraiser can ask for the checklist. As noted, it provides a framework from which the appraiser can identify distinctions between the subject and its competition.

If the building has a certification from another organization, details of the certification process should be available. Research the details of the organization to understand the rating system used. This information will be useful in investigating comparables later in the analysis.

Green building encompasses a wide range of renewable construction materials, energy- and resource-efficient building techniques, and an overriding philosophy of sustainable development. The most significant green building practices, commonly referred to as the "six elements of green building," relate to site, water, energy efficiency, indoor air quality, materials, and operations and maintenance.

Site	The sustainability of land (e.g., development density, stormwater management, brownfield redevelopment). Site planning occurs during the design

A green roof can help reduce heating and cooling costs and absorbs rainwater. Wayne Senville, *Planning Commissioners Journal*, www.plannersweb.com

	phase of the construction project and encompasses two overarching ideas behind green site planning and development: (1) to protect or restore habitat and (2) to maximize open space, providing societal and environmental benefits. In addition, the location, solar access, shading, landscaping, and wind are considered.
Water	Water efficiency (e.g., water use reduction, landscaping). This element considers the consumed water as well as stormwater and wastewater management.
Energy	Energy and atmosphere (e.g., renewable sources, ozone depletion). By design, green building considers the conservation of energy in the building's design by closing the building envelope, integrating energy-efficient mechanicals and fixtures, landscaping to assist in shade or solar access, or using renewable energy sources such as solar, wind, or geothermal alternatives.
Indoor air quality	Indoor environmental quality (e.g., air quality, emissions, passive heating). Green building design focuses on mitigating the negative effects of off-gassing, combustion-based appliances, and moisture.
Materials	Materials and resources (e.g., reuse, recycling, renewable materials). The materials used can have a significant effect on indoor air quality. Green buildings use materials that are less toxic than their conventional counterparts and thus do not off-gas as much. Additional considerations include what the material is made of, how it is manufactured, and where the material originates.

Operations and maintenance	Innovation and sustainable design includes measures to control water and energy consumption along with the use of durable materials and designs that are meant to lower maintenance costs while lengthening the lives of building components.

Measuring the effectiveness of green building efforts is difficult. Sustainability is not always easy to measure at the property level, and many experimental materials and methods have not proven to be physically or economically sustainable. Many local governments have created sustainability plans with incentive programs to reward owners and developers of green buildings. A recognized professional standard is the Leadership in Energy and Environmental Design (LEED) standard for sustainable development. Possible impacts on the valuation process include the following:

- The financial feasibility and productivity of sustainable construction and design elements could affect highest and best use analysis.
- The higher cost (perceived or actual) of sustainable building materials and more efficient equipment and systems can add to the cost of construction indicated in the cost approach. RS Means currently publishes a green building project planning and cost estimating manual (see http://rsmeans.reedconstructiondata.com/). The distinction between cost and value becomes a critical consideration when green building materials and systems are involved. In the debate over the benefit of green building, the essential question is: Is the added expense worth the perceived additional cost to a typical property owner or investor in the marketplace? The use of the terms *gross cost* and *net cost* should be analyzed. Gross cost is affected by incentives and tax credits attributed to green building that often offset a portion of the added costs and result in a lower net cost of green building. Furthermore, an argument could be made that a lack of sustainable features in a new building is a functionally obsolete design in a market that expects green building features. Likewise, the perceived lifespan of sustainable building components may need to be accounted for in cost estimates if the market participants expect the sustainable features to last longer than traditional components.
- In the income capitalization approach, the reduced operating expenses of a building with energy- and water-efficient, low-maintenance features may have a positive impact on effective gross income, and thereby value. Overall operations and maintenance expenses should be less than the expenses of a code-built structure.
- As green building becomes accepted and then expected in a market, the presence or lack of green building features in a subject or comparable property could affect the selection of comparable properties, adjustment for physical characteristics, and other aspects of the application of the sales comparison approach.

In a market value appraisal assignment, the appraiser has a professional obligation to provide an independent and objective opinion of value and so must distinguish the social and governmental influences on the value of sustainable improvements from the value the market ascribes to those improvements. The sales comparison approach may not provide a credible value opinion until the market has sufficient sales data.

Additional Resources

US Green Building Council (www.usgbc.org)

Green Building Initiative (www.thegbi.org)

Energy Star (www.energystar.gov)

Description of Interior Materials and Design

An interior description provides information about

- interior walls, partitions, demountable walls, and doors (including how the space is divided)
- interior supports
- stairways

- painting, decorating, and finishing (including floor and ceiling coverings)
- protection against decay and pests

Interior Walls, Partitions, and Doors

Like exterior walls, interior walls and partitions can be either load-bearing or non-load-bearing. In general, having fewer load-bearing interior walls allows for greater flexibility in the division of space within the structure.

Interior Supports

A building description includes consideration of the building's internal supports, which include

- beams, columns, and trusses
- the flooring system
- ceilings

Beams, Columns, and Trusses

Beams and columns are used in many residential, commercial, and industrial buildings with basements or crawl spaces that are too wide for the first-floor joists or subfloor systems and cannot be supported by the foundation walls alone. As interior support systems, traditional joist construction is being replaced by both roof and floor truss systems.

Flooring System

Subflooring provides safe support for floor loads without excessive deflection and an adequate base for the support and attachment of finish floor material. Bridging stiffens the joists and prevents them from deflecting.

Division of Space

A building description provides a complete list of the number of rooms in the structure and their uses. Room sizes may also be stated. The number of bedrooms and bathrooms in a residential property usually influences the market for the property and its value. The number of units in an apartment building and the types and sizes of the rooms within the units significantly influence the property's income-producing potential. Similarly, the amount of office space in an industrial property and the partitioning of office suites may affect property value.

In certain parts of the United States, many types of buildings have basements. In these areas buildings without basements may have substantially less value than similar buildings with basements. If basements are not common in the area, a basement may add little or no value to a building.

Storage Areas

Homeowners often complain about a lack of adequate storage space, especially in kitchens. Ample cabinets, closets, and other storage areas are important, particularly in homes without basements. Storage is particularly important in multifamily residential buildings. The value of apartment and condominium projects is often enhanced by the availability of storage space. Frequently, mini-storage facilities are located near apartment complexes because apartment units often have inadequate storage space. Storage problems can also exist in commercial and industrial buildings.

Ceilings

In some structures, the underside of the upper story is an adequate ceiling. Appraisers typically measure and consider ceiling height.

Stairs, Ramps, Elevators, Escalators, and Hoists

Designing and constructing even the simplest staircase is complicated. Local building codes dictate the minimum and maximum tread and rise of stairs, which should be consistent within a building. The Americans with Disabilities Act of 1990 (ADA) established accessibility guidelines, and public buildings that do not meet those regulations may suffer a value penalty based on the cost of necessary changes.

In multistory buildings, appraisers must evaluate how efficiently the elevators and escalators in the building move people and freight. The elevators and escalators in many multistory buildings are inadequate

Interior Description

Walls

Type	Residential buildings
Materials	Wood studs covered with drywall materials (gypsum board, wood panels, ceramic tile, plywood, hardboard)
	Plaster (less popular now)
	Masonry (in masonry houses)
Characteristics/Use	Interior walls can be painted, papered, or decorated in other ways.
Type	Commercial buildings
Materials	Wire partitions
	Glass
	Wood
	Plywood
	Hardboard
	Metals
	Tile
	Concrete
	Solid masonry walls for fire protection
Characteristics/Use	Interior walls can be painted, papered, or decorated in other ways.

Partitions

Materials	Various materials
Characteristics/Use	Generally non-load-bearing and movable.

Doors

Types	Simple hollow-core doors in most residential construction
	Solid-core doors in older buildings and office buildings
	Complex, self-closing, fire-resistant doors in commercial and industrial buildings
	Specialty, self-opening and -closing doors in offices and commercial buildings
	Special-purpose doors (e.g., doors to bank vaults)
Characteristics/Use	Hanging a door is complicated and often done improperly. Most poorly hung doors close improperly or fail to touch an edge of the frame when closed.

and fall short of current market standards. Curing these deficiencies is often expensive or impossible. Hydraulic elevators usually have lift posts with oil lines and cylinders in the ground, and leaks can go undetected into the ground.

Special elevators and hoists are often considered part of a building, although they may be studied under the equipment category.

Painting, Decorating, and Finishing

Most buildings are decorated many times during their useful lives. An appraiser reports the condition of the painting and decorating in a structure and notes when they will need to be redone. The attractiveness of painting and decorating is subjective. Many new owners and tenants will redecorate to suit their personal tastes. Unusual decorations and colors may have limited appeal and, therefore, may detract from a building's

Interior Description, cont.

Interior Supports	
Types	Beams
	Columns
	Trusses
Materials	Wood, masonry, concrete, or steel
Characteristics/Use	Designed to support heavy loads. Cracked or sagging beams may be an early indication of more serious problems in the future.
Type	Flooring system
Materials	Generally wood or concrete
Characteristics/Use	Serves as a base for floor covering.
Type	Ceiling
Materials	Same material as interior walls (e.g., gypsum), tile, or underside of upper floor
Characteristics/Use	Ceilings that are too high or low for the property's current highest and best use as improved may be considered items of functional obsolescence and decrease the property's value.
Stairs and Ramps	
Type	Residential buildings
Characteristics	Provides for safe ascent and descent, with adequate headroom and space for moving furniture and equipment. Railings should be installed on the sides of all interior stairways, including stairways in attics and basements, where they are often omitted.
Type	Public buildings
Characteristics	Codes often regulate where stairs are located, how they are designed and constructed, and how they are enclosed for fire protection. Public buildings may also have to be barrier-free to provide access for handicapped people as mandated by the Americans with Disabilities Act of 1990 (ADA), which may require that ramps be installed both inside and outside the structure.

value. The quality of decoration is sometimes an important consideration in valuing a restaurant, store, or other commercial building.

Some considerations of interior finishes and decorating include the following:

- If finished basements are used for purposes other than storage and these uses are accepted and typical in the area, they can add significantly to the property's value.
- The types and finishes of various wall and ceiling components should be differentiated.
- A wide variety of flooring is available, and some flooring materials are selected primarily for their low cost and durability. An appraiser should consider whether floor coverings can endure wear and tear and how they conform to a building's design and decoration. Green buildings use floor coverings that have low volatile organic compound (VOC) concentrations and are durable and recyclable.
- Green buildings use low or no VOC paint to provide better indoor air quality.

Americans with Disabilities Act

An appraiser cannot assume that improvements comply with the requirements of the Americans with Disabilities Act (ADA) of 1990. Enforcement of the requirements can be triggered by a change in use or a title transfer. Owners of older properties may have to add ramps, elevators, or other special equipment to comply with ADA regulations, which can affect value greatly.

Along with related legislation such as the Fair Housing Amendments Act of 1988 and the Uniform Federal Accessibility Standards, ADA extends protection under civil rights laws to people with disabilities. Among other provisions directed toward employment opportunities, the legislation guarantees access to places of public accommodation to persons with disabilities. Specifically, Title III of the act, which deals with "places of public accommodations" and "commercial facilities," is of particular importance to appraisers. Government publications regarding ADA are available online at www.usdoj.gov/crt/ada/publicat.htm, and the ADA information line is 800-514-0301 (voice) or 800-514-0383 (TDD).

A real estate appraiser is not required to become an expert in the field of ADA requirements, but the Competency Rule of the Uniform Standards of Professional Appraisal Practice requires appraisers to have the knowledge and experience necessary to complete a specific assignment competently or to disclose the lack of knowledge and experience to the client, take all steps necessary to complete the assignment competently, and describe their lack of knowledge or experience and the steps taken to competently complete the assignment in the report. Further guidance on ADA-related matters is provided in Guide Note 9: The Consideration of the Americans with Disabilities Act in the Appraisal Process, in the Guide Notes to the Standards of Professional Appraisal Practice of the Appraisal Institute.

For an overview of specific requirements of ADA in building design, see:

- Randall Bell, "Appendix 2: Americans with Disabilities Act (ADA) Overview," *Real Estate Damages: An Analysis of Detrimental Conditions* (Chicago: Appraisal Institute, 1999), 268-272.

For further discussion of ADA considerations in the valuation process, see:

- Richard W. Hoyt and Robert J. Aalberts, "Appraisers and the Americans with Disabilities Act," *The Appraisal Journal* (July 1995): 298-309.
- Robert J. Aalberts and Terrence M. Clauretie, "Commercial Real Estate and the Americans with Disabilities Act: Implications for Appraisers," *The Appraisal Journal* (July 1992): 53-58.

- Unique, restored molding can add value to older houses, but the use of moldings is decreasing.
- Most fireplaces in homes and commercial buildings such as restaurants, inns, and specialty stores do not provide the building's primary source of heat. In fact, because of their design, many have

Interior Painting, Decorating, and Finishing

Basement Finishes

Types	Unfinished, used for storage
	Finished (in residences and some commercial buildings), used for storage and other purposes
Characteristics	Dampness, which is often a problem in basements, may be caused by poor foundation wall construction, excess groundwater that is not properly drained by ground tiles, poorly fitted windows or hatches, poor venting of equipment, or poorly constructed or operating roof drains that allow water to enter. Signs that may indicate a wet basement include a powdery white mineral deposit a few inches off the floor, stains near the bottom of walls and columns or equipment that rests close to the floor, and the smell of mildew.

Flooring and Floor Coverings

Components	Sand, compressed dirt, bituminous paving, brick, stone gravel, concrete, and similar products
Characteristics	Suitable for many industrial buildings, warehouses, garages, and basements. In many commercial and industrial buildings, floors must be especially thick or reinforced to support heavy equipment.
Components	Terrazzo flooring
Characteristics	Made of colored marble chips that are mixed into cement and ground smooth; used for high traffic areas such as the lobbies of public buildings.
Components	Wood in various forms
Characteristics	Continues to be a popular material for floors. Planks and blocks are used for industrial floors, and many commercial buildings use wood floors to conform with the design and overall decoration. Wood planks and hardwood strips are found in many residences.
Components	Resilient, ceramic, and quarry tiles
Characteristics	Used in all types of buildings.
Components	Resilient flooring
Characteristics	Usually a combination of vinyl and asphalt or laminate produced as sheet goods.
Components	Carpeting
Characteristics	Once considered a luxury in residences, offices, stores, and commercial buildings, but today is widely used in all types of buildings.

Interior Wall Coverings and Ceilings

Types	Walls and partitions
Characteristics	May be painted, papered, or paneled. Supplemental finishes include ceramic tile and wainscot paneling.
Types	Ceilings
Characteristics	Can be drywall, plaster, or suspended panel (drop ceilings).
Types	Partitions
Characteristics	Can be wood or metal.

little heating power. Because fireplaces are difficult to construct, many are badly made and function poorly. One common problem is downdraft, whereby smoke is blown into the building by the wind outside. This can happen if the chimney does not extend at least two feet above any part of the roof within 10 feet of the chimney.

Protection Against Decay and Insect Damage

All wood is susceptible to decay and insect damage. When wood is consistently exposed to moisture and water, destructive organisms propagate on or beneath its surface. Insects damage wood more rapidly and visibly than decay does. Although several species of insects destroy wood, termites are by far the most destructive to both damp and dry wood. They colonize in moist soil or in dry wood and create infestations that are extremely difficult to eradicate.

Builders employ various techniques to protect against decay and insect damage:

- sloping the ground away from foundations for good drainage and putting vapor barriers on the interior sides of exposed walls
- using polyethylene as a soil cover in crawl spaces
- flashing, gutters, downspouts, and splash blocks to carry water away from foundation walls
- using poured concrete foundation walls, concrete caps over unit masonry foundations, wood treatments, soil treatments, or metal termite shields

Building with dry, naturally durable woods and conducting regular maintenance inspections can also help prevent insect infestation and damage. Poorly aimed lawn irrigation systems can be a serious problem for improvements if the water collects against the foundation or is directed at exterior walls or windows. An improperly installed irrigation system can rot a window assembly or cause a mold problem in only a few years.

Miscellaneous and Special Features

In valuing industrial and commercial properties, an appraiser may find it helpful to distinguish between two categories of equipment:

- equipment and mechanical systems that provide for human comfort–e.g., plumbing, heating, air-conditioning, and lighting
- fixed building equipment that is process-related–e.g., air hoses, process piping, craneways, bus ducts, heavy electrical lines, and freezer equipment

Because different users of structures and related improvements frequently adapt them for their own particular needs, some elements may not be suited for other users and therefore will not contribute to market value. Limited-market properties may require additional research because less data is available to support the utility and market acceptance of extra or unusual elements of the improvements.

Some properties with specialized functions and design features that may require additional research include

- steel mills
- oil refineries and ethanol plants
- chemical plants
- concrete factories
- mines
- commercial establishments with unique design features (e.g., drive-in restaurants) or special facilities (e.g., the cooling room in a furrier's shop)
- amusement parks
- sports complexes
- wharves and docks
- transportation terminals
- television and radio transmission towers, studios, and theaters

Personal Property

During the site visit, the appraiser may also find personal property, sometimes referred to as "furniture, fixtures, and equipment (FF&E)." Certain property types include a substantial amount of personal property. Examples include the following:

- Hotel properties include guest room and common area furnishings, pool and fitness equipment, and other items.
- Convenience stores and retail fuel properties have gas pumps, canopy, signage, and lighting outside as well as shelving and food service equipment inside.
- Nursing homes include furniture, medical equipment, specialized bathing equipment, physical therapy apparatus, walkers and wheelchairs, hospital carts, and other equipment.
- Apartments include dishwashers, stoves, refrigerators, washer and dryers, and sometimes window coverings.

These non-realty components should be identified and the appraisal report should indicate if they are or are not included in the ownership interest of the subject property.

In appraisals prepared for certain types of litigation, such as eminent domain and property tax appeals, appraisers must be familiar with case and statutory law related to fixtures and other non-realty-related property.

Equipment and Mechanical Systems

Most buildings cannot perform the functions for which they were designed and constructed unless their equipment and mechanical systems are in working order. Major equipment and mechanical systems include

- the plumbing system
- the heating, ventilation, and air-conditioning (HVAC) system
- the electrical system

Plumbing System

Plumbing is an integral part of most buildings. It consists of supply, waste, and vent piping (which is usually covered or hidden except in industrial buildings) and fixtures and fittings (which are visible). Laundries, laundromats, and certain industrial buildings have elaborate plumbing systems.

Piping

Much of the cost of a plumbing system is due to piping. The quality of the materials used, the way the pipes were installed, and how easily they can be serviced are significant considerations in estimating how long the pipes will last and how much they will cost to maintain. In many areas and for many building types, a high-quality piping system will last as long as the building.

Fixtures and Fittings

The appraiser must decide which building fixtures are part of the real estate and which are personal property. The design of bathroom fixtures can change substantially over time, and old fixtures may become obsolete during a building's economic life. An appraiser should report the need for modernization, but old fixtures of good quality, such as porcelain pedestal basins and footed tubs, are often rehabilitated and valuable.

Hot Water System

All homes and most commercial and industrial buildings need an adequate supply of hot water. Buildings with inadequate hot water systems suffer from functional obsolescence. The size of the hot water storage tank needed is determined by the number of occupants and their water-using habits and by the recovery rate of the tank. The size and recovery rate of a storage tank may be limited to what the market will pay for. Many new and remodeled homes have tankless hot water systems. Commercial and industrial buildings often require much more hot water than homes.

Heating Systems

Most heating systems use warm or hot air, hot water, or steam and are powered by fuel oil, natural gas, electricity, or coal. The heating capacity required relates to the cubic content, exposure, design, and insulation level of the structure to be heated and appropriate standards for the local market area. The appraiser cannot assume that a building's heating system is adequate. A heating system installed at the time of construction may not be acceptable to potential buyers today. New

Plumbing System

Piping

Types	Supply pipes Waste pipes Vent pipes
Materials	Copper, cast iron, or plastic
Characteristics/Use	Galvanized steel, lead, or brass pipes in older buildings may need to be replaced.

Bathroom Fixtures

Types	Lavatories (or washbasins) Bathtubs Showers Toilets (or water closets) Bidets Urinals
Materials	Cast iron covered with acid-resistant vitreous enamel, or porcelain (fiberglass or other materials are also used in lower-quality fixtures)
Types	Sinks (or double sinks)
Materials	Porcelain, metal, stainless steel, enameled steel, or cast iron covered with acid-resistant enamel

Kitchen Fixtures

Types	Sinks (or double sinks) Garbage disposals Dishwashers
Materials	Monel® metal, stainless steel, enameled steel, cast iron covered with acid-resistant enamel, or porcelain

Other Fixtures

Types	Instant hot water units Laundry tubs Wet bars Swimming pools or saunas Janitor sinks Drinking fountains Handwashing and eyewashing fountains

Fittings

Types	Faucets Spigots Drains Shower heads Spray tubes Floor drains in industrial buildings
Characteristics/Use	The water in an area may be hard—i.e., it contains minerals that react unfavorably with soap and make it difficult to rinse from clothing, hair, and skin. Often hard water cannot be used until it is treated, either with simple equipment or with automatic, complex, multistage systems.

Hot Water System

Types	Self-standing heater (in residential buildings) Large cast iron or steel boiler and storage tanks (in commercial and industrial buildings) Tankless systems
Characteristics/Use	Generally powered by electricity, gas, or oil.

technology continues to reduce energy consumption for large heating systems. Many industrial users who once depended on gas alone now install more efficient oil or electric systems to provide heat when the gas supply is curtailed. Electric heat has become so expensive in some areas that buildings using it sell for substantially less than similar properties using other types of fuel. Cogeneration, the simultaneous production of electrical energy and low-grade heat from the same fuel, is also being used in some parts of the country.

Buyers are sensitive to energy costs. In some markets, apartments in which the owner supplies heat and hot water will sell for less than similar properties in which tenants pay for utilities. Buildings that have high ceilings, many openings, and poor insulation may be at a disadvantage in the market.

Air-Conditioning and Ventilation Systems

The most common type of air-conditioning system consists of an electrically powered compressor that compresses a coolant from gas into liquid outside the area being cooled. The heat released in this process is either blown away or carried away by water. Air-conditioners range from small, portable units to units that provide many tons of cooling capacity.

Commercial and industrial air-conditioning and ventilation systems are more complex. Some simply bring in fresh air from the outside and distribute it throughout the building. Others merely remove foul air. Still others combine these two functions, but do not have any cooling or heating capacity. More complex systems wash, filter, and add or remove humidity from the air. The most complex systems perform all of these functions and also heat and cool air through a complex system of ducts

Heating Fuels: The type of fuel used in a building's heating system should be explained in the building description. Depending on the area and the type of building, one type of fuel may be more desirable than another. Nevertheless, many building heating systems do not use the most economical fuel. For any specific use, different fuels have different advantages and disadvantages, which are subject to change.

Type	Characteristics
Fuel oil	In spite of its high cost, fuel oil is a popular energy source that is easy to transport and store. On-site, 275-gallon tanks are used in millions of houses, and tanks that hold thousands of gallons of fuel oil are buried on industrial and commercial sites.
Natural gas	Natural gas is a convenient type of fuel because it is continuously delivered by pipelines; no storage tank is needed. In many parts of the United States, natural gas is the most economical fuel. Liquid petroleum gas, such as butane and propane, is used in many rural areas. It requires on-site storage tanks and is usually more expensive, but in other respects it is similar to natural gas.
Electricity	Like oil, gas, or coal, electricity can be used to produce heat in a furnace or to heat water in a boiler. In most areas electrical heating costs are high, but good insulation and control can eliminate waste.
Coal	In the past coal was the most popular fuel for heating. It is still used in electrical generating plants and to generate power for some industrial and commercial uses. Coal is also used in residences for stoves and fireplaces, but the burning of certain types of coal creates environmental pollution.

and fans. In larger systems that use less electricity, water cools the pipes in which the gas has been compressed. The water is then conserved in towers that cool it for reuse.

Electrical Systems

In an electrical system, power is distributed from the electrical service station through branch circuits, which are wires located throughout the building, to electrical outlets. Each branch circuit starts at a distribution box, where it is separated from the main service by a protection device such as a fuse or circuit breaker.

In commercial and industrial buildings, the wiring between the distribution boxes and the outlets is usually a rigid or flexible conduit. In most houses BX or armored cable is used. Plastic-coated wire is used

HVAC System

Heating System	Heating is rated in British thermal units (Btu).
Types	Warm or hot air
Characteristics/Use	Air heated in a furnace and circulated by a pressure blower or relying on the force of gravity. May include thermostats, filters, humidifiers, air cleaners, and air purification devices.
Types	Hot water (or hydronic systems)
Characteristics/Use	Hot water pumped by a circulator through pipes to radiators and cold water is returned to the boiler to be reheated. In radiant heating systems, hot water is pumped through narrow pipes embedded in floors, walls, and ceilings rather than through radiators.
Types	Steam
Characteristics/Use	Produced by a boiler, distributed through a one-pipe gravity system (identical to the piping used in hot water systems), and transferred through radiators. More complex and expensive two-pipe systems are found in larger, high-quality structures. In many states, licenses are required for certain classes of steam boilers. Appraisers must be familiar with local boiler license laws and ascertain whether boilers have current, valid licenses.
Types	Electric
Characteristics/Use	Includes heat pumps, wall heaters, baseboard units, duct heating units, heating units installed in air-conditioning ducts, and radiant heat produced by electric heating elements embedded in floors, walls, and ceilings. The automatic regulation of a heating system helps it operate efficiently. A multiple-zone system with separate thermostats is more efficient than a single zone system with one thermostat. Complex systems provide an individual temperature control for each room. The efficiency of certain systems can be increased by putting a thermostat on the outside of the building. This helps building operators anticipate how much heat the system will need to produce.
Air-Conditioning and Ventilation System	
Types	Electrically powered compressor and non-ozone-depleting refrigerant
	Gas-powered compressor and ammonia as coolant
	Combination with water-cooled pipes in which gas is compressed
Characteristics/Use	Standards depend on climate. Capacity is rated in tons of refrigeration. In some buildings the central air-conditioning equipment uses the same ducts as the hot air heating system. This is not always possible, however, because the air-conditioning may require ducts of a different size. Furthermore, heating registers should be placed low on the walls, while air-conditioning registers should be higher up or in the ceiling.

in certain areas, and the old knob-and-tube wiring is still found in rural areas and older buildings, although it is considered obsolete.

Large-capacity power wiring may contribute to the value of an industrial improvement. However, if the wiring is an uncommon type and adds to a building's operating costs or will be expensive to remove, it may result in functional obsolescence. Similarly, any building with insufficient electrical service or wiring suffers from functional obsolescence.

Miscellaneous Equipment

In the building description, the appraiser must also consider miscel-

Electrical System

Components	Rigid or flexible conduit BX or armored cable
Characteristics/Use	Most electrical wire is copper. A typical residential electrical system is a single-phase, three-wire system that provides a minimum of 100 amperes of electricity. Ampere services of 150, 200, 300, and 400 are needed when electric heating and air-conditioning are used. Most of these services can provide up to 220 volts by connecting three wires to the outlet.
Components	Power wiring
Characteristics/Use	Used in commercial and industrial buildings to operate utility systems, appliances, and machinery. The electrical power is generally carried at higher voltages (e.g., 240, 480, 600 volts or more) and higher amperages (e.g., 400, 800, 1,200 amperes or more). Power wiring is usually three-phase or three-phase-four-wire, which allows both lighting and three-phase power loads to be delivered by the same supply. It is carried in conduit or by means of plug-in bus ducts. Overhead bus ducts are frequently found in manufacturing plants where flexible service is needed.
Components	Switches and lighting fixtures
Characteristics/Use	Because lighting fixtures are stylized and styles change, they are often obsolete before they wear out. Fluorescent lighting, which may be suspended, surface-mounted, or recessed, is used extensively in commercial and industrial buildings. Often continuous rows are used in large spaces. Incandescent fixtures may be used for smaller rooms, accents, or special purposes. Sodium, mercury vapor, halogen, and halide lights are often installed in industrial buildings.
Components	Outside, yard, and parking lot lighting
Characteristics/Use	Usually downlighting of some kind; often mercury vapor, halogen, or halide lights.
Components	Floor outlets or floor duct systems
Characteristics/Use	Used extensively in commercial and office buildings; provide convenient electrical outlets for office machines and telephone outlets at desks using a minimum number of cords.
Components	Low-voltage switching systems
Characteristics/Use	In some houses and commercial buildings; allow many outlets and lights to be controlled from one place.

laneous equipment, such as

- fire protection
- elevators, escalators, and speed ramps
- signals, alarms, and communication systems
- loading facilities
- attached equipment
- reclaimed water systems

Intelligent Buildings

An intelligent, or smart, building is designed with automated systems that detect and adjust heating and cooling equipment in response to changing environmental conditions to increase energy efficiency and ensure the comfort of occupants. The building may also include centralized control over fire safety, security access, and telecommunications systems and the use of other technologies that help address the changing needs of building occupants while controlling costs. These systems are designed to improve end-user security, control, and accessibility, with the aim of increasing worker productivity and occupant comfort levels.

The occupants of the building often use prominently displayed real-time information about energy costs (e.g., on an easy-to-read digital control panel) to train themselves to use energy more efficiently in the building.

The commonly accepted definition of a building automation system (BAS) includes the comprehensive automatic control of one or more major building system functions, such as heating, ventilating, and air-conditioning systems. Since the 1960s, automation has increased in complexity, from simple systems like lighting that turns itself on as daylight fades outside and doors that open automatically (first installed in buildings before 1970) to fire alarm systems that monitor the position of fire and its path within a building (which appeared after 1980).

More recently, intelligent building design has also included the idea of connecting to a smart grid, an electricity distribution network based on digital technology that is used to supply electricity to consumers through two-way digital communication. Smart grids were introduced to overcome the weaknesses of conventional electrical grids by using smart net meters. By connecting to a smart grid and using a demand response (DR) system, a building can determine automatically through its building management system how much electricity it needs at various times of day. A DR system manages a building's consumption of electricity in response to supply conditions and responds to a utility company's demand event (such as rolling blackouts) by automatically reducing the amount of power being used or starting on-site power generation.

Miscellaneous Equipment

Fire Protection

Components	Fire escapes Standpipes and hose cabinets Alarm services Automatic sprinklers
Characteristics/Use	A wet sprinkler system must have adequate water pressure to ensure that the pipes are always filled. A dry system has pressurized air in the pipes. When a sprinkler head opens, the pressure is relieved and water enters. Dry systems are used on loading docks, in unheated buildings where there is a danger of water freezing, and in areas where there is no city water (usually because a well cannot supply sufficient pressure to operate a wet system).

Elevators

Type	Passenger
Characteristics/Use	Generally electric. Most modern elevators are high-speed and completely automatic.
Type	Freight
Characteristics/Use	Electric or hydraulic. Hydraulic elevators are suitable for low-speed, low-rise operations.

Escalators and Speed Ramps

Type	Passenger
Characteristics/Use	Used to move large numbers of people up and down or along horizontal or gradual slopes; must be adequate to accommodate those who use the building.

Signals, Alarms, and Communication Systems

Components	Smoke detectors
Characteristics/Use	Required by law in many areas.
Components	Security alarm systems
Characteristics/Use	Available for residential, commercial, and industrial use to warn occupants of forced entry, fire, or both.
Components	Clocks, pneumatic tube systems, mail chutes, and incinerators
Components	Telephone wiring
Characteristics/Use	In small buildings the telephone company supplies the wiring and equipment. Larger buildings may have extensive systems of built-in cabinets, conduits, and floor ducts for telephone service. The telephone service in a building may be suitable for the current occupant but unsuitable for a potential buyer.
Components	Fiber-optic cable connections and wireless networks
Characteristics/Use	Internet access capabilities for telephone, computers, and cable television

Loading Facilities

Type	Open loading docks
Characteristics/Use	May be important in commercial and industrial buildings. Off-street loading docks are usually required by zoning ordinances. Many older buildings have loading doors only or substandard loading facilities. The floor of an efficient, one-story industrial building may be built above grade at freight car or truck-bed level.
Type	Covered loading docks
Characteristics/Use	In some buildings, docks are enclosed for trucks and freight cars, and leveling devices are provided to assist in loading or unloading. A properly designed industrial building has space in front of truck docks so that vehicles can maneuver.

Attached Equipment	
Components	Air hoses Process piping Industrial wiring for heavy electrical capacity Bus ducts Freezer equipment
Characteristics/Use	Often considered in terms of use value.

- solar photovoltaic (PV) systems

Whole Building Approach

For a building to function for its intended use, all the building mechanical systems (plumbing, HVAC, electrical, etc.) must work together. In traditional building design, however, these systems are installed and operate separately. Green building has popularized a new style of design called the "whole building approach."

The whole building approach is elementary to green building. This approach views all of a building's parts as an integrated system. The goal of the whole building approach is to ensure that the different parts of a building work with, rather than against, one another. Examples of whole-systems thinking include

- the use of native landscaping
  - to reduce required maintenance (mowing and irrigation)
  - to preserve and enhance groundwater and wildlife habitat
- daylighting
  - to reduce the need for artificial lighting and energy consumption
  - to improve worker comfort and productivity
- convenient access to public transportation
  - to reduce amount of space allocated for parking
  - to foster reductions in vehicular miles traveled (VMTs) and carbon usage

Design Concepts in the Whole Building Approach

front-end loading. An approach to development that includes the examination of site factors, engineering definition, and a project execution plan before construction. Factors examined in the front-loaded design process include possible process simplification (value engineering), a constructability review process, customized standards and specifications, predictive maintenance, and design-to-capacity considerations.

end-use/least-cost considerations. A focus on designing an end product that provides the user with what they actually want and need, at the least cost to both the owner (or developer) *and* the environment. (Source: www.rmi.org/buildings)

Teamwork

Collaboration among key professionals is fundamental to planning and designing successful green developments, redevelopments, and building retrofits. Appraisers should be part of the process, providing market and financial analysis. Using the whole building approach:

- Design is no longer a linear process, with one step taken and then the next.
- Front-loaded design focuses on up-front solutions with the right team considering all aspects of the project.
- Significant savings can be achieved by thinking through and analyzing how the building will be used and considering how performance can be optimized before potentially flawed and costly decisions are made.

Analysis of Architectural Style and Functional Utility

A building may have functional utility but lack architectural style, such as a multipurpose precast concrete warehouse near an interstate interchange, or it may have admirable style but little utility, such as a cavernous 1920s-vintage movie palace in a declining urban neighborhood. Form and function work together to create successful architecture. Functional utility is not necessarily exemplified by minimal space or form. People's need for comfort and pleasure must also be considered in the design of offices, stores, hospitals, and houses. An appraiser must recognize and rank market preferences regarding style and functional utility and then relate these preferences to market value. The ability of improvements to provide utility and the desirability of specific land uses in the marketplace are the sources of value and the focus of an appraiser's investigation of the architectural style and functional utility.

Good design meets the following criteria:

- Functions well–fitness of intended use
- Looks good–appeals to aesthetic sense
- Feels good–carries meaning, recreates feeling from another time or place
- Balance–sense of correct proportion, compatibility
- Affordable–consistent with market expectations for price range

Social and economic issues have the greatest impact on residential design. Governmental issues have a greater impact on non-residential design through zoning and building codes. Environmental issues affect the site more than the improvements, although topography and other factors may influence the placement of the improvements on the site.

Architectural Style

Architecture is the art and science of building design and construction. Architectural style affects the market value of property, so an understanding of its nature is important to appraisers. Two basic types of styles are distinguished in American architecture: formal architecture and vernacular architecture. Figures 13.3 and 13.4 illustrate formal and vernacular architectural styles.

Figure 13.3 Formal Architecture

Figure 13.4 Vernacular Architecture

Formal architecture refers to the art and science of designing and building structures that meet the aesthetic and functional criteria of those trained in architectural history. Formal architectural styles are identified by common attributes of expression and are frequently named in reference to a geographic region, cultural group, or time period–e.g., the Italianate, Second Empire, and Prairie School styles.[5]

To a degree, the distinction between formal and vernacular architecture is analogous to the difference between fine art and folk art. Vernacular architecture identifies structures designed and built without reference to the aesthetic and functional criteria of architectural history, often buildings with an emphasis on function over form. Vernacular architecture reflects custom and responds to the environment and contemporary lifestyles. Vernacular styles share common attributes and may be technologically simple or sophisticated. These styles are usually unnamed because they are not formally studied by architectural historians. The traditional barn, the mass-produced homes constructed in modern subdivisions, and multitenant industrial park buildings are examples of vernacular styles.

Good architecture is a blend of aesthetics and function. Many historic buildings are architecturally superior, with great aesthetics but poor

5. Literature on American architectural history is abundant. For a description of architectural styles in a real estate appraisal context, see Judith Reynolds, *Historic Properties: Preservation and the Valuation Process*, 3rd ed. (Chicago: Appraisal Institute, 2006) and Carole Rifkind, *A Field Guide to American Architecture* (New York: Dutton, 1980). Additional sources are cited in the bibliography.

architectural style
The character of a building's form and ornamentation

formal architecture
Architecture identified by its conformity to aesthetic and functional criteria recognized by persons trained in architectural history.

vernacular architecture
Architecture designed and built by individuals according to custom and for its adaptive response to the environment and contemporary lifestyles, without reference to the aesthetic and functional criteria of architectural history.

Market preferences are influenced both by the desire to maintain tradition and by an expectancy of innovation.

functionality. A modern vernacular building is more likely to offer better functionality and poor aesthetics.

Architectural style is influenced by market standards and tastes, which are influenced both by the desire to preserve tradition and by the desire for change, variety, and efficiency. The market's desire for change provides the impetus for developing new elements of architectural design. Changes in architectural trends are caused by the market's reaction to current styles. When a style becomes too extreme, a shift to elements of past styles frequently occurs. A reactive shift, then, provides contrast to the preceding, dominant architectural style. Such changes also produce avant-garde or experimental building styles, which are tested in the market and ultimately accepted or discarded.

Changes in architecture can also be generated by external forces. For example, in the 1970s rising energy costs prompted new developments in the heating, ventilation, and air-conditioning systems used in office buildings. These developments include the trend toward stand-alone HVAC systems and the use of new exterior materials that conserve energy.

Architectural styles are modified over periods that are loosely related to the economic life cycles of buildings. Newly constructed buildings usually contrast in style with buildings of the previous period. New buildings of all architectural styles enjoy broad market appeal, whether they are professionally designed or not. When a building is no longer new, however, it is compared with other buildings in terms of the quality and usefulness of its architectural style. Form and structure, the most basic components of architectural style, limit and define a building's potential uses (and changes in use). These factors become more influential as time passes.

For appraisals that require compliance with the Uniform Appraisal Dataset (UAD) established by Fannie Mae and Freddie Mac, the Uniform Collateral Data Portal (UCDP) contains a field for architectural design. Ideally, this field would be filled with the name of a formal architectural style rather than a generic descriptor such as "two stories" or "typical." The UCDP compliance check reviews the architectural design field as if it were required, even though it is not identified as a required field in the UAD instructions. Properly identifying the architectural style in this field could improve the efficiency of the review process and avoid a callback for corrections.

Functional Utility

To be functional an item must work and be useful. The definition of functional utility, however, is subject to changing expectations and standards. Optimal functional utility implies that the design and engineering of a building are considered to best meet perceived needs at a given time.

Functional inutility is an impairment of the functional capacity of a property or building according to market tastes and standards. It qualifies as functional obsolescence when ongoing change, caused by technological advances and economic and aesthetic trends, renders building layouts and features obsolete to the extent that value is impaired. (The concept of functional obsolescence is discussed in detail in Chapter 29.) Functional inutility must be judged in light of market standards of acceptability, specifically the standards of buyers who make up the market for a particular type of building within a particular period of time. Certain design elements of "smart" office buildings, such as extra cooling capability, more flexible cabling systems, and additional power to run more sophisticated computer systems, may have been superadequate when they were originally constructed, but changing market desires have made some of these items standard.

Standards of functional utility vary with the type and use of property. Specific considerations for different types of property are discussed in the remainder of this chapter. Some general standards of functional utility considered by appraisers include

- compatibility
- suitability or appropriateness
- comfort
- efficiency
- safety
- security
- accessibility
- ease and cost of maintenance
- market standards
- attractiveness
- economic productivity

functional utility

The ability of a property or building to be useful and to perform the function for which it is intended according to current market tastes and standards; the efficiency of a building's use in terms of architectural style, design and layout, traffic patterns, and the size and type of rooms.

functional inutility

Impairment of the functional capacity of a property or building according to market tastes and standards; equivalent to functional obsolescence when ongoing change makes layouts and features obsolete and impairs value.

In architecture, style and functional utility are necessarily interrelated because form and function work with design and construction to create a successful product.

Design and Functional Utility by Property Type

Marketability is the ultimate test of functional utility and is a central concern in market analysis, as discussed in Chapter 15. Generally, a building is functional if it successfully serves the purpose for which it was designed or adapted. Specific design considerations that affect the functional utility of residential, commercial, industrial, agricultural, and special-purpose buildings are discussed below.

Residential

Trends in single-unit and apartment design change, and building components such as porches, balconies, raised or walk-out basements, fireplaces, dining rooms, large kitchens, entry halls, and family rooms may be included or excluded. Housing standards vary widely for different income levels and in different regions. Historic houses are often less functional, but they may be in great demand due to their preservationist appeal. To evaluate the functional utility of residential buildings, appraisers should analyze standard market expectations. The functional utility of a single-unit or multifamily dwelling results primarily from its layout, accommodation of specific activities, adequacy, and ease and cost of maintenance.[6] In general, more people have better housing today than they had in the past. Many amenities are now considered necessities and their inclusion is taken for granted. Even in periods of high construction and financing costs when average houses are smaller, the tendency is to retain extra bathrooms, labor-saving devices, and fireplaces.

In apartment buildings, amenities tend to be more important than space. Occupants often prefer a fireplace or an extra bathroom to an

Emerging Trends in Residential Design

Closets:	Walk-in closets becoming standard in bedrooms.
Bathrooms:	Multiple fixture bathrooms are standard, particularly in master/owner suites.
Remodeling:	As common as new construction.
Great room:	Increasingly important to the functions of the residence; may replace the traditional living room.
Floors:	Wood or simulated wood floors gaining popularity.
Countertops:	Tile or laminate is a typical material; granite or concrete countertops may be an overimprovement in all but the highest-priced residences.
Windows:	Often retrofitted with vinyl coverings on frames for ease of maintenance.
Recessed ceiling lights:	High ceilings are currently popular despite the energy costs, and recessed lighting increases the feeling of space.
Electrical, plumbing, and heating systems:	Often replaced with more efficient systems in homes for resale.
Cabinet finishes:	Subject to the whims of fashion.
Doors:	Heavy, solid-core doors are replacing standard, hollow-core doors.
Daylight, view-out, and walk-out basements:	New basement design creates an environment similar to above-grade living areas.

6. For further discussion of single-unit home design and functional utility, see Henry S. Harrison, *Houses—The Illustrated Guide to Construction, Design & Systems*, 3rd ed. (Chicago: Real Estate Education Company, a division of Dearborn Financial, 1998) and Appraisal Institute, *Appraising Residential Properties*, 4th ed. (Chicago: Appraisal Institute, 2007). The most complete source for information on residential architecture is: *A Field Guide to American Houses*, by Virginia & Lee McAlster (New York: Alfred A. Knopf, 1984). For discussion of apartment properties, see Arlen C. Mills, Richard L. Parli, and Anthony Reynolds, *The Valuation of Apartment Properties*, 2nd ed. (Chicago: Appraisal Institute, 2007) and Daniel J. O'Connell, *The Appraisal of Apartment Buildings* (New York: John Wiley & Sons, Inc., 1990).

additional 200 square feet of area. Smaller kitchens and bathrooms tend to be more acceptable to the market for apartments than the market for houses. A dining area that is a part of the living room or kitchen is generally acceptable. Family rooms and living rooms may be spacious to offset the smallness of other rooms, and closet space must be plentiful.

The layout of a residential property relates to traffic patterns–i.e., where kitchens and bathrooms should be located for convenience and how private and non-private areas should be separated (see Table 13.2). A layout has functional inutility if it causes awkward traffic patterns. For example, inutility may result if people have to cross the living room to get to a bedroom, if the dining area is not next to the kitchen, or if groceries have to be brought through the living room to the kitchen.

Standards of adequacy vary. For the most part, the market will not accept a one-bedroom house, although one-bedroom apartments and condominium units remain popular. New kitchens and baths are larger, better equipped, and more expensively finished than the small, utilitarian kitchens and baths of the recent past. Dishwashers, garbage disposals, and wall ovens are usually standard in new construction, and their absence may create a value penalty. Ceramic or stone tile in baths and more elegant fixtures are becoming commonplace. The master bedroom frequently has its own compartmentalized bath with a spa tub and a separate dressing area. Closets are abundant in new apartments and houses. Some examples of functional obsolescence in residential property are listed in Table 13.3.

Table 13.2 Residential Layout Considerations

Poor floor plans are easily recognized by those who make up the market for houses, but standards often vary with current trends in a region and neighborhood. The location of various rooms in relation to the site can increase or diminish a dwelling's privacy and comfort.

Single-Unit Homes

- Bedrooms and living rooms are increasingly found in the rear of residences, often accessible to the garden or backyard. Formerly it was considered desirable for the living room and largest bedroom to be at the front of the house, oriented to the street. The master/owner's bedroom is frequently separated from the other bedrooms for privacy.
- Kitchens, which were once relegated to the rear, are now just as likely to be on one side of a hall in the middle or at the front of a residence.
- Full bathrooms are most convenient, accessible, and private when they are near or attached to the bedrooms. They should be accessed directly or through a hall, not through another bedroom. Powder rooms should be located off a hall and near, but not too near, the living room or dining room.

Multifamily Units

- Two-story, two-unit residences with vertical access from within the unit, rather than from public space, have strong market appeal.
- Multiunit housing is also built in stacked configurations with access on more than one level to minimize stair climbing.
- Low-rise, multifamily housing projects can be designed in a great many ways.
- Elevator apartment buildings tend to have more standardized, predictable floor plans to make the best use of space within a simple rectangular configuration.
- Structures designed for other uses are now being converted to apartments. Silos, breweries, warehouses, churches and schools have been successfully converted into multiunit loft projects.

Table 13.3 Examples of Functional Obsolescence in Residential Improvements

- Interior and exterior finishes that require extensive maintenance can make a structure less competitive.
- In most markets a house that wastes fuel and electricity suffers major functional obsolescence. Energy-conserving features such as well-insulated windows and efficient heating and cooling systems are particularly important in multifamily dwellings and often make the difference between a profitable operation and an unprofitable one. Green building may be the wave of the future for new multifamily dwellings to improve profitability and take advantage of incentives including special financing for green multifamily buildings.
- The mix of units in an apartment project (e.g., two-bedroom units and three-bedroom units) should meet market demands. An improper unit mix may indicate functional inutility.

Residential units that are not energy efficient may become functionally obsolete as energy costs increase and green building grows. If the Sensible Accounting to Value Energy (SAVE) Act[7] passes, it will affect existing housing because the monthly utility bill will be included in the debt-to-income qualifying ratios, typically calculated as PITI (Principal + Interest + Taxes + Insurance). Although the maximum permitted debt-to-income ratios would be adjusted upward to account for the inclusion of expected energy costs, the passing of this bill may affect existing homes that are not energy efficient.

Commercial

Commercial buildings are used for offices, stores, hotels, banks, restaurants, and service outlets. Frequently, two or more commercial uses are combined in a single building, e.g., a high-rise office building with ground-level retail space or a hotel with a retail arcade off the lobby. The structural and design features of commercial buildings are constantly changing. Developers want the most competitive building possible, within the cost constraints imposed by economic pressures, so they incorporate technological changes to meet the demand for innovation whenever practical.

The efficiency of commercial construction today is much greater than it was in the past. Greater utility can be observed both in the portion of the total area enclosed by the structure, which produces direct income in the form of rent, and in the structural improvements that have evolved from new materials and construction methods. No single method of commercial building construction predominates. Methods vie with one another, and one may surpass others in a given area at a particular time.

Important considerations of functional utility in commercial properties include

- column spacing
- bay depth
- live-load floor capacity
- ceiling height
- module width
- elevator speed, capacity, number, and safety
- level of finish

7. See www.imt.org/save-act/.

- energy efficiency
- parking

Functional utility can be extremely significant in shopping centers. Trends in shopping centers change so rapidly that many structures become functionally obsolete before they deteriorate physically. Because retail space is relatively easy to renovate, many centers are streamlined and modernized when they lose their market appeal. Some enclosed malls developed in the 1980s have been adapted to other uses or have been torn down and redeveloped as big-box power centers for value-oriented shoppers or lifestyle-oriented centers for high-end consumers. Many modern community shopping centers are designed with the power center concept, incorporating a larger number of smaller anchors and a higher ratio of anchor space to minimize risk.[8]

Visibility and access are primary considerations in the analysis of retail improvements. Other building amenities that can contribute to the functional utility of shopping centers include

- attractive public areas
- well-kept grounds
- adequate, well-located restroom facilities
- suitable traffic patterns for shoppers

Emerging Trends in Shopping Center Design

Individuality:	Although products are branded to promote consumer loyalty, shopping center developers are now emphasizing regional differences in architectural style to avoid homogeneity. Strong brand names within a shopping center are still desirable, but the shopping center itself should not be seen as a carbon copy of another property in a chain.
Entertainment retailing:	Entertainment functions—movie theaters, restaurants, themed retailers—are becoming increasingly common in "destination" shopping centers. Research has yet to demonstrate conclusively that the presence of movie theaters increases overall sales within a shopping center, but properties that lack entertainment options may be at a competitive disadvantage in the investment market.
Themed districts within a shopping center:	In the past, the tenant mix was often adjusted so that competitors would be in different areas of a shopping center. To foster convenience, comfort, and control for consumers with limited time, shopping center owners are starting to cluster related retailers—e.g., wings of a mall focusing on fashion boutiques, sports-oriented retailers, goods by price point, and family-oriented stores. The effectiveness of the tenant mix of a shopping center remains a good indicator of the competency of leasing and management staff.

8. For a discussion of the spatial analysis of a shopping center, see M. Gordon Brown, "Design and Value: Spatial Form and the Economic Failure of a Mall," *Journal of Real Estate Research*, vol. 17, no. 1/2 (1999): 189-225, and James D. Vernor, Michael F. Amundson, Jeffrey A. Johnson, and Joseph S. Rabianski, *Shopping Center Appraisal and Analysis*, 2nd ed. (Chicago: Appraisal Institute, 2009).

- adequate column spacing
- sufficient number of escalators and elevators
- durable and easily maintained surface and finish elements
- areas for shoppers and workers to rest
- strong lighting and attractive, coordinated signs

Modern office buildings are often able to fulfill their primary function–accommodating the activities of office workers–longer than any other property type, with the possible exception of residential property. Although trends in office construction move more slowly than trends in retail and hotel design, the flexibility of office space is increasingly important to an office building's viability. Older office buildings that cannot be retrofitted to contemporary standards for wiring, HVAC capacity, and other essential systems will suffer in competition with more functional office space.

Office tenants are more likely to pay higher rents for space in an attractively designed building or for a prestigious address, but tenants are unlikely to renew their leases if the office space is unable to adapt to their changing needs. Even if a developer plans to rent full floors of a new office building, there may come a time when the owner must subdivide floors and rent space to smaller tenants.

Functional considerations for office buildings include

- appropriate density (low-, medium-, or high-rise structure) for market area
- building shape and size
- flexible and efficient use of space (larger floor plates are often desirable but market preferences vary)
- expansion capabilities, including potential vertical expansion (i.e., adding a floor)

Emerging Trends in Office Building Design

Office-hotel concept:	As an alternative to negotiating 10- to 20-year office leases, some office building owners are experimenting with providing short-term or temporary space and services as needed by tenants.
Panel systems:	Panel systems for separating workspaces are replacing traditional methods of dividing space in offices for several reasons: 1. The cost of the technology needed for the average office worker is rising. 2. More diverse work teams need flexible, adaptable meeting space. 3. Private office spaces can be arranged with new panel systems.
Data and power infrastructure:	Raised floors and carpet tile allow greater access to data and power cabling as well as denser bundling. (Carpet tile helps muffle the hollow sound of raised floors.) Sufficient space for telecommunications closets is important for long-term flexibility.
Indoor air quality:	The Environmental Protection Agency has ranked indoor air pollution among the top five environmental risks to public health. Poor indoor air quality can be reduced with proper ventilation and air exchange rates and by using non-VOC products and finishes in construction.

- heating, ventilation, and air-conditioning (HVAC)
- plumbing, electrical, security, and communications systems
- floor-to-floor heights
- facade and interior and exterior signage
- access to lobbies and public space
- vertical transportation
- amenities, e.g., retail and restaurants, fitness centers, day care facilities
- parking

Access to retail and support services is an important amenity in suburban office parks because such services may not be within easy driving distance as they are in urban office districts with a concentration of diverse uses.

Functional utility also affects hotels. Hotels range from tiny inns with fewer than a dozen rooms to huge convention hotels with more than a thousand rooms.[9] All hotels and motels were once measured against standard, current designs. This tendency continues for medium-priced hotels and the various extended-stay and limited-service categories, but in appraising older facilities and luxury hotels, variation in architectural styles and interior finish must be considered.

The physical configuration of a hotel or motel is determined by the type of patrons it serves. A motel must be oriented to the needs of guests who wish to spend a minimum amount of time on the premises. A resort hotel, on the other hand, must provide a variety of entertainment facilities for its guests who will spend a lot of time there.

The amount of hotel space devoted to guest rooms varies. A hotel that is a major meeting and entertainment center has a much lower proportion of guest rooms to public areas than an extended-stay hotel.

Emerging Trends in Hotel Design

Needs of the business traveler:	Access to communications technology (wireless Internet connectivity and fax machines either in guest rooms or in a business center) is increasingly important to business travelers. At a minimum, hotels catering to business travelers should have a health club in addition to a business center.
Product types:	All-suite, extended-stay, and hard budget hotels are still popular lodging concepts. The low-cost hard budget category avoids “amenity creep”—i.e., renovation that is beyond typical maintenance and upkeep and that over time has turned limited-service hotels into mid-priced hotels. More recently, boutique hotels have gained in popularity, offering unique, stylish accommodations and consistent service standards. Large lodging chains have developed their own boutique hotels to attract guests looking for a hip urban experience.

9. For a thorough discussion of hotels, see Stephen Rushmore, John W. O’Neill, and Stephen Rushmore Jr., *Hotel Market Analysis and Valuation* (Chicago: Appraisal Institute, 2012) and Stephen Rushmore, Dana Michael Ciraldo, and John Tarras, *Hotel Investments Handbook* (Boston: Warren, Gorham & Lamont, 1997).

Many extended-stay hotels consist entirely of suites with small equipped kitchens, living rooms, and separate bedrooms. These hotels usually have small lobbies and restaurants. Because few hotels contain lodging facilities alone, appraisers must often consider multiple, mixed uses when analyzing the functional utility of the improvements.

Industrial

The most flexible design for industrial buildings, and the one with the greatest appeal on the open market, is a one-story, square or nearly square structure that complies with all local building codes.[10] Even for the simplest industrial buildings, though, the factors listed in Table 13.4 must be considered.

The combination of old and new industrial space may create substantial functional obsolescence if the new construction contributes less than its cost to the value of the whole. The layout of industrial space should allow operations to be carried out with maximum efficiency. Typically, receiving functions are performed on one side of the building, shipping functions on the other, and processing or storage functions in the middle.

Some industrial buildings include special features such as sprinkler systems, scales, loading dock levelers, cranes and craneways, refrigeration areas, conveyor systems, process piping (for compressed air, water, and gas), power wiring, and employee lockers and lunchrooms. These features may be standard equipment for certain industrial operations but not standard for the local real estate market.

Manufacturing plants and other buildings used for industries that involve bulky or volatile materials and products have specialized equipment and building designs, so they have few potential users. Facilities for industries such as food processing or manufacturing computer chips must maintain prescribed levels of cleanliness. For example, the "clean rooms" needed for silicon wafer production may not contribute as much value as they cost to construct if used for alternative industrial uses. Buildings used for light manufacturing and processing have fewer limitations and greater appeal in the market.

Storage and distribution facilities range from simple cubicles, known as miniwarehouses, to huge regional warehouses with more than a million square feet. For optimal functional utility, warehouses should have adequate access, open areas, ceiling height, floor load capacity, humidity and temperature controls, shipping and receiving facilities, fire protection, and protection from the elements.

The primary consideration in a warehouse's location is good access. Just-in-time inventory practices require a distribution facility to be accessible to a greater variety of vehicles and cargo containers, making more frequent and often smaller pick-ups and deliveries. As a result, docks and dock areas must be designed with greater flexibility. Trucking

10. See also Douglas McKnight, "A Practical Guide to Evaluating the Functional Utility of Warehouses," *The Appraisal Journal* (January 1999): 29-36, and Donald Sonneman, "Challenges in Appraising 'Simple' Warehouse Properties," *The Appraisal Journal* (April 2001): 174-181.

is the most common means of transporting goods, but certain warehouse operations also need access to rail, water, and air transportation. If electric trucks are used, a battery-charging area should be included.

Forklifts, conveyor belts, and automatically guided vehicle conveyor systems are used to move materials inside warehouses. Pallets, or portable platforms, are used for moving and storing materials in most distribution operations. Therefore, ceiling heights in warehouses

Table 13.4 Functional Utility of Industrial Improvements

Surplus land*	In new construction surplus land on the site is frequently allocated for future expansion.
Clear span	Anywhere from 21 to 35 feet. Many smaller warehouses can be operated with a clear span of 15 to 20 feet, but higher ceilings may be standard in the market.
Percentage of office space	Varies widely depending on specific operation. If potential alternate uses of an existing property do not require as much finished office space, the excess may be an overimprovement.
Loading facilities	Multiple load facilities can reduce delays in incoming deliveries and outgoing orders. Overhead doors are less efficient loading facilities than loading docks, dock-high floors, and truck wells.
Floor thickness and loading capacity	Typically, 5 to 8 inches of reinforced concrete. Live-load capacity—the ability to support moving or movable objects in the building at a certain weight—is a minimum 125 pounds per square foot for light warehouse space and manufacturing buildings and 250 pounds per square foot for heavy warehouses.
Power service	Manufacturing plants generally require more electrical service than warehouses.
Land-to-building ratio or floor area ratio	Typically, 2.5 to 3.5 land-to-building area. Many older facilities have ratios from 1.3 to 2.5. The land-to-building ratio must allow plenty of space for parking, truck maneuvering, yard storage, and expansion. Floor area ratio (FAR) is also known as building-to-land ratio.
Size relative to typical building size	Big-box warehouses can be significantly larger than competitive buildings in the market. The cost of reconfiguring a large industrial building for multitenant use is a measure of functional inutility.
Slope of access to the site	Steep inclines can reduce loading efficiency.

* See the discussion of excess land and surplus land in Chapter 12.

Emerging Trends in Industrial Building Design

Automation: Industrial operations are less labor-intensive and more equipment-intensive than they once were, and the buildings that house these operations can devote more space to machinery and systems than to break rooms, locker rooms, etc. For example, telecom hotels, Internet switching centers, and data centers often consist of bare storage space for computer equipment and are rarely visited by the people who own the equipment. Also, automated inventory operations increase efficiency, particularly when dealing with small electronic components or other products that are difficult to distinguish by the naked eye.

Just-in-time manufacturing and inventory practices: Manufacturers do not want to be burdened with the cost of storing large quantities of the products they produce, so their suppliers—and the warehouse operators who serve them—focus less on the long-term storage of inventory and more on the movement of inventory.

should accommodate the stacking of an ideal number of pallets. Newly constructed high-cube warehouses may be more efficient than older buildings with larger footprints and fewer automated systems for moving materials. Because wide spans provide maximum flexibility, a square structure generally is the most cost-effective.

Sprinkler systems are needed in most warehouses, especially those where flammable goods are stored. The nature of the stored material determines whether the system should be wet or dry, using water or chemicals.

Buildings on Agricultural Properties

As the small, family farm has given way to fewer, larger farms, the contribution of farm buildings to the total value of farm real estate has been steadily decreasing. The number of farm buildings per acre of farmland has also decreased. Farms are increasingly operated by large, specialized business concerns, and the equipment and management needed to run agricultural operations have become increasingly specialized.[11]

Farm buildings must accommodate the type of machinery and equipment currently used in farming (see Table 13.5). To be useful, each farm building must contribute to the operating efficiency of the entire farm. Each building's usefulness relates to the type and size of the farm. Functional obsolescence can result from having too many farm buildings when fewer would be more efficient.

Table 13.5 Characteristics of Improvements on Agricultural Land

Type of Building	Characteristics
Barns	• Some barns have traditionally been multifunctional, providing animal shelter, grain storage, and a threshing floor. Other structures, such as tobacco barns and modern farm buildings, serve a single, specialized purpose. • Most barns are built of wood or metal, but some are made of stone, logs, or brick, depending on the region. • Old barns are suitable for modern, general-purpose farming if they are sufficiently adaptable. Virtually all newer barns have pre-engineered pole construction, which is less expensive and can accommodate more farming activities than older, multistory barns can.
Silos	• Silos have become more prevalent and larger. The use of baled, rather than loose, hay and the increased use of ensilage have lessened the need for barn storage.
Animal shelters	• Animal shelters should be dry and clean, provide protection from the wind and sun, and be adaptable to equipment storage.
Machine sheds	• Sheds are needed to house tractors, combines, discs, plows, harrows, cultivators, pickers, trucks, and other equipment.
Shop	• Most farms have an area for maintenance of mechanical equipment. Often the shop is a pole barn or prefab metal building with concrete floors that has been modified. In winter, this may be the most important building on the property. • Usually heated, cooled, and insulated.
Dairy production facilities	• Modern dairy facilities are built using concrete tilt-up, concrete block, or metal prefab construction. Double parallel and rotary milk stalls are standard. Old flat barns and herringbone style stalls are still in use but are being phased out.

11. For additional information on improvements to rural land, see American Society of Farm Managers and Rural Appraisers and Appraisal Institute, *The Appraisal of Rural Property*, 2nd ed. (Denver and Chicago, 2000).

Special-purpose Buildings

Although most buildings can be converted to other uses, the conversion of special-purpose buildings generally involves extra expense and design expertise. Such conversion may not be economically feasible or practical in many situations depending on a building's design and special construction features. Special-purpose structures include

- houses of worship
- theaters
- greenhouses
- schools
- rail and transportation facilities
- sports arenas
- other specially designed and constructed buldings

The functional utility of a special-purpose building depends on whether or not there is continued demand for the use for which the building was designed. When there is demand, functional utility depends on whether or not the building conforms to competitive standards. For example, there is a continued demand for movie theaters, but their design has changed due to high maintenance and utility costs. Older, ornate movie theaters still exist, but newly constructed theaters are generally simple, unembellished, functional structures containing a larger number of smaller screens with stadium-style seating.[12] In the vast majority of markets, large and ornate theaters are not being built.

The design and materials used in houses of worship are simpler today to keep maintenance and utility costs down. The functional utility of these structures, like sports and concert arenas, is primarily related

Evaluating Functional Utility in Special-purpose Buildings

To investigate the functional utility and value of building components designed specifically to serve the use of a special-purpose property, the appraiser can employ several strategies:

- Review appraisal literature pertaining to properties in a similar product category
- Search for market data on similar—i.e., not directly comparable—or related facilities
- Interview the current or recent occupant and other operators in that particular field
- Interview brokers or other appraisers specializing in that product or with experience in that segment of the market
- Interview the project architects and engineers
- Review building plans with a cost estimator or with architects or engineers experienced in that product type
- Review taxation case studies for pertinent precedents

The appraiser should also analyze the Competency Rule of the Uniform Standards of Professional Appraisal Practice in assignments relating to special-purpose property.

Source: David Paul Rothermich, "Special-Design Properties: Identifying the 'Market' in Market Value," *The Appraisal Journal* (October 1998): 410-415.

12. See also Arthur E. Gimmy and Mary G. Gates, *The Business of Show Business: The Valuation of Movie Theaters* (Chicago: Appraisal Institute, 2000).

to seating capacity. The structure's support facilities, general attractiveness, and appeal must also be considered.[13]

The adaptive-use movement has generated public interest in the conversion of special-purpose buildings to preserve architecturally significant structures that have outlived their function. Railroad stations, schools, firehouses, and grist mills are popular structures for conversion. The functional utility of these buildings relates to how much they deviate from building codes and how the cost of rehabilitation compares with the potential economic return. A typical item of functional inutility in adaptive-use projects is an insufficient number of staircases to meet building codes. By contrast, a high ceiling in a specialty property does not indicate functional inutility if it is considered a desirable architectural feature. Compliance with the Americans with Disabilities Act is an additional consideration in evaluating the adaptive use of older buildings.

Mixed-use Buildings

Many buildings successfully combine two or more revenue-producing uses:

- Research and development facilities often combine office, laboratory, and industrial space within a single structure.
- Office buildings often contain ground-level retail space and restaurants.
- Hotels can be combined with retail, office, or residential uses.

In mixed-use buildings, each type of use reflects a number of design criteria, which must be analyzed separately. The structure must also be considered as a whole to determine how successfully it combines uses. The uses that are combined should be compatible, but minor incompatibilities can be alleviated with separate entrances, elevators, and equipment. In a mixed-use building without separate entrances and elevators, for example, the residential units on upper floors and the office units below would both suffer. Only in a rather large building can the extra expense of separate features be justified. A hotel located in an office building should have its own entrance and elevators. Security and privacy should characterize a building's residential area, while a professional, prestigious image is desirable for the office portion of the structure.

Mixed-use developments (MUDs) are characterized by the physical and functional integration of their components. They are often sprawling structures built around centrally located shopping galleries or hotel courtyards. Walkways, plazas, escalators, and elevators provide an interconnecting pedestrian thoroughfare with easy access to parking facilities located underground, at street level, or above-ground. Because mixed-use developments bring together diverse participants, they require extensive, extraordinarily coherent planning.[14]

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13. For more information on houses of worship, see Martin H. Aaron and John H. Wright Jr., *The Appraisal of Religious Facilities* (Chicago: Appraisal Institute, 1997).
14. For a comprehensive analysis of mixed-use developments, see Dean Schwanke, *Mixed-Use Development Handbook*, 2nd ed. (Washington, D.C.: Urban Land Institute, 2003).

Quality and Condition Survey

The building description and analysis of architectural style and functional utility culminate in the quality and condition survey. A structure can have a functional layout and an attractive design but be built with inferior materials and poor workmanship. These deficiencies increase maintenance and utility costs and adversely affect the property's marketability. Conversely, a building can be built too well or at a cost that cannot be justified by its utility. Most purchasers will not pay for these excess costs, and only part of the original investment can be recaptured by the original owner through reduced maintenance expenses.

Practical or reasonable economy of construction results in an improvement that will produce rental income or value commensurate with its cost. Maintenance and operating expenses for an economically constructed building may be slightly higher than minimum expenses, but it is usually better to pay those expenses than to invest in a building of superior construction that will have higher taxes. This tradeoff may be noted in the appraiser's analysis. To achieve the desired level of construction quality and cost, building materials and construction methods must be chosen and used properly. An appropriate combination of elements results in a building that is adequate for its intended purpose.

The character, quality, and appearance of building construction are reflected in each of the three approaches to value. The quality and condition of building components greatly influence the cost estimate, the depreciation estimate, the ability of the property to produce rental income, and the property's comparability with other properties. Analysis of the quality of construction and the methods and materials used complements the appraiser's analysis of the building's structural design and architecture.

When a contractor takes shortcuts and fails to meet the advertised or contracted quality level of new construction, property owners and lenders can find themselves embroiled in litigation with aggrieved occupants. Because of the growing complexity of building design and construction, the quality of building components and construction is often best judged by a consulting engineer. The engineer can monitor the construction process to ensure that the work conforms to approved drawings and that the workmanship is satisfactory. An experienced appraiser may be able to relate evidence of construction problems–sagging floors, leaks, drafts, etc.–gathered in the property inspection to materials of poor quality or shoddy workmanship.

In the condition component of a quality and condition survey, the appraiser generally distinguishes among three types of building components:

1. Items in need of immediate repair on the date of the appraisal (i.e., deferred maintenance items)
2. Items that may be repaired or replaced at a later time (i.e., short-lived items)

In the condition component of a quality and condition survey, the appraiser distinguishes among items in need of immediate repair (deferred maintenance items), short-lived items that can be replaced at a later date, and long-lived items expected to last for the remaining economic life of the building.

3. Items that are expected to last the full economic life of the building (i.e., long-lived items)

Examples of each type of building component are shown in Table 13.6.

Items in Need of Immediate Repair

Although a building may be in excellent condition, the appraiser usually finds some items in need of repair on the date of the appraisal. Repairing these items will normally add as much or more value to the property than the cost of their repair. When the cost approach to value is applied, these are considered items of curable physical deterioration.

The appraiser's repair list should include items that constitute a fire or safety hazard. Many clients request that these items be listed separately in the report. Sometimes the appraiser is asked to estimate the cost of each repair, which is called the *cost to cure*. (Techniques for estimating the cost to cure are discussed in Chapter 29.)

Short-lived Items

During the building inspection, an appraiser usually encounters other items that show signs of wear and tear but would not be economical to repair or replace on the date of the appraisal. The economic life of a building is the period over which the improvements contribute to property value. Many building components have to be repaired at some time during the economic life of the building. If the remaining

Green Building Documentation

In valuation analyses of sustainable, high-performing green properties, appraisers may want to incorporate the following types of documentation:

- third-party certifications and ratings and accompanying reports (e.g., LEED, EPA's National Energy Performance Rating, and ENERGY STAR)
- modeled operating data for proposed buildings (e.g., DOE energy models, USGBC water models, lighting models, transportation demand studies)
- commissioning reports
- post-occupancy evaluations (POEs) for properties at least one year old
- indoor air quality assessments
- technical specifications of specific systems in existing or proposed buildings (e.g., narrative, construction drawings, engineering reports) demonstrating their benefits (e.g., natural ventilation system or interior vegetation)
- estimates from cost estimators based on these technical specifications showing cost differentials relative to standard systems
- site evaluations providing an assessment of ecosystem health, functionality, and the provision of ecosystem services
- lease agreements and other documents demonstrating specific income adjustments based on environmental or social costs and benefits (e.g., a proposed building may qualify for storm water fee reductions based on meeting certain criteria)
- documented incentives, which may include tax abatements that will affect the net income analysis. Current incentives for building green can be found at a national website (www.dsireusa.org). These incentives may offset the additional cost to build green.

Table 13.6 Sample Items Considered in the Quality and Condition Survey

Deferred Maintenance Items

- Touch-up exterior paint needed and the removal of graffiti
- Minor carpentry repairs on stairs, molding, trim, floors, and porches
- Redecorating interior rooms
- Fixing leaky or noisy plumbing
- Loosening stuck doors and windows
- Repairing torn screens and broken windows
- Rehanging loose or damaged gutters and leaders
- Replacing missing shingles, tiles, and slates and repairing leaky roofs
- Fixing cracked sidewalks, driveways, and parking areas
- Doing minor electrical repairs
- Replacing rotten floor boards
- Exterminating vermin
- Fixing cracked or loose tiles in bathrooms and kitchens
- Repairing septic systems
- Eliminating safety hazards such as windows that have been nailed shut
- Eliminating fire hazards such as paint-soaked rags in a storage area

Short-lived Items

- Interior paint and wallpaper
- Exterior paint
- Floor finishes
- Shades, screens, and blinds (often considered personal property)
- Waterproofing and weatherstripping
- Gutters and leaders
- Roof covering and flashing
- Water heater
- Furnace
- Air-conditioning equipment
- Carpeting
- Kitchen appliances (considered short-lived items only if built-in)
- Sump pump
- Water softener system (often rented, not owned)
- Washers and dryers (often considered personal property)
- Ventilating fans

Long-lived Items

- Hot and cold water pipes
- Plumbing fixtures
- Electric service connection
- Electric wiring
- Electric fixtures
- Ducts and radiators
- Walls, foundation, roof structure

life of the component is shorter than the remaining economic life of the structure as a whole, the component is identified as a *short-lived item*. (Age-life concepts such as economic life and remaining economic life are discussed in more detail in Chapter 29.)

The appraiser must decide if an item needs immediate repair or replacement or whether this work can be done later. If the repair or replacement will add less to the value of the property than it will cost, the maintenance should usually be delayed. For example, a building with a sound, 10-year-old roof may hold up well for at least another five years. Although the roof has suffered some deterioration, replacing it probably would not add more value to the property than the cost of a new roof.

The appraiser should consider whether repairing an item is necessary to preserve other components. For example, sometimes the roof cover must be replaced or the economic life of the other components will be reduced. The appraiser should note whether the condition of the short-lived item is better or worse than the overall condition of the building.

Long-lived Items

The final step in a quality and condition survey is to describe the condition of those items that are not expected to require repair or replacement during the economic life of the building, assuming they are not subject to abnormal wear and tear or accidental damage. A building component with an expected economic life that is the same as the remaining economic life of the structure is called a *long-lived item*. Repair may not be required because the component has been built to last and has been well maintained. All the long-lived components of a building are rarely in the same condition. The items that are not in the same condition as the rest of the building are the important ones in the appraisal analysis.

Some defective long-lived items are not considered in need of repair because the cost of their replacement or repair is greater than the amount these items contribute to the value of the property. A serious crack in a foundation wall, for example, would probably be considered incurable physical deterioration. Incurable depreciation that results from problems in the original design of a structure is considered incurable functional obsolescence.

short-lived items
A building component with an expected remaining economic life that is shorter than the remaining economic life of the entire structure.

long-lived items
Building components with an expected remaining economic life that is the same as the remaining economic life of the entire structure.

Statistical Analysis in Appraisal

In the valuation process, data analysis naturally follows the various data collection activities discussed in the previous section of this book. A variety of analyses inform an appraiser's conclusions about value: market analysis, highest and best use analysis, and the application of the approaches to value. Each of those forms of analysis deals directly with different sets of data about the subject property, competitive properties, and the larger market. However, all of those traditional appraisal analyses are increasingly influenced by the discipline of statistics.

Although the study of data has always been at the core of the valuation process, the availability of tools for more rigorous analysis and interpretation of numerical data has raised expectations for more "statistical" support for value conclusions. As a result, a more formal understanding of basic statistical terminology and techniques has become a prerequisite for professional competency in the twenty-first century. Statistical techniques like regression analysis have become accepted tools in the application of the approaches to value. In fact, the application of regression analysis to comparable sales data is a natural and obvious extension of the traditional analysis of differences in the sale prices of comparable properties in the adjustment process. A simple linear regression model can be used to estimate the influence of a particular characteristic with significant statistical reliability when an adequate supply

statistics
A body of principles and methods concerned with extracting useful information from numerical data.

descriptive statistics

1. A branch of statistics concerned only with characterizing, or describing, a set of numbers.
2. The measures used to characterize a set of data (e.g., average, maximum, minimum, coefficient of dispersion) or charts and tables depicting the data.

inferential statistics

The branch of statistics concerned with drawing conclusions about population characteristics through analysis of sample data.

of data is available. Historically, assessors have used similar statistical techniques as part of the mass appraisal of large pools of properties. For years traditional appraisal techniques have been steeped in statistical analysis, even if the formal vocabulary of statistics has not always been used to describe the application of statistical techniques in the context of appraisal.

Statistical applications are generally divided into two types–descriptive statistics and inferential statistics. The category of descriptive statistics deals with the use of summary measures, charts, and tables to describe a sample or population. Inferential statistics involves the use of sample data in support of opinions (i.e., inferences) concerning a population represented by a sample. Statistical inferences can include, among other things, estimates of actual but unknown population central tendency and dispersion, outcome predictions, and the underlying structure of cause-and-effect relationships.

The effective use of descriptive statistical tools such as tables, charts, and graphs is an important skill. Appraisal reports that include helpful data visualizations are often easier for the intended users to read and are perceived as more credible. (The effective use of tables, charts, and other illustrations in appraisal reports is discussed in Chapter 31.) The competent use of inferential tools is more complicated, generally requiring study of a separate body of knowledge. Because the field of statistics is a discipline unto itself, appraisers should identify the extent to which statistical methods will be used in their practices and determine the education and training they will need to be able to use statistics to provide credible appraisal services. This chapter introduces the foundational terms and concepts of statistics and describes the use of statistical analysis in appraisal.[1]

What Is Data?

In the valuation process, *data* is classified in terms of its use in the appraisal, i.e., general data, specific data, or competitive supply and demand data as discussed in Chapter 9. In the broader context of statistics, *data* is any set of facts such as numbers, measurements, or terms. Applying the statistical sense of the word to the activities of real estate appraisers, *data* is simply unprocessed observations and descriptions about real property and the markets in which real property is bought and sold. These raw observations and descriptions fall into two general categories:

1. Appendix B discusses more complex concepts and considerations in the use of statistical applications like multiple regression analysis. In the professional appraisal literature, much has been written about statistical tools and how they relate to appraisal, and this material is readily accessible in publications such as *The Appraisal Journal*. See, for example, a series of three articles by Bryan L. Goddard: "Graphics Improve the Analysis of Income Data," *The Appraisal Journal* (October 2000): 388-394; "The Power of Computer Graphics for Comparative Analysis," *The Appraisal Journal* (April 2000): 134-141; "The Role of Graphic Analysis in Appraisals," *The Appraisal Journal* (October 1999): 429-435; and the regular "Cool Tools" and "Maps & Comps" columns in *Valuation* magazine.

(1) qualitative data, which is descriptive in nature, and (2) quantitative data, which has to do with numbers.

Every appraisal assignment begins with the receipt of raw data from a client in the form of an address, legal description, parcel number, or other descriptive information that identifies the subject property. This type of data is referred to as *qualitative data*. Obviously, addresses and parcel numbers contain numeric information, but that data does not serve a quantitative function. In contrast, *quantitative data* is numerical information, such as the square footage of the improvements, the lot size, the age of the property, or the number of listings in the relevant market area.

Qualitative data can also be separated into two categories: (1) discrete data, which is data that will always have a specific value and for which there are a finite number of possible values (e.g., the number of pending sales in a given zip code or the number of rental units in an apartment building), and (2) continuous data, which is basically all other numerical data. Continuous data is usually associated with some sort of physical measurement (e.g., the square footage of a building or its remaining economic life).

qualitative data
Data that is based on subjective measures, where the data tends to fall into nominal or ordinal categories; usually represented in the form of words. For example, a characteristic like curb appeal may indeed affect market value but may be difficult to quantify numerically. Also referred to as *categorical data*.

quantitative data
Variables that can be objectively measured or counted and expressed in numerical form. For example, square footage, length, age, number of rooms, and ceiling height are all quantitative variables.

Levels of Data

There are generally four levels of data measurement or data classification:

1. Nominal
2. Ordinal
3. Interval
4. Ratio

Nominal level data is data that does not have any standard means of order. Nominal data is distinguished only by its name. For example, architectural style is a type of qualitative data that does not lend itself to ranking or order. A Tudor style house cannot be correctly or incorrectly placed in a list above or below a Victorian, colonial, or brownstone. Simply put, there is no right or wrong way to order a list of architectural styles.

Ordinal level data is also distinguished by name but differs from nominal data because it can fall into an ordering scheme. For example, the condition ratings in the Uniform Appraisal Dataset, C1 to C6, are a series of data that follows specific, meaningful order. Similarly, a more traditional set of condition ratings might flow from *poor* to *excellent*. While there are differences between the rankings (that is, *fair* is better than *poor*), the rankings alone do not indicate a finite measurement that can be applied to identify that difference.

Interval level data is similar to ordinal level data because it also has a specific ordering scheme, but interval data is distinguished from ordinal data in that the difference between one data point and the next is measurable. However, interval data does lack a zero starting point or a baseline. For example, a review of historic sales data might call for a measurement of price changes during the period of, say, 2002 to 2007. Although 2007 is clearly five years after 2002 (i.e., the difference is measurable), there is no absolute beginning year prior to which analysis can no longer take place.

The final level of data is ratio level data, which is just like interval level data except that ratios now make sense. For example, an appraiser might be asked to determine the rentable area for a suite in an office building. Suppose the building has 100,000 square feet of gross area, the total amount of common area in the building is 10,000 square feet, and the usable area of the office suite is 18,000 square feet. First, this data can be ordered:

$$10{,}000 < 18{,}000 < 100{,}000$$

The differences between the data values are also meaningful. Ratios of the various area amounts can be calculated because there is a base point of zero below which there is no building at all:

$\frac{\text{Gross Rentable Area}}{\text{Usable Area}}$	=	Rentable/Usable Ratio	=	$\frac{100{,}000}{90{,}000} = 1.11$
Load Factor (Load)	=	Rentable/Usable Ratio − 1	=	1.11 − 1 = 0.11%
Usable Area × Rentable/Usable Ratio	=	Rentable Area	=	18,000 × 1.11 = 20,000
$\frac{\text{Rentable Area}}{\text{Rentable/Usable Ratio}}$	=	Usable Area	=	$\frac{20{,}000}{1.11} = 18{,}000$

Figures are rounded.

In this case, the rentable area calculated from the supplied data is 20,000 square feet.

Populations and Samples

Pools of data of all levels can be arranged into various sets and subsets. At the broadest end of the spectrum, a *population* consists of all of the items under consideration, such as all of the rental units located in garden-level apartment developments in a given market area. A *parameter* is a summary measure that describes a characteristic of a population (i.e., a variable). The mean size of all of the units in garden-level apartment developments in a given market area is an example of a parameter. (Size is the variable and the population mean is the parameter.) In contrast, a *sample* is a subset of a population that has been selected for analysis. A *statistic* is a summary measure derived from sample data. The mean size of all of the apartment units in a sample selected from garden-level apartment developments in a given market area is an example of a statistic. Statistics are used to estimate parameters. That is, parameter values are inferred through the analysis of statistics.

As stated earlier, descriptive statistics is concerned with data collection, presentation, and quantification. For example, the descriptive statistics on a sample might include the sample size, the collection method, and the date. Descriptive statistics might also include numerically quantifying the dispersion and central tendencies of the sample variables by reporting minimum and maximum values, ranges, quartiles, standard deviations, means, medians, or modes. Specific examples of descriptive charts, graphs, and tables include histograms, pie charts, bar charts, line graphs, scatter plots, ordered arrays, relative frequency distributions, and percentage distributions. Descriptive statistical methods are applicable to population data as well as sample data.

sample
In statistics, a subset of a population selected for analysis.

parameter
1. A constant or value used to index a function, such as use of degrees of freedom to derive an appropriate *t*-statistic or *F*-statistic function.
2. A number that describes a characteristic of a population.

Fundamentally, inferential statistics involves estimating a population parameter using sample data or reaching a conclusion concerning one or more populations based on sample data. For example, the National Association of Realtors (NAR) publishes monthly median home price statistics for various markets throughout the United States. Changes in the price level of the underlying population of homes are generally inferred from this sample statistic. The reliability and validity of this inference–i.e., how accurate the inference is–depend on a number of factors including sample size and how well the sample represents the population.

A measure of accuracy is usually reported along with an inference. The measure of accuracy states the degree of uncertainty associated with the inference. For example, polling data usually includes an inference and its associated margin of error, which describes a confidence interval at some preselected confidence level (generally 90%, 95%, or occasionally 99%).

Uncertainty cannot, however, be quantified when the sample is a nonprobability sample. (With a nonprobability sample, the probability of any given sample item being chosen from the underlying population is unknown. Examples of nonprobability samples include convenience samples, intact groups, and self-selection.) Median home price statistics reported by NAR are derived from nonprobability samples, so a degree of uncertainty is not reported and cannot be calculated due to the manner in which the data is collected.

These terms and concepts are important in all types of real estate appraisals. When appraisers gather comparable sales, they should recognize that only some of the properties in the population of which the sales are a part will have sold in a given time period. Thus, the sales may or may not represent that population and would not constitute a random or unbiased sample. To report that "the mean sale price of the properties sold in the subject property's market area between 2007 and 2008 was $175,000" would be more accurate than to report that "the average price for properties in the neighborhood in 2007 was $175,000." The latter statement implies that all properties were sold.

Measures of Central Tendency

Central tendency refers to a typical value that describes a sample or population variable. The three most frequently used measures of central tendency are the median, mean, and mode. The widely accepted definitions of *market value* all use language that relates to the measures of central tendency (e.g., the "most probable price" is the mode, the "expected price" is the median or mean).

Median

The median is the middle value in an ordered array–i.e., a data set arranged numerically from lowest to highest or highest to lowest. The median is unaffected by extreme values in sample data. As a result, it is often reported when one or more extreme values distort the ability of the mean to accurately depict central tendency.

If a data set contains an odd number of observations, the median value is the observation at the $(n + 1)/2$ position in the ordered array, where n is the sample size. If the data set has an even number of observations, then the median is the value halfway between the two middle observation values. For example, if the data set has 15 observations, the median is the eighth data point in an ordered array of the data. If the data set contains 14 observations, then the median would be the midpoint between the seventh and eighth data points in the ordered array.

Arithmetic Mean

The arithmetic mean is the most commonly reported measure of central tendency. It is often referred to as the *sample mean*, or *population mean*, or simply as the *mean*. Sample mean is represented by the symbol $\bar{x}$. Population mean is symbolized as the Greek letter μ. Sample mean is calculated by summing the values of all observations on a variable and dividing by sample size (n). Similarly, population mean is calculated by summing the values of all items in a population and dividing by population size (N). Because the arithmetic mean includes all observations on a variable, its calculation is affected by any extreme values, which may distort its depiction of central tendency. When this occurs the population mean is not the best representation of central tendency.

The mean is very amenable to statistical inference when the population distribution is known or can be reliably approximated or when the sample is large enough. The Student's t distribution is the most frequently used measure to assess the degree of uncertainty associated with statistical inferences based on the mean.

Geometric Mean

Central tendency for compound financial returns over time can be measured by the geometric mean. The geometric mean is an important financial concept.

Mode

The mode is the most frequently occurring observation in a sample data set. It is not affected by extreme values, but it is more variable from sample to sample. If more than one mode occurs, the data set is multimodal. For example, a data set with two modes is referred to as *bimodal*. The mode is undefined for some data distributions (e.g., the uniform distribution), and unlike the mean and median, there are no statistical tools useful for making inferences based on the mode.

Numerical Example

Table 14.1 shows an ordered array (in ascending order) of a 36-item random sample of garden-level apartment rents. The data set illustrates

Measure	Calculation
median A measure of central tendency identified as the middle value in an ordered array of numerical values, e.g., 7 is the median of (1, 4, 6, 6, 7, 9, 11, 22, 41). If the ordered array contains an even number of values, then the median is the mean of the two values on either side of the middle.	$(n + 1)/2$ ordered observation where n = odd-numbered sample size
mean A measure of central tendency. The sum of values for a variable in a sample or population divided by the number of items in the sample or population. The arithmetic average.	**Sample Mean ($\bar{x}$)** $\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$ where n = sample size **Population Mean (μ)** $\mu = \frac{\sum_{i=1}^{N} x_i}{N}$ where N = population size
geometric mean The nth root of the product of n items. A geometric mean represents the central tendency rate of change for a phenomenon that grows in a compound fashion over time, such as many financial returns.	$\bar{R} = [(1 + R_1) \times (1 + R_2) \times \ldots \times (1 + R_n)]^{1/n} - 1$ where R_i = rate of return for period i n = number of compounding periods
mode A measure of central tendency consisting of the numerical value or categorical characteristic that occurs most frequently in a sample or population. For example, the mode of the data set (2, 4, 5, 6, 6, 7, 7, 8, 8, 8, 8, 10, 12) is 8, and the mode of (poor, poor, below average, average, average, average, average, good, good, excellent) is *average*.	Most frequently occurring observation in a data set.

Table 14.1 Garden-Level Apartment Rents

Monthly Rent
$600
650
695
710
715
730
735
735
760
760
785
800
800
805
815
820
820
825
825
825
825
850
850
850
850
850
850
860
860
890
890
920
920
930
970
995
$\Sigma_x = \$29,370$

$$\text{Simple Mean} = \bar{x} = \frac{\sum_{i=1}^{n} x_i}{n} = \frac{\$29,370}{36} = \$815.83$$

the sample mean, median, and mode. The same data is used later to illustrate measures of dispersion and shape.

Because the sample has an even number of observations, the median is the midpoint between the 18th and 19th ordered observations, which is $825. The most frequently occurring rent is $850, which occurs six times and is the mode of the data set. Since the observations in the sample were randomly selected, the measures of central tendency can be used to infer the corresponding population central tendency.

Often inference can be improved by use of a stratified random sample. For example, if garden apartment units exist in one-bedroom and two-bedroom configurations in a given market, and it is known that one-bedroom units represent 35% of the garden apartment population, then a stratified random sample consisting of 35% one-bedroom garden apartment units and 65% two-bedroom garden apartment units would provide improved inferences on population parameters by ensuring that the unit type variability within the sample is consistent with the underlying population.

Measures of Dispersion

Measures of dispersion indicate how much variation occurs in a given variable. These measures are useful because they can be compared to the characteristics of a known distribution—such as the normal distribution—to determine whether a particular set of parametric inferential

Parametric and Nonparametric Statistics

A *parametric statistic* is a statistic whose interpretation and validity is determined by understanding the distribution of the underlying population data from which a representative sample has been drawn. Many parametric statistics rely on an assumption that the population is normally distributed.

In contrast, a *nonparametric statistic* is a statistic whose interpretation and validity do not rely on knowing the distribution of the underlying population data from which a representative sample has been drawn. Nonparametric statistics involves the use of inferential methods that are valid regardless of the underlying population data distribution.

Inferences on medians (as opposed to inferences on means) derived from nonparametric statistics are useful for analyzing small samples when the underlying population distribution is unknown and the sample is so small that the central limit theorem cannot be relied upon to ensure approximate normality of the sampling distribution of the mean.

Although nonparametric median tests are beyond the scope of this chapter, note that many software packages provide a number of nonparametric tests that are appropriate for making inferences about central tendency and distribution from a single sample and comparing the central tendencies of two or more small samples. For example, the SPSS and Minitab software packages include several nonparametric single-sample analysis tools as well as independent-sample comparison tests and related-sample comparison tests.

Because real property data sets often consist of small-sized samples, it is useful to be able to apply a nonparametric test. Many introductory statistics textbooks include chapters dealing with nonparametric statistics, providing a level of understanding sufficient for most real estate applications. For example, see Mark L. Berenson, David M. Levine, and Timothy C. Krehbiel, *Basic Business Statistics: Concepts and Applications*, 9th ed. (Upper Saddle River, N.J.: Prentice Hall, 2004), Chapter 10, Sections 10.4 and 10.5 (Wilcoxon Rank Sum Test and Wilcoxon Signed Rank Test), Chapter 11, Sections 11.4 and 11.5 (Kruskal-Wallis Rank Test and Friedman Rank Test), and Chapter 12, Sections 12.2, 12.3, and 12.4 (Chi Square Tests).

statistics can be used. For example, if the data is sufficiently close to being normally distributed, then statistical methods based on the normal distribution can be employed to make inferences about the parameters of the underlying population. Measures of dispersion also facilitate comparison of two data sets to determine which is more variable.

Standard Deviation and Variance

The two fundamental measures of dispersion–standard deviation and variance–take into account how all of the data is distributed. In addition, the standard deviation lends itself to further statistical treatment, allowing inferences to be drawn and statements to be made regarding the degree of uncertainty associated with an inference. For this reason, the standard deviation is a commonly calculated and reported sample statistic. The population standard deviation is denoted by the Greek letter σ and the sample standard deviation is denoted by the letter S.

Variance is simply the square of the standard deviation. Sample variance equals S^2 and population variance equals σ^2. The sample standard deviation for the sample of 36 apartment unit rents is calculated in Table 14.2.

When data is normally distributed, approximately 67% of the observations are expected to lie within ±1 standard deviation of the mean, 80% within ±1.28 standard deviations of the mean, and 95% within ±2 standard deviations of the mean. For this data set, 25 observations (69%)

Measure	Calculation
standard deviation The square root of the variance. The sample standard deviation is the square roof of the sample variance and the population standard deviation is the square root of the population variance, i.e., the square root of the sum of the squared deviations from the mean divided by either the population size or by the sample size minus 1.	**Population Standard Deviation (σ)** $\sigma = \sqrt{\frac{\Sigma(x_i - \mu)^2}{N}}$ where μ = population mean N = population size **Sample Standard Deviation (S)** $S = \sqrt{\frac{\Sigma(x_i - \bar{x})^2}{n-1}}$ where $\bar{x}$ = sample mean n = sample size
variance In statistics, a measure of the degree of dispersion of a variable's values; a measure of the extent to which observation values vary from the mean value.	**Population Variance** σ^2 **Population Variance** S^2

Table 14.2 Sample Standard Deviation (S) Calculation

Rent (x_i)	Sample Mean ($\bar{x}$)	($x_i - \bar{x}$)	($x_i - \bar{x}$)^2
600	815.8333	-215.8333	46,584.01
650	815.8333	-165.8333	27,500.68
695	815.8333	-120.8333	14,600.69
710	815.8333	-105.8333	11,200.69
715	815.8333	-100.8333	10,167.35
730	815.8333	-85.8333	7,367.36
735	815.8333	-80.8333	6,534.02
735	815.8333	-80.8333	6,534.02
760	815.8333	-55.8333	3,117.36
760	815.8333	-55.8333	3,117.36
785	815.8333	-30.8333	950.69
800	815.8333	-15.8333	250.69
800	815.8333	-15.8333	250.69
805	815.8333	-10.8333	117.36
815	815.8333	-0.8333	0.69
820	815.8333	4.1667	17.36
820	815.8333	4.1667	17.36
825	815.8333	9.1667	84.03
825	815.8333	9.1667	84.03
825	815.8333	9.1667	84.03
825	815.8333	9.1667	84.03
850	815.8333	34.1667	1,167.36
850	815.8333	34.1667	1,167.36
850	815.8333	34.1667	1,167.36
850	815.8333	34.1667	1,167.36
850	815.8333	34.1667	1,167.36
850	815.8333	34.1667	1,167.36
860	815.8333	44.1667	1,950.70
860	815.8333	44.1667	1,950.70
890	815.8333	74.1667	5,500.70
890	815.8333	74.1667	5,500.70
920	815.8333	104.1667	10,850.70
920	815.8333	104.1667	10,850.70
930	815.8333	114.1667	13,034.04
970	815.8333	154.1667	23,767.37
995	815.8333	179.1667	32,100.71
			$\Sigma(x_i - \bar{x})^2 = 251{,}175.00$

$$S = \sqrt{\frac{\Sigma(x_i - \bar{x})^2}{n-1}} = \sqrt{\frac{251{,}175.00}{36-1}} = \$84.71$$

lie within ±1 standard deviation of the mean, 30 observations (83%) lie within ±1.28 standard deviations of the mean, and 34 observations (94%) lie within ±2 standard deviations of the mean. Based on these measures, the data appears to be approximately normally distributed.

Coefficient of Variation

The coefficient of variation (*CV*) is useful for relative comparisons of dispersion among multiple sets of data because dispersion is standardized to each sample's mean. This is done by stating standard deviation as a percentage of the sample mean as follows:

$$CV = \frac{S \times 100}{\bar{x}}$$

coefficient of variation

The ratio, expressed as a percentage, of a variable's standard deviation to its arithmetic mean.

range

In statistics, the difference between the highest and lowest values in a set of numbers.

The sample having the greatest coefficient of variation has the most widely dispersed data.

For the apartment rent data set, the coefficient of variation is

$$CV = \frac{\$84.71}{\$815.83} \times 100 = 10.38\%$$

Range

The range is a simple measure of the spread of the data. It is the difference between the values of the largest observation and the smallest observation. When data is normally distributed, the range will be approximately equal to 6 standard deviations. The range for the apartment rent data is \$600 – \$995, or \$395. This range equates to 4.66 standard deviations, i.e., less dispersion than would be expected for a normally distributed data set.

Interquartile Range

A data set's ordered array can be divided into four subsets of identical size by identifying quartiles. Quartiles are useful for analyzing the shape of the data distribution, which will be illustrated in the next section of this chapter.

Quartile 1 (*Q1*) ends at the midpoint between the lowest value and the median. Quartile 2 (*Q2*) ends at the median, and Quartile 3 (*Q3*) ends at the midpoint between the highest value and the median.

The following decision rules also apply:

1. If the position point calculation is an integer, then the ordered observation occupying that position point is the quartile boundary.
2. If the position point is halfway between two integers, then the midpoint between the next-largest and next-smallest ordered observation is the quartile boundary.

Measure	Calculation
interquartile range A measure of dispersion. The interquartile range indicates the "distance" between the value dividing the first and second quartile from the value dividing the third and fourth quartile.	**Quartile 1 (Q1)** $Q1 = \frac{n+1}{4}$ ordered observation **Quartile 2 (Q2)** $Q2 = median$ **Quartile 3 (Q3)** $Q3 = \frac{3(n+1)}{4}$ ordered observation Note that Excel calculates quartiles in a different manner.

3. If the position point is neither an integer nor halfway between two integers, then the position point is rounded to the nearest integer and the corresponding ordered observation is the quartile boundary.

For the apartment rent data (36 observations), the position for *Q1* is 9.25 (37 ÷ 4) rounded down to the ninth ordered observation in accordance with the third decision rule above. Position 9 in the ordered array corresponds to $760, which is *Q1*. *Q2* is the median, which is $825. The position for *Q3* is 27.75 (111 ÷ 4) rounded up to the 28th ordered observation in accordance with the third decision rule above. Position 28 in the ordered array corresponds to $860.

The interquartile range is *Q3* – *Q1*, or $860 – $760 = $100. When data is normally distributed, the interquartile range should be approximately equal to 1.33 standard deviations. For the apartment rent data, the interquartile range is 1.18 standard deviations ($100 ÷ $84.71).

Measures of Shape

Measures of shape are essential for determining how close to normal a data distribution is and the extent to which extreme values are distorting the difference between the median and the mean. The normal distribution, which is the basis for many statistical inferences, is symmetrical–i.e., its median and mean are equal. Figure 14.1 shows a normal distribution with a mean of $815.83 and a standard deviation of $84.71. This plot, generated using Minitab statistical software, illustrates how the apartment rent data set would have been distributed if it were perfectly normal. The mean and median would both have been $815.83, and the distribution would have been symmetrical.

A useful graphic illustration of shape is the box and whisker plot, which helps illustrate the extent of skewness, or lack of skewness, in the data distribution. (Skewness will be discussed shortly.) A box and whisker plot is based on what is referred to as a *five-number summary*. The summary includes

1. The lowest value
2. *Q1*
3. The median
4. *Q3*
5. The highest value

The five-number summary for the sample apartment rent data is $600, $760, $825, $860, and $995. The corresponding box and whisker plot, along with the sample mean, is shown in Figure 14.2.

Skewness

The apartment rent data is not perfectly normal. Figure 14.2 shows that the sample data is skewed (i.e., concentrated more densely) to the left, both in terms

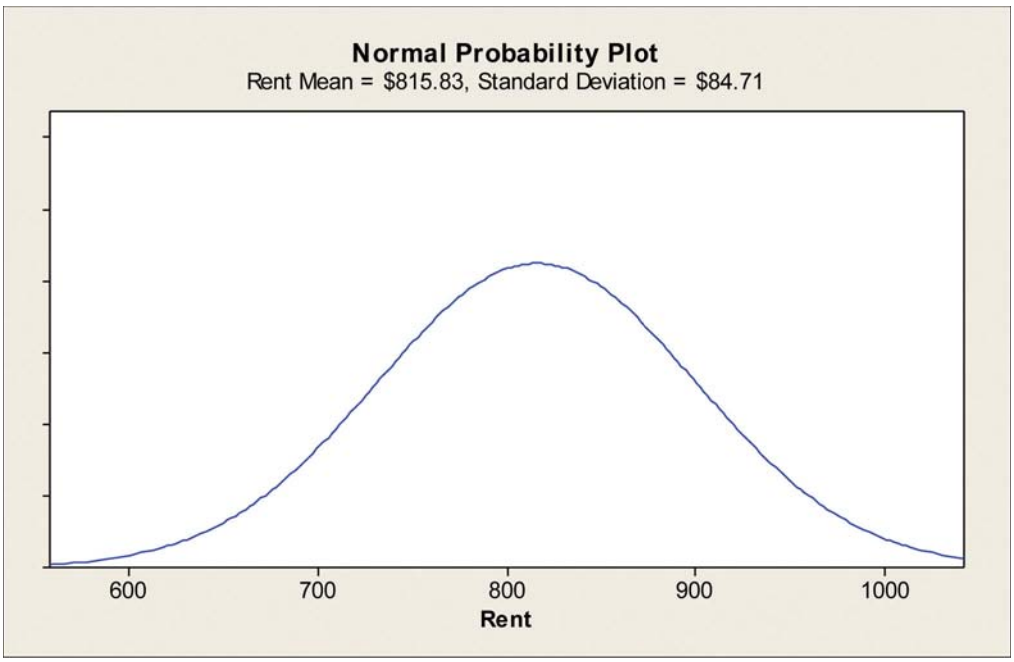
normal curve
A symmetrical, bell-shaped curve that represents the distribution of a population of certain types of measurements or the frequency distribution of all possible means in large samples that may have been drawn from an unknown population distribution. Also known as a *normal distribution* or *normal probability distribution*.

of the interquartile range ($825 – $760 > $860 – $825) and in terms of the tails ($760 – $600 > $995 – $860). Another indication of skewness is the relationship between the median and the mean. When data is left-skewed, the mean will be less than the median. When the data is right-skewed, the mean will be greater than the median. The mean is included in Figure 14.2 to further illustrate the degree of left skewness.

Skewness can also be captured through a graphic depiction of a frequency or percentage distribution. These graphic displays are called *histograms*. Figure 14.3 illustrates a combination frequency and percentage distribution for the apartment rent data and the related percentage histogram.

Measure	Calculation
skewness The degree of deviation from symmetry in a statistical distribution.	**Skewness** $Skewness = \frac{n}{(n-1)(n-2)} \Sigma \left(\frac{x_i - \bar{x}}{S}\right)^3$ where $\bar{x}$ = sample mean n = sample size S = sample standard deviation

Figure 14.1 The Normal Curve



The percentage histogram is derived from conversion of the *numerical* price data (monthly rent) to *categorical* data (rent category) reflecting percentages of the sample items within each class. If the rent data was symmetrical, the distributions to the right and left of center would be mirror images. Instead, the left side extends farther from the center (i.e., left skewness).

Figure 14.2 Box and Whisker Plot

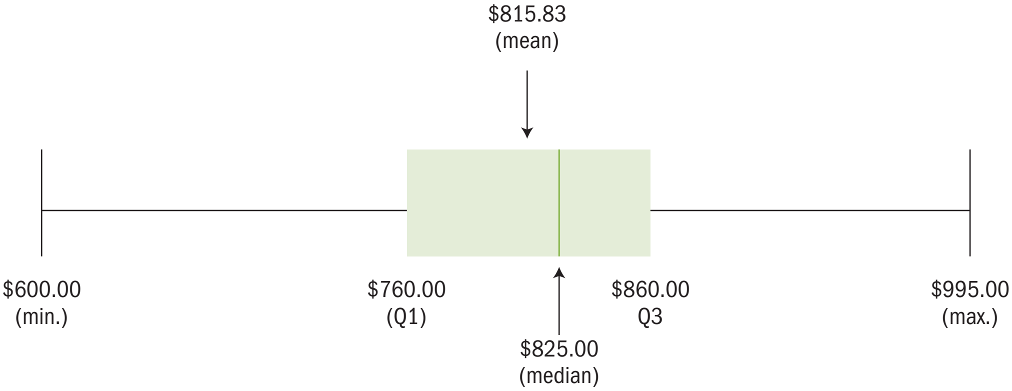
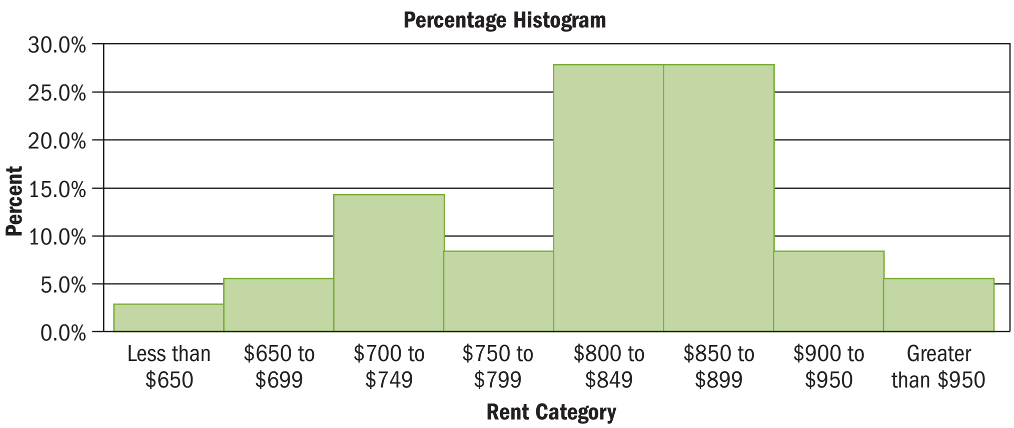


Figure 14.3 Frequency and Percentage Distributions with Percentage Histogram

Rent Category	Frequency (Count)	Percentage of Total
Less than $650	1	2.8%
$650 to $699	2	5.6%
$700 to $749	5	13.9%
$750 to $799	3	8.3%
$800 to $849	10	27.8%
$850 to $899	10	27.8%
$900 to $949	3	8.3%
$950 or more	2	5.6%

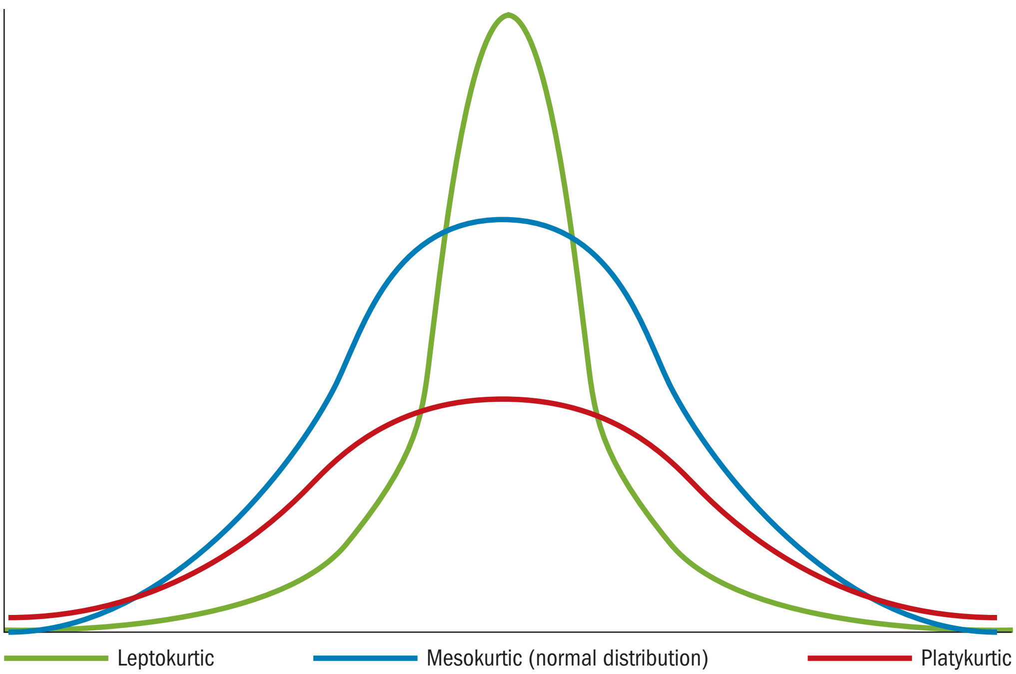


Spreadsheet programs and statistical software packages such as Excel, Minitab, and SPSS provide more quantitative assessments of skewness within their descriptive statistics measures. In the formula for calculating the measure of skewness, if a data distribution is symmetrical, the value in the parentheses following the summation sign is zero and the measure of skewness is zero. If the data distribution is left-skewed, the value in the parentheses following the summation sign is negative and the measure of skewness is negative. If it is right-skewed, the value in the parentheses following the summation sign is positive and the measure of skewness is positive. Skewness for the apartment rent data is -0.312, indicating left skewness as depicted in the box and whisker plot and the percentage histogram.

Kurtosis

The statistical term *kurtosis* refers to the degree of "peakedness" in a data distribution–that is, the height of the probability distribution and thickness of its tails. Curves with kurtosis of 3 are called *mesokurtic*. (Kurtosis values are most often calculated using Excel, Minitab, SPSS, or other statistical software. They are seldom calculated by hand.) The normal distribution has kurtosis equal to 3. More peaked curves (*leptokurtic*) have values larger than 3 and less peaked curves (*platykurtic*) have values less than 3. (See illustrations of various degrees of kurtosis in Figure 14.4.) The apartment rent data set is less peaked (kurtosis = 0.42) than a normal distribution.

Figure 14.4 Kurtosis

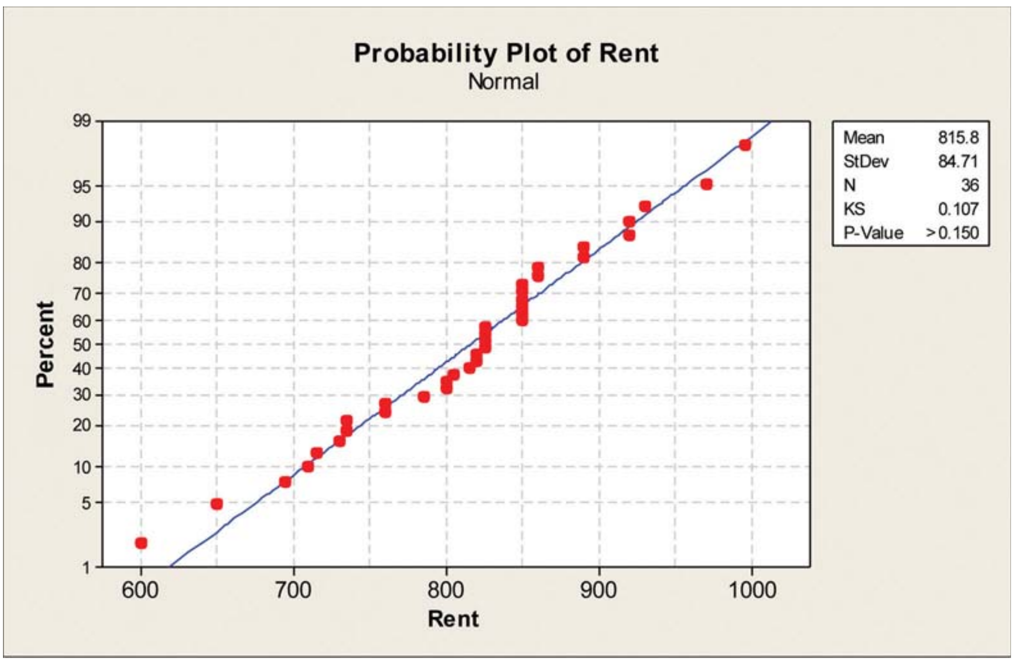


Normality

The apartment rent data appears to be approximately normal based on a menu of measures, including the proportions of observations lying within the mean plus or minus 1, 1.28, and 2 standard deviations and the number of standard deviations encompassed by the range and the interquartile range. However, as these statistics show, the fit to normality is seldom perfect. The rent data is slightly left-skewed and, as mentioned previously, the range is 4.66 standard deviations, slightly less than the normal expectation of 6 standard deviations.

Quantitative tests for normality and normal probability plots are useful for assessing the degree of departure from normality. Data points that are perfectly normal will line up along a straight-line normal probability plot, whereas data points that depart from normal will depart from a straight line that is representative of a perfectly normal distribution. The normal probability plot shown in Figure 14.5 confirms the prior assessment that the apartment rent data is not perfectly normal, but does provide a reasonably close fit. The normal probability plot was generated in Minitab, and the output includes other useful information such as the mean, the standard deviation, and the results of a Komolgorov-Smirnov test (KS test) for normality. The *p*-value from the KS test indicates that the hypothesis that the data was drawn from a normally distributed population cannot be rejected.

Figure 14.5 Normal Probability Plot of Rent



The *p*-value represents the probability of something occurring if the assumption underlying the analysis is true. For example, in this test the analyst asks, "If the population is normal, what is the probability of drawing a sample that departs from normal to the extent this one does?" The *p*-value of 15% indicates that the analyst could expect a sample derived from a normal population to depart from normal to the extent this one does 15% of the time. Generally speaking, a *p*-value of 5% or less would provide convincing evidence of a sample drawn from a non-normal population.[2]

To reiterate the importance of the measures of shape, these metrics are helpful in assessing the extent to which a data distribution conforms to the normal distribution and determining if extreme values are distorting the difference between the median and the mean. If the data distribution is too far from normal, then inferential tests based on assumptions of normality (e.g., *t*-tests and *F*-tests) may not be applicable to small samples. In addition, if extreme values in the data are distorting the arithmetic mean, then the median is likely to be a better indicator of central tendency.

Central Limit Theorem and Inference

Although the most popular and user-friendly inference tests are based on the assumption that a sample has been derived from a normally distributed population (i.e., the so-called "bell curve" with skewness = 0 and kurtosis = 3), normality-based inferences concerning non-normally distributed populations can be made if the sample size is large enough. The adequacy of the sample size depends on the underlying population distribution.

Generally speaking, the sampling distribution of a mean drawn from the population—regardless of the shape of the underlying population distribution—will be approximately normal with a sample size of at least 30, according to the central limit theorem. The *sampling distribution of the mean* refers to the distribution of the sample mean. Creation of a distribution of a sample mean entails taking numerous random samples from a given population, calculating the mean of each random sample, and then examining the distribution of those means.

central limit theorem
A statistical principle that identifies the tendency of the sampling distribution of the mean to become approximately normal as the size of the sample increases, without regard to the shape of the distribution of the underlying population.

When sampling from a nonsymmetrical population, a sample size of at least 30 is required to ensure approximate normality of the sampling distribution of the mean. If the underlying population is fairly symmetrical (like the apartment rent data), the sampling distribution of the mean will be approximately normal with a sample size of at least 15. If the underlying population is normally distributed, then the sampling distribution of the mean is also normal, regardless of

2. Minitab provides two additional normality tests (Anderson-Darling and Ryan-Joiner tests), which also fail to reject the normality hypothesis. Normality tests are also available in SPSS.

Measure	Calculation
confidence interval In statistics, a numerical range (interval) around a sample mean accompanied with a statement of how confident one is that the true population mean lies within the interval.	**Confidence Interval** Confidence interval on μ (σ unknown): $\bar{x} \pm t_{n-1} \frac{S}{\sqrt{n}}$ where $\bar{x}$ = sample mean n = sample size S = sample standard deviation t = Student's t distribution

sample size.[3] The central limit theorem's importance is that it allows inferences to be drawn without knowing the actual distribution of the underlying population.

The apartment rent data sample consists of 36 observations. It can be used to make inferences about the mean of the underlying population rent because the size of the sample meets the criteria of the central limit theorem. The rent data has been drawn from a population with an unknown mean and standard deviation. Population standard deviation is rarely known when making inferences about the true population mean because μ must be known in order to calculate σ. Logically, if μ is known, then there is no need to infer it. However, in rare cases a population has been studied so many times that many estimates on S have been previously published, and they can be relied upon as estimators of σ rather than using S from a sample.

The sample data can be used to infer the underlying population mean because a probability sample (e.g., a simple random sample) was drawn. The sample mean ($\bar{x}$) is \$815.83 and the sample standard deviation (S) is \$84.71.

A confidence interval reflects the degree of uncertainty associated with an inference. It is a range accompanied with a statement of probability or confidence that the range contains the parameter being estimated. *Any inference should be accompanied by this type of statement.* The confidence interval for the mean, when the population standard deviation is unknown, can be derived from the Student's t distribution when the sample size is sufficient to invoke the central limit theorem or when the population is known to be normally distributed. When $n = 36$, values of t_{35} are 1.6896 for a 90% confidence interval, 2.0301 for a 95% confidence interval, and 2.7238 for a 99% confidence interval.

3. See David M. Levine, Timothy C. Krehbiel, and Mark L. Berenson, *Business Statistics: A First Course*, 3rd ed. (Upper Saddle River, N.J.: Prentice Hall, 2003), 237-239.

These t values can either be looked up in a statistical table or calculated using statistical software. Excel, Minitab, and SPSS will calculate a confidence interval from a data set, given input on the level of confidence sought. The associated confidence intervals on the true population mean price for the apartment rent data are

90% confidence	$\$791.98 \le \mu \le \$839.68$
95% confidence	$\$787.17 \le \mu \le \$844.49$
99% confidence	$\$777.37 \le \mu \le \$854.29$

With 90% confidence, the degree of uncertainty concerning the value of the true mean is 10%. Uncertainty reduces to 5% and 1% as confidence rises, but the associated "cost of less uncertainty" is a wider confidence interval. The level of uncertainty is referred to as "alpha" (α) in statistics, and the confidence level is $1 - \alpha$. Alpha is the probability of making a "Type I Error"–inferring μ to be within a confidence interval when it is not. "Type II Errors" are referred to as "beta" (β)–inferring μ to be outside of the confidence interval when it is actually within the interval.

Sample Size

Suppose a client requires a narrower confidence interval without increasing α. Notice that the width of the confidence interval is reduced when n is increased due to division by the square root of n. In addition, the value of t becomes smaller at a given confidence level as sample size increases. As a result, narrower confidence intervals can be achieved by collecting a larger sample.

A requisite sample size can be estimated to accommodate a predetermined amount of sampling error (e). The equation for sample size is

$$n = \frac{Z^2 \sigma^2}{e^2}$$

The standard normal distribution Z is used in this calculation because the value of t cannot be determined until a sample size has been selected. Consequently, this calculation yields an approximate sample size. Furthermore, it is not unusual for some proportion of collected data to be unusable due to missing variables or "nonresponse." It is good practice to attempt to collect a sample that is comfortably larger than indicated by the sample size calculation. As calculated here, sample size is an estimate of the number of usable observations needed to control the size of sampling error at a given level of confidence.

The sampling error from the 36-unit rent sample for the 95% confidence interval on true mean monthly apartment rent is \$28.66 [(\$844.49 – \$787.17) ÷ 2]. Suppose, however, that the needs of the client dictate that a sampling error no larger than \$15 is acceptable at a 95% confidence level. In order to calculate a revised sample size, Z is derived from the standard normal distribution and is equal to 1.96 at a 95% confidence level. The population standard deviation (σ) is unknown but can be estimated as \$84.71 based on the previous calculation of S. (The population standard deviation is usually unknown and must be estimated based on prior research, a pilot sample, or other bases used to support an assumption.) On this basis, the sample size would have to be increased to at least 123 observations, computed as follows:

$$n = \frac{1.96^2 \times 84.71^2}{15^2} = 122.5$$

Sample size is always rounded up. Furthermore, because t_{122} is approximately 1.9799, the sample size could be increased to 126 based on the difference between the standard normal Z and t_{122}, as follows:

$$123 \times \frac{1.9799^2}{1.96^2} = 125.5$$

As this example demonstrates, increased inference precision can add to the expense of data collection. Here an approximately 48% reduction in sampling error from \$28.66 to \$15 results in a need to increase sample size by almost 250%. Obviously, mean apartment rent could be known with certainty by analyzing a census of all apartments in a market. In many cases, however, it simply is not possible or is too costly to collect data on each item in a population.

Regression Analysis

Regression analysis is a statistical technique in which a mathematical equation can be derived to quantify the relationship between a dependent (outcome) variable and one or more independent (input) variables. In appraisal, the dependent variable is usually price or rent. The independent variables are usually broadly derived from the four forces that affect value (social, economic, governmental, and environmental) and the physical characteristics of the land and improvements. Often, data collection protocols control for the four forces that affect value by focusing on property sales or rents that are subject to common social, economic, governmental, and environmental influences. The relevant physical characteristics of comparable property data (site and improvement information) should be included as independent variables, unless all of the comparable properties and the subject property are identical in some physical aspect (e.g., all are stucco, all have two-car attached garages, or all are located on interior lots of identical size). In some instances it is also necessary to include a date of sale variable (or variable set) to account for economic change over time. In addition, it is not uncommon to include an environmental variable or variables when investigating the effects of an external environmental factor such as traffic noise or factory odor.

Regression models have been used for mass appraisal by property tax assessors for many years, especially in highly developed residential markets, because regression modeling is more resource-efficient than

regression analysis
A statistical method that examines the relationship between one or more independent variables and a dependent variable. Regression models can be used to examine the structure of a relationship or to forecast dependent variable values. Simple linear regression has one independent variable, whereas multiple linear regression includes more than one independent variable.

performing a traditional appraisal for each property in a large assessment district with an active real property market. Regression modeling is often the logical choice for tax assessment, when the alternative is to appraise each property individually and resource constraints prohibit doing so as often as would be necessary to ensure equitable taxation.

Regression models (along with expert systems and neural networks, which are discussed briefly below) also form the basis for many automated valuation models (AVMs), of which mass appraisal models are a subset. AVMs initially became important in the 1990s as residential lenders began to concentrate on shortening loan approval turnaround time to compete more intensely on transaction fees.

Statistical Applications in Appraisal Practice

The widespread use of personal computers, spreadsheet programs, and statistical software has allowed appraisers to incorporate statistics into their analyses and appraisal reports easily and accurately. In the early years of personal computing for business, statistical analysis was generally limited to providing descriptive statistics and accompanying charts, tables, and graphs. As graphical user interfaces became more prevalent in operating systems, statistical programs such as SPSS, Minitab, and SAS became more user-friendly, largely because the user no longer had to write programming code.

As computer users have become more sophisticated, spreadsheet programs have added statistical tools to meet the needs of customers. Currently, Microsoft Excel includes a statistical tool pack that will generate statistical output such as correlation matrices, F-tests of variances, t-tests of means, and linear regression models. However, Excel provides very little in the way of diagnostics to accompany its inferential tools. Excel's statistical strength continues to be in its charting capabilities.

Automated Valuation Models

The automated valuation models used by appraisers today originated with the tax assessment mass appraisal techniques and tools that existed long before the advent of AVMs. Property tax assessors developed mass appraisal models to improve productivity and fairness in non-rural locations where manpower was insufficient to carry out the function of estimating assessed value. In addition, in the early years of mass appraisal, tax assessors were in a unique position to take advantage of large amounts of data that had been converted into a computer-readable format. Assessors continue to use AVMs as a means of automating assessment and making use of the large amounts of digitally coded data they possess. Internet access to more reliable data from taxing authorities and third-party data sources has enabled most appraisers to access the large data resources required for statistical analyses.

automated valuation model (AVM)
Computer software that queries property and market data, analyzes comparable property and market information to assign a value or range of values to a particular property, or generates metrics applicable to assessing the credibility of valuation-related statements or conclusions.

The initial research on AVMs pitted neural networks and expert systems against regression-based models. In essence, neural networks "learn" the relationships among variables to develop and continually update an internal and unknowable algorithm for estimating price. Neural networks can be considered "atheoretical" in that their algorithms can only be tested by comparing estimation results to a known standard. Because of their "black box" decision model, neural networks have not developed a large practical following. Professional standards do not require that appraisers know or be able to explain an AVM's algorithm, but appraisers should be able to explain the overall estimation process and verify that the AVM consistently produces results that accurately reflect market behavior.[4] Unlike neural networks, expert systems develop decision models that attempt to mimic expert (i.e., appraiser) behavior. They essentially automate the human problem-solving process. For example, some AVMs employ an expert systems layer for such tasks as selecting comparable sales or comparable rents.

Regression-based AVMs apply multiple regression models at some level within the valuation product to produce a value-estimation equation, a value estimate, adjustment coefficients for automatically selected comparable sales or rents, or some combination of these outputs. Many AVMs now include other features that enable appraisers, appraisal reviewers, and underwriters to produce and review descriptive statistics by user-defined property characteristics, market area, subdivision, zip code, city, or county. These features provide scales of reasonableness against which the contentions, assumptions, and conclusions of appraisers can be measured. In addition to this quality control function, AVMs also enhance a lender's ability to prequalify borrowers, conduct audits, mitigate loss, assess portfolios of loans, provide home equity loans, and engage in numerous other functions.

Although AVMs were initially perceived as a means of replacing human appraisers with machines, they have developed more recently into underwriting devices and tools designed to assist appraisers and appraisal reviewers. Professional standards note that "the output of an

Professional Standards and the Use of an AVM

According to Advisory Opinion 18 of the Uniform Standards of Professional Appraisal Practice: Use of an Automated Valuation Model (AVM), an appraiser should be able to answer affirmatively to the following questions before deciding to use an AVM in an appraisal or appraisal review assignment:

1. Does the appraiser have a basic understanding of how the AVM works?
2. Can the appraiser use the AVM properly?
3. Are the AVM and the data it uses appropriate given the intended use of assignment results?
4. Is the AVM output credible?
5. Is the AVM output sufficiently reliable for use in the assignment?

4. See Advisory Opinion 18 of the Uniform Standards of Professional Appraisal Practice: Use of an Automated Valuation Model (AVM).

AVM is not, by itself, an appraisal."[5] According to the Uniform Standards of Professional Appraisal Practice, the output of an AVM may be used as a basis for opinions and conclusions in an appraisal or appraisal review assignment if the appraiser believes that the output is credible for use in a specific assignment. Today, practicing real estate appraisers are working to gain an understanding of AVM technology and shifting markets for appraisal services to determine how best to take advantage of new business opportunities resulting from AVMs.

Currently a variety of AVM products are offered nationally, and new products emerge constantly. As the lending industry works through issues and problems related to data reporting, data transfer, data accuracy, and modeling, AVM standards are continually being refined by professional organizations such as the Joint Industry Task Force on Automated Valuation Models, the Real Estate Information Providers Association, the Mortgage Bankers Association, the Mortgage Industry Standards Maintenance Organization, and others.

Custom valuation models represent another opportunity for appraisers to incorporate statistical applications into their practices. Given access to adequate amounts of data, which are generally more readily available in single-unit residential and rental apartment markets than in most commercial markets, appraisers with adequate statistical modeling skills and appropriate software can apply statistical models to customized, unique valuation questions. Applications vary widely and include

- property tax assessment and equity studies
- price or rent trend analysis
- augmentation of traditional valuation approaches
- impact studies addressing the effects of nuisances or environmental hazards
- preparation of value estimates for litigation

Some custom applications are straightforward and easily modeled, and others are complex and difficult to model. Production of a credible work product is of paramount importance. Appraisers should not attempt to build a statistical model that is beyond the limits of their education and experience. As with any appraisal specialty, the ability to address complex statistical problems grows with experience. Experience is best gained by collaboration with a more qualified statistical analyst and participation in continuing education to build skill sets.

5. Ibid.

Market Analysis

The term *market analysis* is used broadly in economics to describe the identification and study of the market for a particular economic good or service, but it has more specific meaning within the discipline of real property appraisal. For appraisers, market analysis is a process for the examination of the demand for, and supply of, a property type and the geographic market area for that property type.

Appraisers generally apply market analysis at two levels:

1. From the perspective of a broad market
2. From the perspective of the market in which a given property competes

Although there is a logical continuum from the general to the specific, market analysis applied to a specific property is of particular importance in the valuation process and should not be confused with general market analysis or related studies. (When a specific property is not the focus of the study, the term *market study* is normally employed. For a specific property, the term applied is *marketability study*.) Market analysis may take the form of either *inferred analysis* or *fundamental analysis*, depending on the intended use of the appraisal, the property type, and market conditions. Although the process is commonly referred to as *market analysis*, all appraisals must include what is more precisely labeled a *marketability study*. A marketability study includes a critique of the subject property, a study of the economic environment in which it is

market analysis

A process for examining the demand for and supply of a property type and the geographic market area for that property type.

market study

A macroeconomic analysis that examines the general market conditions of supply, demand, and pricing or the demographics of demand for a specific area or property type.

marketability study

A microeconomic study that examines the marketability of a given property or class of properties, usually focusing on the market segment (or segments) in which the property is likely to generate demand.

and will be functioning, and an estimate of the subject property's proportional capture of market demand.

In the appraisal of a specific property, the purpose of market analysis is to show how the interaction of supply and demand affects the property's value. For example, if current market conditions do not indicate adequate demand for a proposed development, market analysis may identify the point in time when there will be adequate demand for the project. Thus, market analysis helps an appraiser forecast the timing of a proposed improvement and the amount of demand anticipated in a particular period of time. The marketability study helps the appraiser forecast how much of the demand the subject property will capture (e.g., future absorption and operations outlook for future occupancy and rents).

Market analysis also provides a basis for determining the highest and best use of a property. In short, the market determines the use, and the use affects the value. An existing or proposed improvement under a specified use may be put to the test of maximum productivity in highest and best use analysis only after it has been demonstrated that an appropriate level of market support exists for that use. In-depth market analyses go much further in specifying the character of that support. The studies may determine key marketing strategies for an existing or proposed property, address the design characteristics of a proposed development, provide estimates of the share of the market the property is likely to capture and its probable absorption rate, or suggest alternative uses in a market in which the existing use of a specific property is oversupplied.

To measure the market support for a specified property use, the analyst must identify the relationship between demand and competitive supply in the subject real estate market, both at the present time and in the future. This relationship serves as an indication of the state of the present market and the conditions likely to characterize the market over the forecast period. Real estate markets are typically in a state of disequilibrium created by market actions, e.g., there is natural lag in meeting demand and reaching a point of equilibrium because of the time that elapses between identifying a need and developing new buildings. The complex interim steps in the real estate development process required for land use approval, design, financing, and construction tend to make real estate markets less efficient than the markets for commodities that are less time-, labor-, and capital-intensive to produce.

The market value of a property use is largely determined by its competitive position in its market. Familiarity with the characteristics and attributes of the subject property (generally called *property productivity analysis*) enhances the appraiser's ability to identify competitive properties (supply) and to understand the comparative advantages and disadvantages that the subject offers potential buyers or renters (demand). An understanding of economic conditions, their effect on real estate markets, and the momentum of these markets helps an appraiser appreciate the externalities affecting a property. In its broadest sense, therefore, market analysis provides vital information needed to apply the three approaches to value, as shown in Table 15.1.

In addition to its use in the application of the approaches to value, market analysis is relevant to the final reconciliation of the value indications of the various approaches applied in an assignment. Market analysis helps appraisers determine the appropriateness and the accuracy of judgments made in the rest of the valuation analysis and establishes confidence in the final value opinion.

Analyses of real estate markets can be elaborate undertakings, particularly if a large amount of primary research is required. Most market analysis assignments can be performed using a six-step process, which is illustrated in Figure 15.1. For proposed properties, a seventh step can be added to perform financial feasibility analysis of alterna-

Table 15.1 Market Analysis in the Approaches to Value

Approach to Value	Uses of Market Analysis
Cost	Market analysis provides an appraiser with information about current building costs and market conditions. This information helps the appraiser estimate the profit an entrepreneur will expect and any economic advantage or obsolescence that may have affected the property since its construction.
Sales comparison	Market analysis helps an appraiser identify competitive properties and determine their exact degree of comparability with the subject. With a thorough understanding of current market conditions gained through market analysis, an appraiser can adjust the sale prices of comparable properties for changes in market conditions that may have occurred since the sales occurred and support an adjustment for the economic characteristics of comparable properties.
Income capitalization	In the market analysis process, an appraiser collects data on vacancy and absorption rates, market rents, current and anticipated rates of return, and the competitive position of the subject property in its specific market. In the income capitalization approach, this information is used to determine the anticipated lease-up or sell-out rate for the subject property, the share of the market that the subject is likely to capture, the future income stream it is likely to enjoy, and an appropriate discount rate or capitalization rate to apply to the income stream projection or annualized income expectancy. Market analysis also helps appraisers forecast supply and demand and stabilized revenue, i.e., develop a revenue forecast for the subject.

Figure 15.1 Six-Step Market Analysis Process

Step 1.	Define the product (property productivity analysis)
Step 2.	Market (market area and competitive area) delineation
Step 3.	Demand analysis
Step 4.	Supply analysis (survey and forecast of competition)
Step 5.	Analyze the interaction of supply and demand
Step 6.	Forecast subject capture (market penetration concepts)

tive uses and threshold testing, often using the breakeven point of the investment as the threshold.

In property productivity analysis (Step 1), an appraiser identifies which features of the subject property shape its productive capabilities and the potential uses of the property. Those attributes can be physical, legal, or locational, and they will be the basis for the selection of comparable properties as well as shape conclusions about the capture of forecast marginal demand.

In the second step, an appraiser considers the potential uses of the subject property and identifies a market for the defined use (or more than one market if the property has alternative uses). A procedure known as *economic base analysis* is the foundation of this analysis of existing and anticipated market demand.

In Step 3, an appraiser studies population and employment data to analyze and forecast demand. The scope of work required by the assignment (as well as time and budgetary constraints) will dictate to what extent demand-side variables must be investigated. Consideration of the scope, intended use, and credible results are required regardless of the time frame.

In Step 4, an appraiser analyzes the existing and anticipated supply of the property type under investigation. In Step 5, an appraiser investigates the interaction of supply and demand to determine if demand exists and then makes predictions as to when the market will move out of equilibrium.

Finally, in Step 6, by comparing the productive attributes of the subject property to those of competitive properties, an appraiser can judge the market share the subject property is likely to capture given market conditions, demand, and competitive supply.

Foundations of Market Analysis for Real Estate

The discipline of market analysis for real estate has been built on the basic concepts of valuation and the long tradition of economic analysis of market supply and demand. The integral processes of delineating a market, assessing demand for a product, surveying the competitive supply, studying the interplay of supply and demand, and tracking market trends serve as the underpinnings of the formal six-step process of market analysis.

Market Definition and Delineation

At the outset of the market analysis process, an appraiser must clearly identify two things:

1. The real estate product
2. The real estate market in which the subject property competes

These two tasks can be complementary. The identification and analysis of the real estate product provide a portion of the information needed in the next step–identifying the market area in which the property competes.

In property productivity analysis, an appraiser identifies the relevant characteristics of the appraised property and further analyzes the physical, legal, and locational characteristics that affect the property's ability to compete for demand in the defined market area. Analyzing the characteristics and attributes of the real estate product helps an appraiser identify competitive properties that constitute the applicable market. Defining the real estate market for the subject property clearly enhances an appraiser's understanding of how externalities affect the subject. Through market analysis, an appraiser breaks down a specific real estate market into market segments (i.e., the market participants) and separates the properties by characteristics (e.g., class of property, location).

Demand

In its broadest sense, *demand* serves as a measure of the needs, material desires, and purchasing power of consumers. In market analysis for real estate, demand analysis focuses on identifying the potential users of a subject property–i.e., the buyers, renters, clientele, or customers it will attract. For each particular type of property, demand analysis focuses on the end product or service that the real estate provides. For example, a demand analysis for retail space would attempt to determine the demand for retail services generated by potential customers in the market area. A demand analysis for office space would attempt to identify businesses in the area that occupy office space and their space or staffing needs. (Table 15.2 illustrates the important factors in demand analysis for various property types.)

Employment is the primary predictor of real estate demand for all property types because changes in employment start a chain reaction, as shown in Figure 15.2. Employment growth leads to growth in demand for office and industrial space, which in turn leads to an increase in demand for housing (especially in close proximity to the new office and industrial space). And the growth in housing leads to growth in demand for retail space close to the housing.

Figure 15.2 Real Estate Demand Hierarchy

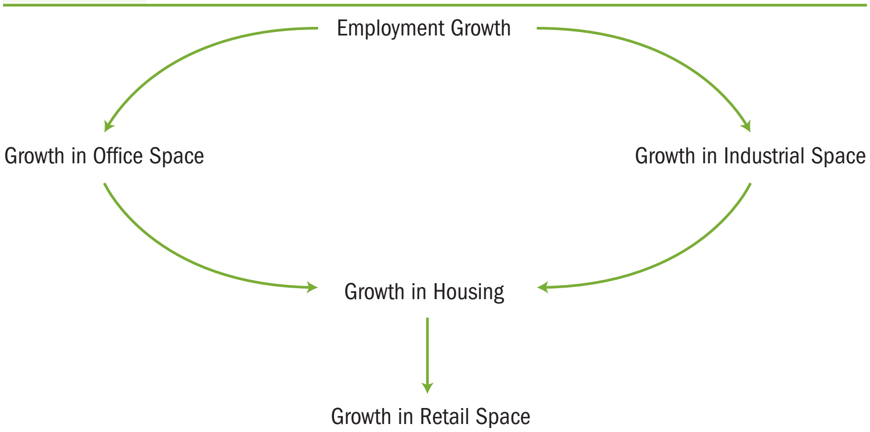


Table 15.2 Demand-Side Factors

Residential Market	· Population of the market area—size and number of households, rate of increase or decrease in household formation, composition, and age distribution · Income (mean or median per household and per capita) · Employment types and unemployment rate · Percentage of owners and renters · Financial considerations such as savings levels and lending requirements (e.g., interest rates on mortgages, points charged, loan-to-value ratios) · Land use patterns and directions of city and area growth and development · Factors affecting the physical appeal of the neighborhood, e.g., geography and geology (climate, topography, drainage, bedrock, and natural or man-made barriers) · Local tax structure and administration, assessed values, taxes, and special assessments · Availability of support facilities and community services (cultural institutions, educational facilities, health and medical facilities, fire and police protection, access to technology) · Externalities (noise, odors, etc.)
Retail Market	· Population of trade areas—size and number of households, rate of increase or decrease in household formation, composition and age distribution of households · Per capita and household income (mean and median) · Percentage of household income spent on all retail purchases and percentage of disposable income (effective purchasing power) spent on various specific retail categories · Rate of sales retention in the trade area · Required volume of sales for a retail facility to operate profitably and existing sales volume per square foot · Retail vacancy rate and trends in the market · Percentage of retail purchases captured from outside the trade area · Land use patterns and directions of city growth and development · Accessibility (transportation facilities and highway systems) and cost of transportation · Factors that affect the appeal of the retail center (image, quality of goods, and tenant reputation)
Office Market	· Area employers who use office space; current and estimated future staffing needs · Average square foot area of office space required by an office worker—requirements vary according to the category of work, the rank of the office worker, and the location of the office (in the suburbs or the central business district) · Vacancy rate for the specific class of office building · Move-up demand for space in Class A and Class B buildings or fall-out demand for space in Class B and Class C buildings · Land use patterns and directions of city growth and development · Accessibility (transportation facilities and highway systems) and cost of transportation · Factors that affect the appeal of the office building (quality of construction, management, and mix of tenants) and the availability of support facilities (shops, restaurants, recreational centers)
Industrial Market	· Presence of raw materials · Exchange capability (currency values and trade barriers) · Area employers who use industrial space; current and estimated availability of skilled and unskilled labor · Land use patterns and directions of city growth and development · Accessibility (transportation facilities and highway systems) and cost of transportation · Employment in manufacturing, wholesale, retail, transportation, communications, or public utilities · National and regional economic growth that affects local demand · Retail sales (applicable in market analysis for retail storage and wholesale distribution properties) · Cargo flows by transport type (e.g., truck, rail, water, air) and product type (e.g., high or low bulk)

Demand analyses for residential and retail markets specifically investigate the households in the subject's market area. (A *household* is defined as a number of related or unrelated people who live in one housing unit. Thus, a single individual may constitute a household.) In addition to the number of households in the market area, these analyses focus on the disposable income, or effective purchasing power, of the households and the ages, gender, preferences, and behavioral patterns of household members.

Competitive Supply

In the context of market analysis for real estate, *supply* refers to the production and availability of the real estate product. To analyze supply, an appraiser can compile an inventory of properties that compete directly with the subject property, including known future competition and even unknown, but likely, future competition. Competitive properties include the stock of existing units, units under construction that will enter the market, and projects in planning.

Appraisers should exercise care in developing and analyzing data on proposed or announced projects because some will not ultimately be constructed. Appraisers should also determine the number of units lost to demolition and the number added or removed through conversion. Data on supply in a market may be gathered in various ways:

- field inspection
- review of building permits (issued and acted upon), plat maps, and surveys of competitive sites
- interviews with developers and city planners

Figure 15.3 lists some factors appraisers study in analyzing the supply of competing properties.

Vacancy rates are an extremely important tool for predicting future trends, particularly for short-term forecasts. Many real estate economists and other professionals consider vacancy rates to be a leading indicator.

Figure 15.3 Supply-Side Factors

- Quantity and quality of available competition (standing stock)
- Volume of new construction (competitive and complementary)—projects in planning and under construction
- Availability and price of vacant land
- Availability of construction loans and financing
- Costs of construction and development
- Currently offered properties (existing and newly built)
- Owner occupancy versus tenant occupancy
- Causes and number of vacancies
- Conversions to alternative uses
- Special economic conditions and circumstances
- Effect of building codes, zoning ordinances, and other regulations on construction volume and cost

market equilibrium
The theoretical balance where the demand for and supply of a property, good, or service are equal. Over the long run, most markets move toward equilibrium, but a balance is seldom achieved for any significant period of time.

market disequilibrium
A general characteristic of real estate markets over the short term in which the supply of and demand for real estate are out of balance.

active market
A market characterized by numerous transactions.

depressed market
A market in which a drop in demand is accompanied by a relative oversupply and a decline in prices.

buyer's market
A market in which buyers have the advantage; exists when market prices are relatively low due to an oversupply of property or reduced buyer demand.

seller's market
An active market in which the sellers of available properties can obtain higher prices than those obtainable in the immediately preceding period; a market in which a few available properties are demanded at prevailing prices by many users and potential users.

weak market
A market characterized by low demand and declining price levels; also called a *soft market*.

Market Equilibrium

Over the short term, the supply of real estate is relatively fixed and prices are responsive to demand. If demand is unusually high, prices and rents will start to rise before new construction can begin. The completion of a building may lag considerably behind the shift in demand. Thus, disequilibrium generally characterizes real estate markets over the short term.

Theoretically, the supply of and demand for real estate move toward equilibrium over the long term. However, this point of equilibrium is seldom achieved or maintained. In some real estate markets, such as those characterized by a very specialized economy, supply responds slowly to changes in demand. Even when an excess in the quantity of real estate units offered for sale becomes apparent, projects currently under construction generally have to be completed. More stock will continue to be added to the existing surplus, causing greater disequilibrium. A decline in demand may also occur while new real estate units are being constructed, further exacerbating the oversupply.

Trends in Market Activity

Appraisers and market participants describe the activity of real estate markets in a variety of ways. An *active market* is primarily characterized by numerous transactions. Market observers might see growing demand, a corresponding lag in supply, and an increase in prices. An active market is also referred to as a *seller's market* because the sellers of available properties can obtain higher prices. A *depressed market* is a market in which a drop in demand is accompanied by a relative oversupply and a decline in prices. A depressed market is also referred to as a *buyer's market* because buyers have the advantage.

Descriptive terms applied to markets are subject to interpretation. For example, markets are sometimes characterized as *strong* or *weak*. Strong markets may reflect either high demand and increasing price levels or a large volume of transactions. Weak, or *soft*, markets may be identified by low demand, declining price levels, or a reduced volume of transactions. Other loosely defined terms include *broad* and *narrow markets*, *loose* and *tight markets*, and *balanced* and *unbalanced markets*.

All markets cannot be described with simple characterizations. Sometimes supply and demand do not act as expected. For example, supply may fail to respond to increasing demand because the rate of demolition or change of use exceeds the rate of new construction. In this case, prices will continue to rise.

As shown in Chapter 10, the activity of the real estate market is cyclical. Like the business cycle, the real estate cycle is characterized by successive periods of expansion, decline, recession, and recovery. The real estate cycle is, however, not necessarily synchronized with the business cycle. Real estate activity responds to both long-term and short-term stimuli. The long-term cycle is a function of changes in the characteristics of existing employment, population, and income and shifts in consumer preferences. The short-term cycle is largely a function of the availability of credit and the condition of the overall economy.

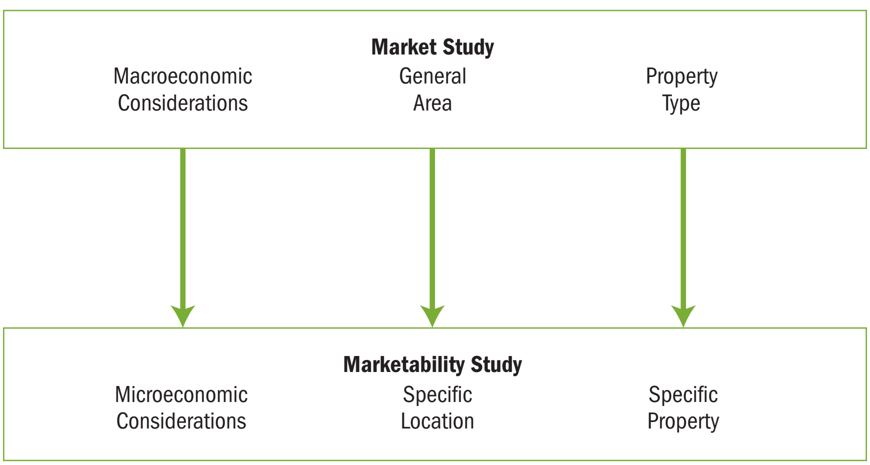
Types and Levels of Market Analysis

Specific market analysis techniques can be characterized by the depth of the analysis and by the way demand is measured. Distinctions can be made between different types of market analysis (market studies and marketability studies) and different levels of market analysis (inferred analysis and fundamental analysis). Performing market analysis requires appraisers to combine those perspectives and determine the appropriate type and level of analysis to adequately support the results of the appraisal.

Market Studies and Marketability Studies

A market analysis can focus on general market information about a property type or a defined area, or it can focus on a specific property in a defined area. Figure 15.4 illustrates the distinctions between and relationship of market studies and marketability studies based on the depth of the market analysis required by the appraisal assignment.

Figure 15.4 Market Studies and Marketability Studies



Every market analysis begins with a market study of the broad, or macroeconomic, influences on a subject property. A market study always precedes a marketability study, which uses the data gathered in the market study of a property type in the general market area. The marketability study adds to the market study data and focuses the study on a specific property in a specific market area.

A macroeconomic market study provides a broad picture of supply and demand conditions for a specific property type (e.g., residential units, retail space, office space, industrial plant, agricultural operation), for a specific area, or for both. In a market study, the appraiser does not focus on a specific property, so for most valuation assignments a more detailed marketability study is necessary. In fact, all appraisal assignments that involve the development of an opinion of the market value of a specific property must include a marketability study.

In a marketability study, the appraiser investigates how a particular property will be absorbed, sold, or leased under current or anticipated market conditions by analyzing the fundamental forces of demand–income, population, and employment. A market study, or analysis of the general class of property, should precede a marketability study. In contrast to market studies, a marketability study is property-specific. It should identify the characteristics of the subject's market and quantify their effect on the value of the property.

A marketability study is based on analysis of the four factors that create value–utility, scarcity, desire, and effective purchasing power. The interaction of these four factors will determine the marketability of a property.

The development of a property usually entails both a construction (conversion or renovation) phase and a marketing phase. The marketability study for a property in development should describe the supply and demand situation under current market conditions (for the estimate of value as is) as well as the demand and supply situation over the planned construction period (for the value upon completion) and the marketing period (for the estimate of value upon stabilization). In other words, a marketability study for such a property focuses on each point on the development timeline for which a value opinion needs to be developed.

A marketability study can also be used to analyze an existing property. Appraisers regularly forecast income and occupancy, e.g., whether the market expects the subject property to maintain or lose tenants and how much rent the owners can expect in the future. In regard to vacant land, appraisers often need to forecast the timing for use in order to select and adjust comparables. This too is a marketability study. The demand and supply analysis must investigate market conditions, both current and future, to determine the absorption rate and other factors that will affect value during the marketing period. (Figure 15.5 lists the sort of questions that should be answered in a marketability study.)

If a marketability study prepared by another party is being used in a valuation, the appraiser must recognize that this study represents secondary data. The appraiser should carefully review the study to determine its validity and whether it can be used.

Figure 15.5 Questions a Marketability Study Should Answer

- Who will the end users be—i.e., buyers or tenants?
- What are the characteristics of the expected end users (e.g., for residential property—age, family size, space needs, and preferences as to facilities and amenities)?
- Does the utility of the improvements, whether proposed or existing, satisfy the requirements of the intended market?
- What is the demand for the proposed or existing property that is to be marketed?
- How many end users would want the property (desire)?
- How many potential users can afford it (effective purchasing power)?
- What share of demand is the property likely to capture (capture rate)?
- What is the supply of competitive properties that will be marketed?
- How many competitive units currently exist?
- How many competitive units are under construction?
- How many competitive units are planned?
- What is the estimated absorption rate for the proposed property to be marketed?
- If already developed, what is the direction of future rent change and what occupancy is expected?
- Are there alternative uses for the property that would provide a higher return on the investment?
- What are the relative risks associated with the alternative uses?

An appraiser must be careful not to misinterpret data or use historical data as an absolute prediction of the future. For example, the absorption rate experienced by competitive projects is sometimes incorrectly assumed to indicate the absorption rate for the subject property when that rate may actually be an indication of demand for the entire market area. Consider an appraiser who is analyzing a proposed residential subdivision and finds three competitive subdivisions in the subject property's market area. Over the past year, these subdivisions have had average sales rates of three lots per month, five lots per month, and seven lots per month. Simply using the average sales rate for the three competitive subdivisions of five lots per month as the estimated absorption rate for the subject property would most likely be incorrect. The total lot sales for the three competitive subdivisions can, however, be used as an indication of the total historical demand for similarly developed residential lots in the subject's market area—i.e., 15 lots per month could be the implied demand for this type of real estate product. In this situation, the appraiser could study additional market factors, including growth patterns and the development of new competitive subdivisions, to gather more support for the estimate of total demand over the subject's marketing period.

In this marketability study, the subject property's marketing period can be determined by analyzing the supply of competitive residential subdivision lots in the market area, including the subject property and all other proposed and existing subdivisions. Consider these additional facts:

- The appraiser expects the three existing subdivisions mentioned above to continue to sell off lots during the subject's marketing period.

- Another proposed subdivision will be added to the competition in the subject's market during this period.
- Total demand is 15 lots per month.

Thus, the average absorption rate for the five subdivisions will be three lots per month. The appraiser can then determine whether the subject property's absorption rate will be the same as, higher than, or lower than the average rate. The reasoning for the rate chosen should be explained in the appraiser's conclusion.

Inferred Analysis and Fundamental Analysis

As mentioned earlier, the manner in which demand is analyzed is an additional way to characterize a market analysis assignment. Estimates of demand are formulated differently depending on the level of analysis required by the appraisal problem. In some cases, demand may simply be *inferred* from current and historical market conditions. To perform an in-depth analysis of forecast (*fundamental*) demand, an appraiser must gather and segment extensive data and apply sound judgment to make projections.

Inferred analysis, which is sometimes called *trend analysis*, is descriptive and relies on historical data and inferential statistics to support future projections. The focus of the analysis can be general, with selected comparable properties representing the larger market, or more specific and include area-wide market data and subject-specific conclusions. Whether inferred analysis is a market study or a property-specific marketability study, the demand analysis rests on the expectation that future trends will replicate historical and current trends.

In the analysis of fundamental demand, an appraiser identifies the present demand and forecasts future demand based on a segmentation of broad demographic and economic data to analyze the subject property's specific market. Thus, fundamental demand analysis must be a marketability study because it is property-specific.

Furthermore, fundamental demand analysis focuses on the economic forces that generate demand, i.e., what are known as the *fundamental forces of demand*. The relationship of employment, population, and income can be studied in inferred analysis, but an understanding of the relationships among those forces is essential for fundamental analysis. As shown earlier in Figure 15.2, the fundamental forces of demand have a hierarchy, with employment growth (or decline) first affecting the number of office and industrial jobs in a market area. Population change usually follows, serving as an indication of housing demand, which is followed then by change in demand for retail space.

The performance of the subject property is likely to be the most reliable indicator of current demand for existing properties in the market. Other indicators of de-

inferred demand
Demand projected on the basis of current market conditions, historical rates of change, and absorption patterns.

fundamental demand
Demand projected on the basis of the underlying factors that affect the economic well-being of real estate such as employment; population; household income, expenditure amounts, and preferences; and spatial growth patterns. In real estate appraisal, these factors are segmented to the subject property's submarket and then to the subject property.

Economic Base Analysis

As defined in Chapter 9, the economic base of a community is the economic activity that allows local businesses to generate income from markets outside the community's borders. Thus, economic base analysis is a survey of the industries and businesses that generate employment and income in a community as well as a study of functions of employment such as the rate of population growth and levels of income.

Economic base analysis is used to forecast the level and composition of future economic activity. Specifically, the relationship between basic employment (which brings income into a community) and nonbasic employment (which provides services for workers in the basic employment sector) is studied to predict population, income, or other variables that affect real estate values or land use.

Employment figures serve as a proxy for income in economic base analysis. Basic employment industries provide the economic foundation for a community by producing goods and services that can be exported to bring money into the local economy. Although some segments of the service sector can be considered basic economic activities, most service industries are nonbasic because the service provided and the income generated remain within the community's borders. Growth in basic employment can serve as evidence of changes in population levels, household income, or other economic factors influencing land use and real estate value.

Often the structure of a community's business sector is discussed using the North American Industry Classification System (NAICS) developed and used by the US Bureau of the Census. Government publications such as the *Census of Retail Trade* use NAICS codes in describing the composition of trade in a metropolitan statistical area. A sample from the NAICS codes is shown below.

Surveys and other data-gathering techniques employed in economic base analysis generate primary data that can be used in other types of market analysis.

2012 NAICS Definition

T = Canadian, Mexican, and United States industries are comparable.

Search results for: 31

Number of records found: 652

31-33	**Manufacturing^{T}**
311	**Food Manufacturing^{T}**
3111	**Animal Food Manufacturing^{T}**
31111	Animal Food Manufacturing^{T}
311111	Dog and Cat Food Manufacturing
311119	Other Animal Food Manufacturing
3112	**Grain and Oilseed Milling^{T}**
31121	Flour Milling and Malt Manufacturing^{T}
311211	Flour Milling
311212	Rice Milling
311213	Malt Manufacturing
31122	Starch and Vegetable Fats and Oils Manufacturing^{T}
311221	Wet Corn Milling
311224	Soybean and Other Oilseed Processing
311225	Fats and Oils Refining and Blending
31123	Breakfast Cereal Manufacturing^{T}
311230	Breakfast Cereal Manufacturing
3113	**Sugar and Confectionery Product Manufacturing^{T}**
31131	Sugar Manufacturing^{T}
311313	Beet Sugar Manufacturing
311314	Cane Sugar Manufacturing
31134	Nonchocolate Confectionery Manufacturing^{T}
311340	Nonchocolate Confectionery Manufacturing
31135	Chocolate and Confectionery Manufacturing^{T}
311351	Chocolate and Confectionery Manufacturing from Cacao Beans

Source: 2012 NAICS, available online at www.census.gov/cgi-bin/sssd/naics/naicsrch?chart=2012 mand in the market must be investigated for proposed properties or vacant land, i.e., when there is no performance record of an existing property. Table 15.3 lists the indicators of market demand relevant in both inferred analysis and fundamental analysis of proposed properties and vacant land.

Table 15.3 Market Indicators of Demand for Proposed Properties and Vacant Land

Area Examined	Indicators of Demand
Property-specific	Current and historical vacancy rates
	Current and historical rental rates
Market area	Current and historical vacancy rates for existing competitive space
	Current and historical rental rates for existing competitive space
	Construction activity—competitive space
	Preleasing of planned space and space under construction
	Current condition and historical changes in fundamental forces of demand
Macroeconomic area	Current and historical vacancy rates for existing property types
	Current and historical rental rates for existing property types
	Construction activity—property type
	Preleasing of planned space and space under construction
	Current condition and historical changes in fundamental forces:
	· Employment levels and foreclosure rates
	· Residential occupancy and foreclosure rates
	· Income levels and consumer spending

In inferred analysis, the reliability and relevance of market data for a specific property tend to decrease as the geographic area examined in the demand analysis is broadened. Clearly, current data on change in employment levels for the state has less relevance than employment figures for a subject property's immediately surrounding area. Likewise, data on a related, but distinct, property type is not a reliable indicator of demand for the subject property. For example, the analysis of inferred demand for space in neighborhood shopping centers would not use the occupancy levels in regional malls in the area as an indicator of demand.

Currently occupied space serves as an appropriate indicator of inferred demand as long as there is no pent-up demand or artificially induced occupancy. Current net absorption of new and vacant space on the market is the key consideration.

Levels of Market Analysis

The levels of market analysis that can be performed cover a spectrum of increasingly complicated methodologies.[1] The practice of market analysis is commonly segmented into four levels of progressive depth and complexity:

- Level A
- Level B

1. For a comprehensive discussion of the various levels of market analysis, see Stephen F. Fanning, *Market Analysis for Real Estate: Concepts and Applications in Valuation and Highest and Best Use* (Chicago: Appraisal Institute, 2005).

- Level C
- Level D

In this organizational scheme, Level A and Level B studies typically involve inferred demand analysis while Level C and Level D analyses look at fundamental demand. Table 15.4 summarizes the distinctions between inferred and fundamental demand analysis and indicates the levels of analysis associated with each.

In most appraisal assignments, a Level A, B, or C marketability study is the appropriate scope of work. Labor-intensive Level D market analyses typically focus on the individuals behind the economic and demographic characteristics studied. Although appraisers do not usually need to perform a Level D market analysis in assignments for valuation purposes, they may use some techniques associated with Level D analysis in a Level C marketability study. Table 15.5 illustrates the tasks involved in the various levels of market analysis, and Table 15.6 summarizes the distinctions between levels.

Determining the level of market analysis appropriate to a specific appraisal assignment is a scope of work issue. The major criteria involved in the decision include the prevailing market conditions at the time of the appraisal and the complexity of the property being appraised. For

Table 15.4 Types and Levels of Analysis

	Levels of Analysis*	
	Inferred Demand Studies	Fundamental (Derived) Demand Studies
Level of Study	A B	C D
	Inferred subject attributes	Quantified subject attributes
	Inferred locational determinants of use and marketability by macroanalysis	Quantified and graphic analysis of locational determinants of use and marketability by macro- and microanalysis
	Inferred demand from general economic base analysis conducted by others	Inferred demand derived by original economic base analysis
	Inferred demand by selected comparables	Forecast demand by subject-specific market segment and demographic data
	Inferred supply by selected comparables	Quantified supply derived by inventorying existing competition and forecasting planned competition
	Inferred equilibrium/highest and best use and capture conclusions	Quantified equilibrium · Highest and best use—graphic—map · Timing—quantified capture forecast
	Emphasis is on: · historical data · judgment	Emphasis is on: · quantifiable data · forecast · judgment

Note: An appraisal without a fundamental demand study—e.g., Level C or D market analysis—is designed to estimate value only in a certain and stable market.

* As defined in Stephen F. Fanning, *Market Analysis for Real Estate: Concepts and Applications in Valuation and Highest and Best Use* (Chicago: Appraisal Institute, 2005), 18–30.

Table 15.5 Levels of Market Analysis

WORK ITEM	Level of Study			
Location	**A**	**B**	**C**	**D**
General description—city and neighborhood	✓	✓	✓	✓
Specific analysis of site linkages		✓	✓	✓
Specific analysis of urban growth determinants		✓	✓	✓
Detailed competitive location rating			✓	✓
Detailed probable future land use analysis				✓
Demand Analysis				
General evidence of sales/leasing activity	✓	✓	✓	✓
General city growth trends	✓	✓	✓	✓
Analysis of overall market absorption from secondary data		✓	✓	✓
Demand forecast by specific projections of population, employment, and income			✓	✓
Demand forecast for subject market segment			✓	✓
Direct attitudinal survey of target market				✓
Competitive Supply Analysis				
Vacancy rates for selected comparables		✓	✓	✓
Vacancy rate from secondary data—broad market surveys			✓	✓
Field research on all competitive properties			✓	✓
Research on proposed properties—field inspection, building permit analysis, identification of potential sites			✓	✓
Detailed competitive amenities rating			✓	✓
Direct interviews with developers				✓
Highest and Best Use Conclusion and Marketability or Timing				
Vacant Land				
Probable use and timing but no specific timetable for development	✓			
Generalized land use plan				
Probable use supported by present value analysis		✓		
Timing supported by secondary data		✓	✓	✓
Specific land use plan				
Probable use supported by present value analysis		✓	✓	✓
Land plan drawn to site			✓	✓
Timing based on marginal demand and competitive rating analysis			✓	✓
Cost estimate for subject development				✓
Value impact analysis of alternative marketing/development strategies				✓
Improved Properties				
General *ad hoc* judgments	✓			
NOI projection supported by performance of selected comparables	✓	✓	✓	✓
Use, timing, *NOI* projection supported by analysis of secondary data		✓	✓	✓
Capture rate/*NOI* projection supported by marginal demand of market segment and competitive ratings			✓	✓
Risk analysis of *NOI* forecast				✓
Value impact analysis of alternative marketing/development strategies				✓

Source: Stephen F. Fanning, *Market Analysis for Real Estate: Concepts and Applications in Valuation and Highest and Best Use* (Chicago: Appraisal Institute, 2005), 25.

Table 15.6 Comparison of Marketability Studies

Category	Level A	Level B	Level C
Property productivity			
Physical	Descriptive only	Descriptive + Critique	Descriptive + Critique
Legal	Basic	Basic + Deed research	Basic + Deed research
Locational	General	Linkages/urban growth	Linkages/urban growth + Rating grid
Market delineation	Macro: whole community	Concerned with direct competition	Concerned with source of demand (users)
Demand analysis	Comparable data + General regional/city/neighborhood data	Comparable data + Published surveys + Trends	Comparable data + Published surveys + Forecasting
Timing/phasing of use	Timing not an issue	Timing could be minor issue	Timing an issue
Future market strength	Inferred from comparable data	Inferred through total demand	Calculated through marginal demand

example, a stable market is easier to analyze than a volatile market, and a volatile market often hurts the reliability of inferred demand analysis. In a stable market with no overbuilding or shortage of supply evident, an inferred marketability study might be acceptable. Similarly, a large or complex property often requires a higher level of market analysis. For instance, a marketability study for a large property that combines multiple uses would generally require a fundamental analysis.

Figure 15.6 illustrates the spectrum of marketability studies in typical appraisal assignments. A Level A inferred demand analysis would only be appropriate when the subject property is relatively simple and small for the market and the market itself is stable. In other words, the conditions fit all the criteria for Level A analyses. A single factor listed under the Level B criteria would raise the level of analysis necessary, and two or more of those factors would likely increase the level of analysis to Level C.

Other factors considered in the determination of the appropriate level of market analysis include the needs of the client and any requirements of professional standards for the specific assignment. A client's informational needs and tolerance of risk can influence the depth of market analysis desired, which could be well beyond what might be required by professional standards for the particular appraisal assignment.

Figure 15.6 Marketability Study Reliability Continuum

Level A	Level B	Level C
Simple property Small property Stable market } 3 of 3	Complex property Large property Volatile market } 1 of 3	Complex property Large property Volatile market } 2+ of 3
Timing is now.	Timing is probably now.	Timing is an issue.

Measuring Financial Feasibility

The process of measuring financial feasibility is an integral part of highest and best use analysis, which is discussed in the following chapter, but the analysis of financial feasibility can be a market analysis assignment in its own right that an appraiser might be asked to perform. (The terms *feasibility analysis*, *economic feasibility analysis*, and *financial feasibility analysis* are often used interchangeably.) In a feasibility analysis assignment, an appraiser investigates the profitability of a specific real estate project in terms of the criteria of a specific market or investor.

For a property use to be financially feasible, the value that the market places on that use must be commensurate with its cost. For a property to have value, there must be a proper balance of utility, demand (i.e., desire and effective purchasing power), and scarcity, all of which are measured in market analysis. In short, a use cannot be financially feasible if it is not appropriately supported by the market.

The six-step market analysis process provides data and tools for determining which uses to test for appropriate market support. Also, it ensures sound application in selecting uses and ensures that conclusions are reasonable. In market analysis, financial feasibility can be indicated in two ways:

- It can be implied through market activity.
- It can be measured through financial analysis.

Regulatory requirements, however, usually stress the minimum level of marketability study necessary to produce credible appraisal results.

Applications of Market Analysis

Level B and Level C marketability studies are the most common market analysis procedures that appraisers use in the valuation process. The choice of Level B or Level C analysis depends on whether inferred analysis or fundamental analysis better suits the scope of work of the assignment. For example, a Level B marketability study may not be appropriate for a volatile market because the results of historical trend analysis may not be reliable if the market is changing quickly and without a discernible pattern. In that situation, an appraiser would need to perform a more extensive Level C marketability study of the fundamental forces of demand in order to be able to provide the client with credible results.

All property-specific marketability studies follow the six-step process introduced earlier in this chapter. Figure 15.7 illustrates the framework of the six-step process more fully, enumerating the interim steps in a typical assignment. The examples of Level B and Level C marketability studies that follow will illustrate the interim steps appropriate for specific situations and provide information about considerations relating to other property types at each step of the market analysis process.

Level B Inferred Demand Analysis

Real estate developers often want to know how many homes they can build in a subdivision, what prices they could expect to receive for those properties, and the timing of sales over an anticipated absorption period. A Level B marketability study would be appropriate for a relatively large and simple property in a stable and predictable market.

Figure 15.7 Six-Step Process

Step 1. Define the Product (Property Productivity Analysis)
- A. Physical attributes
- B. Legal and regulatory attributes
  1. Private
  2. Public
- C. Locational attributes
  1. Identification of economic attributes—the association between land uses and their linkages
  2. Identification of the movement of demand in relation to the direction of urban growth

Step 2. Market (Market Area and Competitive Area) Delineation
- A. Concepts
  1. Time-distance concepts and standards
  2. Area over which equally desirable substitute properties tend to compete with the subject
- B. Techniques
  1. Gravity models
  2. Customer spotting

Step 3. Demand Analysis
- A. Demand segmentation
  Identification of characteristics of most probable user (consumer profile)
- B. Tastes and preferences: behavioral, motivational, and psychological factors
- C. Inferred demand analysis
  Analysis of historical growth and absorption data
- D. Fundamental demand forecast
  Submarket-specific demand forecast
  Major demand drivers
  1. Population creates households
  2. Income creates retail buying power
  3. Employment creates office/industrial users

Step 4. Supply Analysis (Survey and Forecast of Competition)
- A. Existing stock of competitive properties
- B. Competitive properties under construction
- C. Potential competition
  1. Proposed construction
  2. Probable additional construction
- D. Attributes and characteristics of competitive properties
  1. Economic and financial
  2. Locational
  3. Site
  4. Structure

Step 5. Analyze the Interaction of Supply and Demand
- A. Competitive environment
- B. Residual demand concepts

Step 6. Forecast Subject Capture (Market Penetration Concepts)
- A. Inferred methods
  Comparison of subject to general market indicators
  - Comparable property data
  - Secondary data surveys and forecasts
  - Subject historical performance
  - Local economic analysis
  - Other
- B. Fundamental capture methods
  Estimate subject capture potential of fundamental demand forecast by such methods as
  - Share of market
  - Adjust by quantifiable rating techniques
  - Subject historical capture rate
  - Other
- C. Reconcile subject capture indications derived by analysis of inferred and fundamental methods

Use of Study Process (Six-Step) Conclusions
- Economic demand data for financial testing of highest and best use alternatives
- Economic demand data for the valuation models

Source: Stephen F. Fanning, *Market Analysis for Real Estate: Concepts and Applications in Valuation and Highest and Best Use* (Chicago: Appraisal Institute, 2005), 15.

For example, consider a proposed subdivision of single-family homes in a suburban location. In the aftermath of the financial crisis of 2008, severely overbuilt and relatively inactive residential markets have been seen as examples of poor forecasting of potential absorption prior to the precipitous decline in prices and transactions. In a more typical, stable market, proposed residential subdivisions are well understood. In fact, the estimation of subject capture and an absorption rate for a proposed residential subdivision has traditionally served as an instructional example of the mechanics of market analysis because the property type and its market are familiar to even the newest real estate market observers. A proposed subdivision of single-family homes will be used as an illustrative example in this discussion of Level B marketability studies.

Property Productivity

In all marketability studies, appraisers analyze the physical, legal, and locational characteristics of the property. In the case of a proposed suburban residential subdivision, linkages to major employers and amenities and what is known as *residential situs* would be major locational considerations.[2]

Other physical characteristics include the size and shape of the lot, topography, soil quality, orientation, stage of development, and features of the improvements. Legal characteristics that might affect value would include local zoning ordinances, building codes, the influence of a homeowners association, property taxes, and any local codes, covenants, and restrictions.

Property Productivity Analysis for Other Property Types

Property Type	Considerations in Property Productivity Analysis
Existing apartment complex	· Design and appearance of the property · Number, size, and mix of units · Site improvements and amenities (in units and for complex as a whole) · Parking · Zoning (particularly the possibility of a zoning change for potential condominium conversion) · Infrastructure · Public planning for growth · Natural features and land use trends · Linkages to major employers and amenities · Externalities (busy street, noise, etc.)

2. The concept of *situs* relates to the movement between centers of economic activity and the accessibility of those locations. For a detailed discussion of situs, see Stephen F. Fanning, *Market Analysis for Real Estate: Concepts and Applications in Valuation and Highest and Best Use* (Chicago: Appraisal Institute, 2005), and Richard B. Andrews, *Urban Land Economics and Public Policy* (New York: The Free Press, 1971).

Property Type	Considerations in Property Productivity Analysis
Office space demand	· Building design and construction materials · Signage · Exterior lighting · Street layout · Utilities · Parking · Lot and building lines · Landscaping and grading · Office space layout · Tenant finish · Floor sizes · Stairways, corridors, and elevators · Electrical system · Heating, ventilation, and air-conditioning · Amenities · Security · Building management and tenant mix
Hotel demand	**Site and improvements** · Size · Room rate structure · Overall decor and physical appearance · Quality of management · Chain affiliation · Quality and character of the market area · Facilities and amenities offered · Revenue per available room (RevPAR), which is a common unit of comparison used in the lodging industry to compare the income of competing facilities **Location** · Airport hotels and highway-oriented hotels cater to transient guests. · Center city hotels draw both tourists and business travelers. · Hotels in suburban locations often rely on adjacent commercial or industrial businesses. · Convention center hotels or resort properties are themselves the destination rather than any nearby land use.
Industrial properties	· Size (and land-to-building ratio or floor area ratio) · Ceiling height · Loading capacity · Climate control · Percentage of office space · Automated operations (including the use of robotics and other evolving technologies) · Utilities · Security · Building management and tenant mix · Environmental regulations

Market Area Delineation

In the marketability study of the proposed subdivision, an appraiser would define and delineate the market area of the subject property as well as the competitive market area based on the location of competitive properties, i.e., housing that would appeal to the same consumers as the subject property. Also, the appraiser would determine the profile of the most likely users, either renters or buyers.

To analyze the characteristics of likely users of the specified housing units, an appraiser would develop a consumer profile describing income levels, household size, age, and preferences. The market area of potential users could be defined in terms of

- time-distance relationships–the commuting time to employment centers and support facilities
- social or political boundaries–cities and neighborhoods, school districts, voting precincts
- man-made or natural boundaries–major thoroughfares, physical barriers such as rivers, lakes, and mountains
- the location of competitive housing

Market Delineation for Other Property Types

Property Type	Considerations
Existing apartment complex	The boundaries of the market area for an existing apartment are based on · time-distance relationships—the commuting time to employment centers and support facilities · social or political boundaries—school districts, voting precincts · man-made or natural boundaries—major thoroughfares, physical barriers · the location of competitive housing
Office space demand	The market area for an office building is generally diffused over a broad metropolitan area, with law firms and financial institutions often seeking space in prestigious, centrally located buildings, while businesses providing other types of services may prefer suburban offices with ample parking facilities and reasonable rents.
Hotel demand	The market area for a hotel does not necessarily rely on households in nearby communities to generate demand. Instead, linkages to sources of visitations in the area can be more significant than the characteristics of the surrounding neighborhood. Hotel development often occurs in clusters, and the emergence of a new cluster nearby can have an impact on the competitiveness of existing properties.
Industrial properties	Established trade routes can define the boundaries of the competitive market for multitenant industrial space. Because warehouses and distribution centers must be close to major highways or railroad lines, industrial development will tend to cluster around those features, especially major freeway interchanges in centrally located states where a large percentage of the region's or even the country's population can be within a day's drive.

Forecast of Inferred Demand

To measure current residential demand using inferred data, an appraiser can conduct trend analysis by first measuring the current and projected number of households within the defined market area, keeping in mind that household size varies with the age of the head of the household. Alternatively, the appraiser may need to examine the number of current and projected households headed by owners and those headed by renters. (There may be an overlapping category of renters who can afford to buy.) The sources of data on historical and current household characteristics are typically secondary sources, e.g., the US Census Bureau, the relevant Council of Governments, or a local planning department.

The resale market for comparable properties in the competitive market can serve as an indication of market demand for units in the subject property. Comparing the resale market for the entire community with the strength of the competitive market will indicate whether a Level B analysis will be adequate. If the competitive market area is weak while the number of households in the entire community is growing, a more detailed analysis might be necessary. Again, the data analyzed in Level B analysis is largely obtained from secondary sources, e.g., the local multiple listing service, published reports, or local real estate agents.

The general analysis of the market for properties competitive with the subject property leads into an investigation of the performance of the subject property's primary competition. The absorption of competitive properties is the indicator used in Level B marketability studies. Unlike the data in the other interim steps in the analysis of inferred demand, the data used in the identification of the performance of the subject property's primary competition is primary data compiled by the appraiser. Information about competing properties that may be gathered includes

- reputation and track record of the project developer
- total number of lots
- type of project (e.g., infill or new growth area)

Inferred Demand Forecast for Other Property Types

Property Type	Considerations in Analysis of Inferred Demand
Existing apartment complex	· General growth trends · Residential construction trends · Historical absorption figures · Effective rental rates
Hotel demand	· Travel and tourism data · Hotel employment data and convention center activity · Office space absorption and employment statistics—particularly regarding wholesale and retail trade, services, and the financial, insurance, and real estate (FIRE) sector · Occupancy rates at competitive lodging facilities in the subject's class and market area

- age of project
- identification of finished product
- absorption summary
- special amenities and advantages or disadvantages

The measurement of current demand in a Level C marketability study would differ from this Level B study in that this step in a Level C analysis would be driven by forecasts of employment, income, households, and population. The use of forecasts gives the appraiser the ability to modify historical trends so that the analysis considers current and future events.

Competitive Supply Analysis

To measure and project the competitive supply of housing units in the defined market area, an appraiser would compile an inventory of competitive supply by identifying the number of

- existing competitive properties within the subject's identified market area
- properties under construction in that area
- planned properties in the area for which building permits have been obtained
- proposed properties in the area

The total number of competitive properties in the defined market area for the projection period can be refined by checking the total number of building permits issued against those actually put to use in recent years.

Some other factors that may influence potential supply include

- availability and price of vacant land
- cost and availability of construction materials
- availability of desired product features
- availability of construction loans and financing
- effect of building codes, zoning ordinances, and other regulations on construction

In addition to quantitative measures of current and anticipated supply, this step in the analysis process includes consideration of the timing and competitive position of the future competition. In distressed markets, such as the many overbuilt residential markets created by the subprime mortgage crisis, the amount of competitive supply may be so far out of equilibrium that decades would be required to absorb the existing excess supply at historical rates, barring some external influence like the demolition of existing houses for redevelopment to some other use. In those cases, the market may be stable but not considered predictable enough for inferred demand analysis to be meaningful. Therefore, a Level C marketability study might be necessary instead.

Competitive Supply Analysis for Other Property Types

Property Type	Considerations in Analysis of Competitive Supply
Existing apartment complex	· Existing competitive properties · Properties under construction · Planned properties for which building permits have been obtained · Proposed properties
Office space demand	Important characteristics of competing properties: · Size (gross building area or rental area) · Age · Vacancy level · Access · Parking · Tenant quality · Building management · Building quality and condition · Amenities · Support facilities
Industrial properties	· Size, particularly in relation to other industrial buildings · Age and condition · Vacancy level · Access · Building management and tenant quality · Building quality

Calculate Marginal Demand

To calculate marginal demand, an appraiser can compare existing and potential demand with current and anticipated competitive supply to determine whether demand for additional units or square footage of housing (i.e., marginal demand) exists or when it may develop. This can be particularly difficult for a residential subdivision because the supply and competition changes each month–i.e., marginal demand is a moving target.

The measure of inferred demand calculated in the third step of the process is compared with the competitive supply calculated in the fourth step. The demand may be expressed as a rate of sales per month (say, a historical average) while supply might be expressed as the number of total lots available to be purchased. The relevant measure of marginal demand would be the net absorption for the competitive market area over the projection period for sellout of the subject property.

Forecast Subject Capture

The final step in the market analysis process for a proposed subdivision is to analyze the competitive rating to forecast the likely capture rate for the subject. The appraiser can make qualitative judgments regarding the relative appeal of the subject property in the marketplace that must be reconciled with the quantitative evidence of marginal demand.

Techniques include calculating the subject property's pro rata share of the marginal demand and analyzing specific comparable properties.

Level C Fundamental Demand Analysis

The distinguishing characteristic of Level C marketability studies is the analysis of fundamental forces of demand. That more detailed analysis may result in different conclusions from a Level B marketability study. In fact, the market area for a fundamental demand analysis usually differs from the competitive market area analyzed in a Level B study.

As an example, this section will outline the six-step process, including a forecast of fundamental demand, for an existing or proposed community shopping center at a specific site over a given period.

Property Productivity Analysis

Analysis of the legal, physical, and locational attributes of the subject property and the competitive shopping centers in or near the subject's trade area focuses on current industry (or market) standards. Retail properties can become outdated quickly as industry norms change. Particular attention is given to the following attributes of the subject site and improvements:

- land-to-building area ratio and availability of expansion land
- building area
- parking adequacy
- frontage, visibility, and depth
- topography
- utilities
- landscaping
- site design and layout
- accessibility
- amenities
- gross building area and gross leasable area
- store sizes
- store width and depth
- building design and layout
- signage
- service facilities and space

Tenant mix and related characteristics influence market appeal as well.

Relevant legal characteristics of the subject property would include zoning and use restrictions, long-term store leases that affect the marketability of the property, and ground leases in place.

In a Level C study, an appraiser rates the physical and legal characteristics of the subject property and competitive properties against the market standard. The use of rating grids formalizes the comparison process and helps an appraiser identify functional obsolescence, select comparable sales, identify influences on rent and occupancy, and support the subject capture of demand.

Unsurprisingly, locational factors are important for retail properties. The locational attributes that should be investigated include

- land uses and linkages with the surrounding community
- site location in relation to patterns of urban growth
- proximity to competitive supply

The culmination of the property productivity analysis is rating the macroeconomic location of the subject property in comparison with the competition. In other words, an appraiser identifies what is known as the *competitive differential* to discover the relative strengths and weaknesses of the subject property in the market. Analysis of the macroeconomic location would include consideration of the following:

- proximity to households in the market area
- proximity to new retail development
- location in the path of growth, e.g., new or projected residential development
- proximity to major roads, in terms of access and visibility
- relative traffic counts
- proximity to the market
- size and drawing appeal of anchor stores
- tenant mix and compatibility in the trade area
- effective age and reputation of the properties in the retail cluster
- special amenity features

A Level C marketability study might include the use of mapping and other graphic analysis tools to illustrate linkages and patterns of urban growth that might affect the boundary of a market area.

Market Delineation

The geographic market area relevant in a Level C marketability study may differ from the market area defined for a Level B study because the analysis of fundamental demand often requires a market area that aligns with the sources of specific data.

Effective analytical tools for defining the primary and secondary trade areas of a shopping center have been objects of study for many years. The most commonly used techniques include

- trade area circles, in which preliminary trade area boundaries are adjusted for the specific geographic, demographic, and economic characteristics of the community
- gravitational models, a variation of trade area circles that takes into account the effects of competition

- customer spotting, a more detailed form of trade area circles in which actual customer addresses are surveyed to determine distances and linkages

Forecast of Fundamental Demand

The estimate of current and future demand in a Level C marketability study is the step of the process that departs the most from the scope of work of a Level B study. In essence, the forecast of fundamental demand starts with the trend analysis prepared in a Level B marketability study and adds to it.

For example, analysis of inferred demand for retail space may include study of the following:

- economic base and city growth trends
- citywide retail center occupancy
- competitive center occupancy

Analysis of fundamental demand for retail space requires scrutiny of additional market data, including the following:

- number and size of households
- average household income
- percentage of average household income spent on retail purchases
- percentage of retail purchases typically made at shopping centers similar to the subject property
- percentage of purchases made at the subject shopping center allocated to primary trade areas
- volume of sales per square foot of retail area required to support the subject property
- normal vacancy rate in the market

This data allows an appraiser to estimate demand for the primary market area, but a similar analysis should be performed for the secondary market area as well and those results can be combined to determine the total demand for the primary and secondary market areas.

The estimates of inferred and fundamental demand can be reconciled with a ratio analysis of the trade area in which the current amount of occupied retail square footage per capita is compared to the future population forecast. The conclusions of these analyses may be further adjusted to account for retail income from outside the trade area and leakage of retail income to other areas.

Competitive Supply Analysis

The identification and inventory of competitive supply in a Level C study is similar to the process applied in a Level B study, but only the defined subject market area is relevant.

Fundamental Demand Forecast for Other Property Types (Over and Above Analysis of Inferred Demand)

Property Type	Considerations in Analysis of Fundamental Demand
Proposed single-unit residential subdivision	· Current and projected population within the defined market area · Current and projected number of households, keeping in mind that household size varies with the age of the head of the household · Number of current and projected households headed by owners and those headed by renters—there may be an overlapping category of renters who can afford to buy
Existing apartment complex	· Current and projected population within the defined market area · Current and projected number of households (dividing population figures by average household size) · Current and projected changes in household size (number of households vs. number of people per household) · Number of current and projected households headed by owners and those headed by renters · Number of households that are or will be able to meet the monthly rent on units in the subject property
Office space demand	· Size of the workforce occupying office space, segmented by occupational category* · Size of the workforce occupying office space in the subject's class · Requisite space per worker† · Normal vacancy rate
Hotel demand	· Number of nights per stay · Number of people per room · Periods of use during the year · Prices paid for rooms · Food, beverage, entertainment, and telephone usage · Methods of travel
Industrial properties	· Employment in manufacturing, wholesale, retail, transportation, communications, or public utilities · Cost of available labor force in relation to alternative locations · Patterns and directions of industrial growth and development, which often cluster along major highways and around intersections · Presence of raw materials · Exchange capability

* One way to calculate the number of office space occupants in economic and occupational sectors is to establish the ratio between the number of office workers and the number of total workers in each sector. In a sector such as finance, insurance, and real estate (FIRE), a high percentage (more than two-thirds) of all office workers occupy space in freestanding office buildings—i.e., buildings entirely occupied by office workers. The number of FIRE office workers in freestanding buildings may be estimated by multiplying the total number of workers by this percentage. In sectors such as manufacturing, however, a very low percentage of office workers occupy space in freestanding office buildings. Using these ratios, the number of office workers in each sector can be determined and the aggregate of office workers in all sectors can be calculated. See Ian Alexander, *Office Location and Public Policy* (New York: Chancer Press, 1979).

† The average space required for an office worker ranges from 200 to 300 square feet. Very general estimates of average area requirements are published by the Building Owners and Managers Association (BOMA). Because the square foot area required per employee varies widely with community size and the type of employment in the community, market analysts should compare BOMA estimates with area-per-worker data developed as part of the competitive supply analysis. Estimates obtained from other national and local sources may also vary.

As for other property types, an inventory of competitive retail space covers

- existing competitive properties
- properties under construction
- planned properties for which building permits have been obtained
- proposed properties

To complete the analysis, an appraiser would rate the supply of competitive space (existing and anticipated) according to

- size
- access and location
- quality of merchandise
- project amenities
- reputation
- rental rates
- vacancy
- tenant mix

The analysis of competitive supply should yield estimates of the square footage of specific competition, the market rent the subject can expect to generate in the current market, and a comparative ranking of the subject property.

Calculate Marginal Demand

In a Level C marketability study, an appraiser would follow the same procedure as in a Level B study, simply using the figures for fundamental demand rather than the figures for inferred demand. In the analysis of a retail property or other leased property, unlike the residential subdivision discussed earlier, marginal demand should account for frictional vacancy, i.e., the amount of vacant space a market needs to operate in an orderly fashion.

The difference between supportable leasable space and the amount of existing and anticipated retail space would be the estimate of additional space needed in the market. Sales per square foot in individual retail stores may indicate the performance level of an existing shopping center, the center's share of the market, and whether there is opportunity for expansion. This data may be used to check the reasonableness of the estimate of additional space demanded. If there is a current surplus of retail space, the forecast of market conditions may identify when in the future the available retail space will be absorbed and demand for additional retail space will begin to come on line.

If there is excess demand, frictional vacancy is applied to the demand to determine how much space the

frictional vacancy
The amount of vacant space needed in a market for its orderly operation. In a stabilized market, where supply and demand are in balance, frictional vacancy allows for move-ins and move-outs. In markets for income-producing property, frictional vacancy measures the lost rental income as leases roll over and expire.

excess demand can support. If there is excess supply, frictional vacancy is applied to the supply to determine how much space must be absorbed to reach stabilized occupancy. Note that the calculations are different depending on whether frictional vacancy is applied to demand or supply.

Forecast Subject Capture

Because retail concepts can change quickly, subject capture is especially difficult to forecast for retail properties. Inferred analysis is a starting point for the forecast of subject capture, using methods such as

- historical capture of the subject property
- capture of comparable properties
- secondary data surveys and forecasts
- effect of marginal demand on the subject property
- local economic analysis

In addition to inferred analysis of historical capture rates of the subject and competitive properties, fundamental methods that can be used include

- forecasting subject capture by pro rata share
- forecasting subject capture using a competitive rating comparison

Then, the results of the inferred analysis and the fundamental analysis techniques that were applied should be reconciled to determine the future occupancy and expected rent levels for a specific property.

Highest and Best Use Analysis

The analysis of relevant data to develop a market value opinion requires two important steps in the valuation process before the applicable approaches to value are applied. Market analysis begins the process of narrowing the focus of the analysis from a broader macroeconomic view to data that is especially pertinent to the subject property. Highest and best use analysis relies on that analysis to then identify the most profitable, competitive use to which the subject property can be put.

An understanding of market behavior developed through market analysis is essential to the study of highest and best use, which is an economic concept. As explained in the previous chapter, market forces create the use, and the use affects market value. The interaction of market forces, therefore, is a key to identifying the highest and best. The highest and best use is shaped by the competitive forces within the market where the property is located, and it provides the support for a thorough investigation of the competitive position of the property in the minds of market participants.

The analysis of highest and best use can be thought of as the logical end of a spectrum of market analysis procedures, running from the macroeconomic overview of a general market study, through more detailed marketability studies and analyses of financial feasibility, to the formal analysis of highest and best use. Table 16.1 outlines the essential characteristics of the various types of analyses. All the analyses are interrelated

Table 16.1 Comparison of Real Estate Market Analyses

Goal/Purpose	
General market study	Identify demand for appropriate potential uses
Marketability study	Identify demand for a particular property
Feasibility analysis	Compare cost and value and analyze if specific market or investor criteria are fulfilled
Highest and best use analysis	Of the appropriate potential uses, determine the use that yields the maximum value
Processes/Steps	
General market study	Perform supply and demand analyses for appropriate potential uses
Marketability study	Follow the six-step process
Feasibility analysis	Calculate *NOI*/cash flows of appropriate potential uses and select appropriate overall capitalization rate/discount rate (based on data collected during market analysis—e.g., residual land value, rate of return, capitalized value of overall property)
Highest and best use analysis	Specify terms of use, timing, and market participants (e.g., user of the property, most probable buyer) and compare values of appropriate potential uses
Results (Data Generated)	
General market study	Forecast oversupply or undersupply and the effect on absorption rates and probable rents or prices for appropriate potential uses
Marketability study	Forecast how a specific property will perform under current or anticipated market conditions
Feasibility analysis	State whether potential uses are feasible based on respective data
Highest and best use analysis	Determine which alternative use (or alternative uses) creates the highest value

processes that measure the economic potential of real estate, although in practice some feasibility analyses may be more involved than highest and best use analyses, have a different focus, or require additional research.

Fundamentals of Highest and Best Use

The analysis of highest and best use is at the heart of appraisals of the market value of real property, but the concept has not always been well understood by practitioners and has long been a source of debate in the professional literature. The essential components of the analysis of highest and best use are contained in the following definition of the term:

> The reasonably probable use of property that results in the highest value.

This simple definition will serve as a point of departure for examining the concept in the rest of this chapter.

To be reasonably probable, a use must meet certain conditions:

- The use must be *physically possible* (or it is reasonably probable to render it so).
- The use must be *legally permissible* (or it is reasonably probable to render it so).
- The use must be *financially feasible*.

Uses that meet the three criteria of reasonably probable uses are tested for economic *productivity*, and the reasonably probable use with the highest value is the highest and best use.

The Difficulty of Defining *Highest and Best Use* and Related Concepts

The definition of *highest and best use* has evolved over time to address the common understanding (or misunderstanding) of the topic. Traditionally, the explanation of the term has been more elaborate than the definition developed for this edition of the textbook. For example, the longstanding definition included ambiguous language that has often been commented on but never defined, as seen in the entry for the term in the fifth edition of *The Dictionary of Real Estate Appraisal*:

> **highest and best use**
> The reasonably probable and legal use of vacant land or an improved property that is physically possible, appropriately supported, financially feasible, and that results in the highest value. The four criteria the highest and best use must meet are legal permissibility, physical possibility, financial feasibility, and maximum productivity. Alternatively, the probable use of land or improved property—specific with respect to the user and timing of the use—that is adequately supported and results in the highest present value.

The precise meaning of "appropriately supported" has been debated in the appraisal literature almost since the basic template of this definition of *highest and best use* was developed in the mid-1970s.

A streamlined definition was developed more recently for the Appraisal Institute course *General Appraiser Market Analysis and Highest & Best Use* (2008), reducing the ambiguous language while eliminating direct reference to the four traditional tests of highest and best use:

> **highest and best use**
> The reasonably probable use that produces the most benefits and highest land value at any given time.

The International Valuation Standards had previously defined *highest and best use* in a similar fashion as *The Dictionary of Real Estate Appraisal*, but the 2011 edition of the standards removed the definition and instead described highest and best use as "the use of an asset that maximises its productivity and that is possible, legally permissible, and financially feasible" in the standards document's discussion of valuation principles. (Section 33, IVS Framework)

The Uniform Appraisal Standards for Federal Land Acquisitions (also known as *The Yellow Book*) defines *highest and best use* as the "highest and most profitable use for which the property is adaptable and needed or likely to be needed in the reasonably near future," citing US case law as a source. (Section B-3)

Historically, other concepts have been championed as alternatives to the term *highest and best use* as a description of what use of vacant land or an improved property should be analyzed, depending on the nature of the appraisal assignment:

> **most probable use**
> 1. The use to which a property will most likely be put based on market analysis and the highest and best use conclusion. The most probable use is the basis for the most probable selling price of the property.
> 2. Highest and best use in the context of market value.
>
> (*The Dictionary of Real Estate Appraisal*, 5th ed.)

> **most profitable use**
> Highest and best use in the context of investment value.
> (*Real Estate Appraisal Terminology*, rev. ed.)

Usage of *most probable use* in the appraisal literature has dropped significantly in the last 15 years, while the alternative related to investment value, *most profitable use*, is now largely used in the context of valuation for litigation purposes.

For more discussion of the debate on useful definitions of *highest and best use*, see, for example, John E. Bohling, "Highest and Best Use: A New Definition, A New Opportunity," *The Real Estate Appraiser* (January-February 1976): 33-36; Terry V. Grissom, "The Semantics Debate: Highest and Best Use vs. Most Probable Use," *The Appraisal Journal* (January 1983): 45–57; Steven Thair, "What's the Use?—Most Probable Use Versus Highest and Best Use," *The Appraisal Journal* (April 1988): 190-199; David C. Lennhoff and Richard L. Parli, "A Higher and Better Definition," *The Appraisal Journal* (Winter 2004): 45-49; and Marvin L. Wolverton, "Highest and Best Use: The von Thünen Connection," *The Appraisal Journal* (Fall 2004): 318-323.

Conceptually, the criteria of highest and best use are self explanatory. For example, *physically possible* uses are land uses that are not unworkable due to some limiting physical characteristic of the land such as inadequate site size, odd shape, irregular topography, or poor soil quality. For example, a steeply sloped site tends to limit the use of the land to only a few possible alternatives. In contrast, a level plot of land with good drainage, soil with adequate bearing capacity, and other physical characteristics to the construction of improvements would likely allow a developer to build many different sorts of facilities. Based on similar logic, *legally permissible* uses would conform to the land's current zoning classification and local building codes along with any other relevant regulatory or contractual restrictions on land use.

The test of *financial feasibility* narrows the number of legally permissible and physically possible uses down further through analysis of the economic characteristics of the potential alternative uses. The remaining options are candidates for the test of *maximum productivity*, which is the final–and deciding–criteria for the highest and best use of both the land as though vacant and the property as improved.

The concept of highest and best use relates to what is done physically with real estate, and physical land use should not be confused with the motivation of owners or users. For example, conservation and preservation are not uses of land. Rather, they are the motivations of individuals or groups for acquiring certain properties. The physical uses in such cases could generally be characterized as "leave the land vacant" or "do not change the historic improvements." A parcel of land encumbered by a conservation easement would have legal limits on use, leaving "no new development" or "development to some limited degree as agreed upon by contract" as the only legally permissible use of the land.

Similarly, assemblage with an adjacent parcel or subdivision are not highest and best uses in and of themselves. While the process of assembling a site with other sites might make the most sense financially for the entity who would benefit from the combination of multiple parcels, assemblage is a motivation for acquiring a property, not a use of the real estate. In other words, an entity might be motivated to purchase a site so that it can be assembled with surrounding parcels to create one large parcel, for which the highest and best use might be, for example, development of a 10-story residential condominium. If the property being appraised is a single site, not a site whose use depends on assemblage with other sites, the highest and best use of the site alone is analyzed as it currently exists by itself. If the property being appraised consists of multiple sites as though sold in one transaction, the highest and best use analysis considers them as one large site.

The same is true of a property suitable for subdivision. The highest and best use of a parcel of land might be for development of 50 single-unit residences. While the parcel must be subdivided to achieve that highest and best use, subdivision in itself is not a use and therefore not the highest and best use.

Testing Highest and Best Use

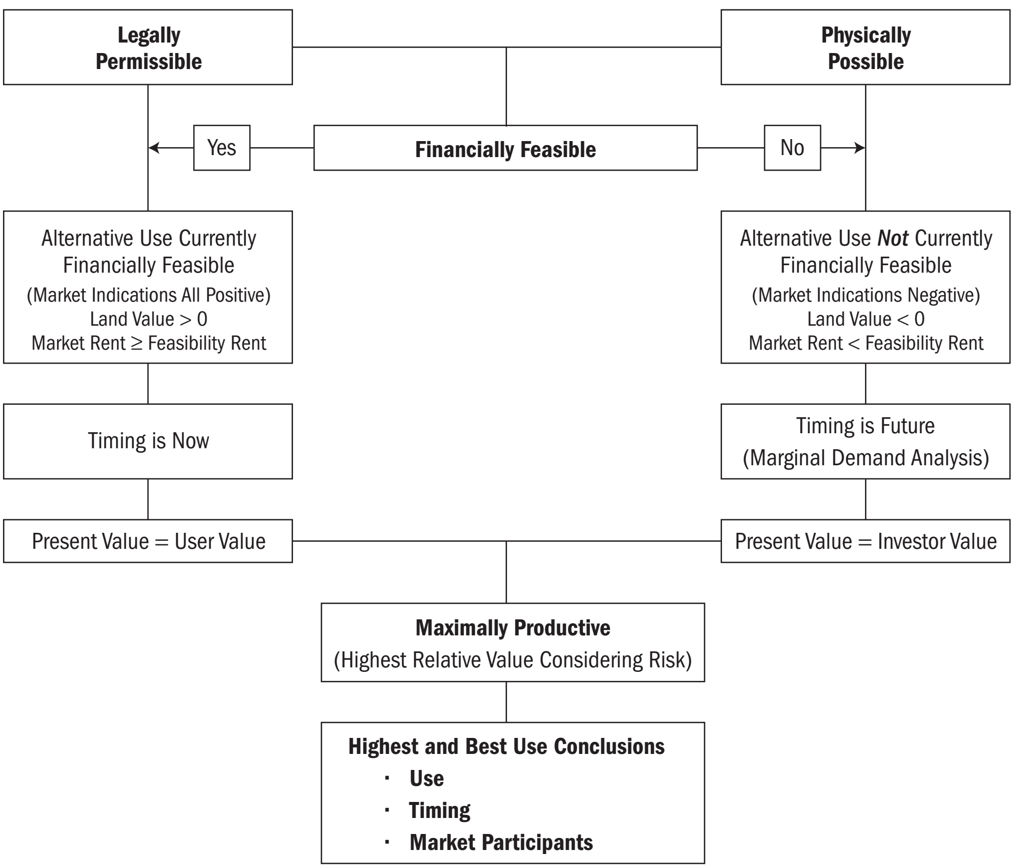
To test alternative uses for the highest and best use, an appraiser usually applies the four criteria in the following order:

1. Legal permissibility
2. Physical possibility
3. Financial feasibility
4. Maximum productivity

In practice, the tests of physical possibility and legal permissibility can be applied in either order, but they both must be applied before the tests of financial feasibility and maximum productivity. A use may be financially feasible, but this is irrelevant if it is legally prohibited or physically impossible.

Figure 16.1 illustrates the relationship of the steps involved in testing alternative use options for both the land as though vacant and the property as improved. Note that neither the test of legal permissibility

Figure 16.1 Testing Alternative Use Options



nor the test of physical possibility is presented as the initial step in the flow chart. The legally permissible and physically possible uses converge at the test of financial feasibility.

The six-step market analysis process described in Chapter 15 provides the data required for the four tests. The initial analysis of the market and land use regulations (i.e., property productivity) usually limits the number of property uses to a few possible choices. For example, a housing development for seniors might be a permissible use for a specific site but, if most residents of the market area that such a facility would serve are under 40 years old, this use is most likely not reasonably probable and would not be tested for financial feasibility.

There may be significant demand for a use in the market area of the subject property and the subject may indeed be suited for this particular use, but a number of other sites may be equally well suited or more appropriate. An appraiser should test the highest and best use conclusion to ensure that existing and potential competition from other sites has been fully recognized, not overlooked simply because the subject property has positive cash flow.

An appraiser should also consider the competition among various uses for a specific site. For example, competition for available sites along a commercial strip development may be intense. Developers of community retail facilities, garden office space, and fast food restaurants may bid against one another and the prices they pay for these sites will reflect this competition. *Market demand is not infinite.* Even though the subject may be physically and locationally suited for a use, better-located sites may satisfy the market demand for that use completely before the subject property can realize its development potential.

The same observation could be applied to central business districts (CBDs). The market may define the highest and best use of land in the CBD simply as high-rise development, which often includes a mix of uses such as office, retail, hotel, and residential apartment or condominium use. At times, the highest and best use conclusion for a CBD site does not indicate a specific highest and best use but rather a class of uses that is supported by market area trends and reflects a consistent density or scale of development.

Land As Though Vacant and the Property As Improved

In addition to the four tests of highest and best use, the first cited definition of the term implicitly includes the idea that highest and best use analysis is viewed from two perspectives:

- the use of a property based on the assumption that the parcel of land is vacant or can be made vacant by demolishing any improvements
- the use that should be made of a property as it exists (i.e., considering the current improvements)

The highest and best use of land as though vacant and the highest and best use of the property as improved are connected but distinctly different concepts.

To clarify the distinction, consider a single-unit residential property located in an area zoned for commercial use. If there is market demand for a commercial use, the maximum productivity of the land as though vacant will most likely be for a commercial use. In this case, the residential improvements may contribute little, if anything, to the value of the property except as an interim use during the transition between land uses. If, however, the market value of the property with the existing improvements is greater than the market value of the land as though vacant less costs to demolish the existing improvements, then the highest and best use of the property as improved is to keep the improvements for residential or commercial use.

The analysis of land as though vacant focuses on alternative uses, with the appraiser testing each reasonably probable use for legal permissibility, physical possibility, financial feasibility, and maximum productivity. In contrast, when the appraiser applies the four tests in the analysis of the property as improved, the focus on alternative uses considers three possible actions related to the current improvements:

1. Retain the improvements.
2. Modify the improvements in some way, such as conversion, renovation, or alteration.
3. Demolish the improvements and redevelop the land.

Considerations in Highest and Best Use

The theoretical focus of highest and best use analysis is on the potential uses of the land as though vacant. In practice, however, the contributory value of the existing improvements and any possible alteration of those improvements are just as important in determining highest and best use and, by extension, in developing an opinion of the market value of the property.

In the analysis of highest and best use of land as though vacant, the appraiser seeks the answers to several questions:

- Should the land be developed or left vacant?
- If left vacant, when would future development be financially feasible?
- If developed, what kind of improvements should be built?

In the analysis of the highest and best use of the property as improved, additional questions must be answered:

- Should the existing improvements on the property be maintained in their current state, should they be altered in some manner to make them more functionally efficient, or should they be demolished to create a vacant site for a different use?
- If renovation or redevelopment is warranted, when should the new improvements be built?

The mechanism for answering those questions is the application of the four tests to both the land as though vacant and the property as improved.

Highest and Best Use of Land As Though Vacant

If land is valued as though vacant in an appraisal assignment–for example, if the cost approach is applied in the assignment, requiring an estimate of land value–then a conclusion of the highest and best use of the land as though vacant is needed. When land is already vacant, an appraiser values the land as it exists, i.e., as vacant. When land is not vacant, however, the land's contribution to the value of the property as improved depends on how the land could optimally be used. Therefore, the highest and best use of land as though vacant must be considered in relation to its current use and all potential alternative uses.

Legally Permissible Uses of Land As Though Vacant

Private restrictions, zoning, building codes, historic district controls, and environmental regulations govern the uses to which land can be put, and those restrictions may preclude many potential land uses. To apply the test of legal permissibility, an appraiser determines which uses are permitted by current zoning, which uses could be permitted if a zoning change were reasonably probable, and which uses are precluded by private restrictions on the site. Private restrictions, deed restrictions, and long-term leases are typically registered on the title, and those legal characteristics of the property may prohibit certain uses or specify building setbacks, heights, and types of materials. If deed restrictions conflict with zoning laws or building codes, the more restrictive guidelines usually prevail, but this may pose a legal question that an appraiser cannot answer without assistance from a professional with the appropriate legal expertise.

A long-term land lease may affect the highest and best use because lease provisions can limit the type and duration of use to the remaining term of the lease. For example, if a property is subject to a land lease that has 12 years to run, it may not be economically feasible for the lessee to demolish the existing building and then construct and move into a new building with a longer remaining economic life. In such a case, the appraisal report should state that the determination of highest and best use as leased is influenced by the lease's effect on the utility of the land over the remaining lease term. In contrast, some legal issues can be positive influences that enhance a property. For example, a cross easement for access or parking would likely increase the marketability of some alternative use options. Appraisers should take care to thoroughly investigate the positive and negative influences of the legal characteristics of an appraised property, which are often misunderstood.

In addition to analyzing zoning and private restrictions as part of the test of the legal permissibility of a land use, appraisers should also investigate other applicable codes and ordinances, such as building codes, historical district ordinances, and environmental regulations. Building codes can prevent land from being developed to what would otherwise be its highest and best use by imposing burdensome restrictions that increase the cost of construction. For example, the additional cost of a water retention pond with excess capacity that is required by a local ordinance could affect the size of a proposed community shopping center. Less restrictive codes typically result in lower development costs and thereby encourage development, while more restrictive codes tend to increase development costs and discourage development. In some areas, restrictive building codes are used to slow new construction and limit growth. Historical ordinances, such as historic facade easements, and overlay districts may be so restrictive that they preclude any new development at all.

Concerns over the long-range effects of certain land uses sometimes result in increased environmental regulation and stricter development controls. Appraisers should be familiar with environmental regulations pertaining to clean air, clean water, and wetlands, and they should be sensitive to the public's reaction to proposed development projects. When resistance from local residents and the general public (often called *NIMBYism*, for "not in my backyard") occurs, it can pressure public

Probability of a Zoning Change

In investigating the reasonable probability of a zoning change, an appraiser considers zoning trends and the history of rezoning requests in the market area as well as documents such as the community's comprehensive plan (or master plan). Uses that are not compatible with the existing land uses in the area (such as a gas station in the middle of an exclusive single-family residential subdivision) and uses for which zoning changes have been requested but denied in the past (such as an industrial use in a neighborhood where several industrial zoning changes have been turned down in the past two years) can usually be eliminated from consideration as potential highest and best uses.

On the other hand, a zoning change from residential to commercial may be reasonable if other properties in the market area have received a similar zoning change recently or if a community's comprehensive plan designates the property for a use other than its current use. For example, consider a site zoned for single-family residential use in a transitional neighborhood where the zoning on several similar sites has been changed recently to commercial. Also, the city's comprehensive plan designates the property as lying within a future commercial corridor. Both of these factors may support an appraiser's conclusion that there is a reasonable probability of rezoning the subject site for commercial use.

Evidence supporting the possibility of new zoning can include rezoning applications, zoning hearings, actions by municipalities, and interviews with planning and zoning officials. Even if there is no current market evidence of a zoning change, documented interviews with officials and discussions of zoning practices and histories can be helpful in evaluating the possibility of a zoning change. These interviews may, however, not be a "proof" of a likely change or the denial of a change in zoning. Decisions on zoning ordinances are made by elected officials, and the processes are often heavily contested, costly, and time-consuming. The outcomes are not known until official actions are taken.

The probability of a zoning change is never 100%, which presents an appraiser with two challenges:

- to determine whether market participants will pay a premium over the property's current value as zoned in anticipation of a potential zoning change and
- to provide support for that conclusion.

To manage their risk, most developers contract to buy property "subject to" rezoning approval rather than "as is." Many pending sales never close because they are subject to rezoning that could not be obtained within the developer's desired time frame or not obtained at all.

Appraisals involving an assumed zoning change are subject to an extraordinary assumption or hypothetical condition, depending on whether the date of value is a prospective date or a current date. The current market value cannot be based on an extraordinary assumption that the subject property is likely to be rezoned in the future, although depending on the intended use of the appraisal a similar extraordinary assumption could be made in an appraisal of the prospective value of a property that is likely to be rezoned in the future. Extraordinary assumptions and hypothetical conditions must be clearly addressed in the appraisal report, and a statement must be made that their use might have affected the assignment results.

officials to stop or limit certain real estate developments or change the density or character of a specific plan.

A marketability study helps an appraiser compare the maximum development potential of a site that is legally permissible with market norms. For example, legal restrictions and the size of a specific site may indicate a maximum of 100,000 square feet of building area for that site, but if buildings on sites with similar legal and physical characteristics are being developed with buildings of 60,000-80,000 square feet, the difference may need to be accounted for in the analysis of the maximum productivity of the site as though vacant and reconciled in the analysis of the highest and best use of the property as improved.

Market norms can also influence a site's potential for division as a legally permissible option, i.e., the site could be used as is or subdivided. For example, the analysis of the highest and best use of a 20-acre industrial site might start with an investigation of any legal restrictions on development of the entirety or on division and development of smaller parcels.

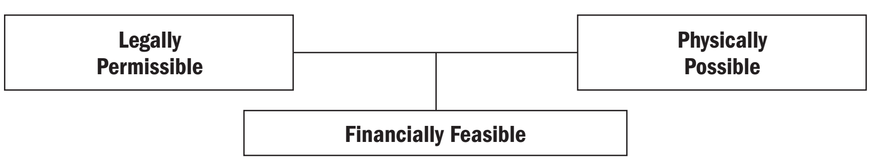
As with zoning ordinances, if there are land use limitations inherent in any applicable codes, ordinances, and regulations, an appraiser should investigate whether there is a reasonable probability of a change relative to the subject property along with any timing and cost considerations related to a potential change.

Physically Possible Uses of Land As Though Vacant

A parcel of vacant land (or an improved site analyzed as though vacant) is the blank canvas on which a real estate developer paints any number of pictures. The physical possibilities of the vacant land are quickly constrained by factors such as site size, shape, frontage, availability of utilities and other support services, topography, soil composition, and other site conditions and environmental factors. As a simple example, an irregularly shaped parcel can cost more to develop and, after development, may have less utility than a regularly shaped parcel of the same size. In addition, if the irregular shape affects ease of access, certain land uses might not be physically possible.

The information that appraisers use to test the physical possibility of a land use is often collected in the property productivity analysis step of the six-step market analysis process. For a parcel of land analyzed as though vacant, the uses that are both legally permissible and physically possible are the pool of alternative uses that can be tested for financial feasibility, as shown in Figure 16.2.

Figure 16.2 Arriving at Financially Feasible Alternatives



Financially Feasible Uses of Land As Though Vacant

An appraiser eliminates uses that are not legally permissible and physically possible before analyzing the financial feasibility of the remaining alternative uses of land as though vacant. Only those uses that meet the first two criteria are analyzed further. For a use to be financially feasible, it must be able to produce a positive return to the land after considering risk and all costs to create and maintain the use.

financial feasibility
The capability of a physically possible and legal use of property to produce a positive return to the land after considering risk and all costs to create and maintain the use.

In determining which uses are legally permissible and physically possible, an appraiser eliminates some uses from consideration. Only those uses that meet the first two criteria are analyzed further. The level of analysis may vary with assignments, but economic demand for the subject property is a prerequisite to the financial testing of alternatives.

Analyses of supply and demand and of location are needed to identify the uses that are financially feasible. The desire for a particular use in a particular location is essential. Clues that supply and demand may not support a particular use include vacancy throughout the market area or no new construction when land is available. The results of market analysis can lead to the potential consideration of the presence of obsolescence.

For income-producing properties, the income analysis for financial feasibility must be supported with the six-step marketability study. If the physically possible and legally permissible uses are income-producing, the analysis of financial feasibility will often focus on which potential uses are likely to produce an income (or return) equal to or greater than the amount needed to satisfy operating expenses, financial obligations, and capital amortization of the investment. However, supply and demand are still essential considerations even if cash flow is positive, i.e., the test of financial feasibility does not necessarily end with cash flow analysis.

Some economic uses of land such as housing may not be income-producing in the sense of a commercial property, and economic feasibility is weighed by considering prices and price trends. If the uses are not income-producing, the financial analysis will determine which uses are likely to create a value or result in a profit equal to or greater than the amount needed to develop and market the property under those uses.

A crucial element in highest and best use analysis is the timing for a specific use. Timing refers to when the improvements might be built as well as the future expectations of occupancy and rent levels. Land and location may suggest a parcel is a prime retail corner at some point in time, but if the retail potential is some years in the future, another use–for example, apartments–that can be developed immediately could make the land more valuable today. For an existing property subject to a lease that is near expiration, the demand for the continued use of the property or conversion to another use may be a timing issue.

Prices and price trends are important indicators of financial feasibility. Recent sales to owner-users indicate recent financial feasibility. If market conditions have changed since the last sales, financial feasibility in the current market might be affected. Sales to speculative investors are more likely to indicate a market in transition, in which case current or proposed uses are not likely to be financially feasible. Other possible market indicators of financial feasibility include current and historical vacancy rates, current and historical rental rates, recent construction activity, and recent space absorption.

The three techniques used to test financial feasibility involve the analysis of different measures of economic performance:

- land residual analysis
- feasibility rent
- profitability index

For any alternative use of vacant land, the cost of construction (including an estimate of entrepreneurial coordination) and the expected value of the specific property use should be known. The difference between those figures is the land residual, which is a primary indicator of financial feasibility. If the land residual is positive, the use is considered financially feasible.

As an example, suppose that a 25,000-sq.-ft. office building is deemed a reasonably probable use of the site as though vacant. If construction costs for office buildings of a similar class in the market area are $125 per square foot and entrepreneurial incentive in the market has consistently equaled 10% of building costs, the total cost to construct the improvements would be $3,437,500 (25,000 × $125 × 1.1). Similar improved properties would be expected to sell for $150 per square foot in the current market, so the expected value of the completed property would be $3,750,000 (25,000 × $150). The residual site value would then be $312,500 ($3,750,000 – $3,437,500), so the office building would be considered financially feasible, using the land residual technique.

feasibility rent
The rent necessary to justify new construction. This concept helps the analyst determine the timing of development, as well as the difference between the required rent and market rent based on known costs and expected returns to the investor. Feasibility rent may also be used to estimate the depreciation of an improved property. The capitalized difference between feasibility rent and market rent represents total depreciation of the existing improved property if market rent is less than feasibility rent. Also known as *feasible rent*.

A carefully developed comparison of market rent with feasibility rent also serves as a quantitative indicator of financial feasibility. Market rent can be seen as an estimate of market demand for the use, and feasibility rent is the rent necessary to justify new construction. Market rent is often estimated in the property productivity step of market analysis. Feasibility rent is calculated by reversing the cash flow format used in the income capitalization approach–starting with net operating income, adding expenses, and adding the vacancy allowance to arrive at gross income.

As an example, assume the ideal improvement for a site–a small industrial facility–would cost $1,750,000 to construct, based on an estimate of the sale prices of comparable sites, the cost of preparing the site, and the estimated building cost of the 50,000-sq.-ft. facility.

Market research supports an overall capitalization rate of 6.75%. The required net operating income could be calculated using this information, i.e., $1,750,000 × 6.75% = $118,125. Feasibility rent is then calculated by (1) adding operating expenses, (2) adjusting for stabilized vacancy and collection loss, and (3) converting the potential gross income to the standard unit of comparison, in this case feasibility rent per square foot:

Net Operating Income ($1,750,000 × 6.75%)	$118,125
Operating Expenses ($2 per Square Foot × 50,000 Square Feet)	+ $100,000
Effective Gross Income	$218,125
Plus Stabilized Vacancy and Collection Loss (5%)	÷ (1 – 5%)
Potential Gross Income	$229,605
Feasibility Rent per Square Foot ($229,605/50,000)	$4.59

The calculated feasibility rent can be compared directly to market rent to determine financial feasibility. In this case, if a marketability study indicated that industrial facilities of the same type would be expected to command a market rent of $5 per square foot, the proposed property would be financially feasible. If the market rent were lower than the feasibility rent of $4.59, the proposed property would not be financially feasible.[1]

Analysis of the profitability index, a technique often used in investment analysis, can serve as a third technique for testing financial feasibility. The profitability index, which is similar in concept to the net present value of an investment, directly compares the value contribution with the cost of some action such as developing a proposed property on a particular site. The profitability index is most useful in the analysis of the financial feasibility of conversion, renovation, or alteration of an improved property, although it can be used to measure the feasibility of establishing alternative uses on vacant land. (Further explanation and examples of the use of the profitability index are covered in Chapter 25.)

The alternative uses of the land as though vacant that pass the test of financial feasibility can continue along the flowchart shown in Figure 16.3. These uses are considered candidates for the test of maximum productivity and, therefore, for the highest and best use of the land as though vacant.

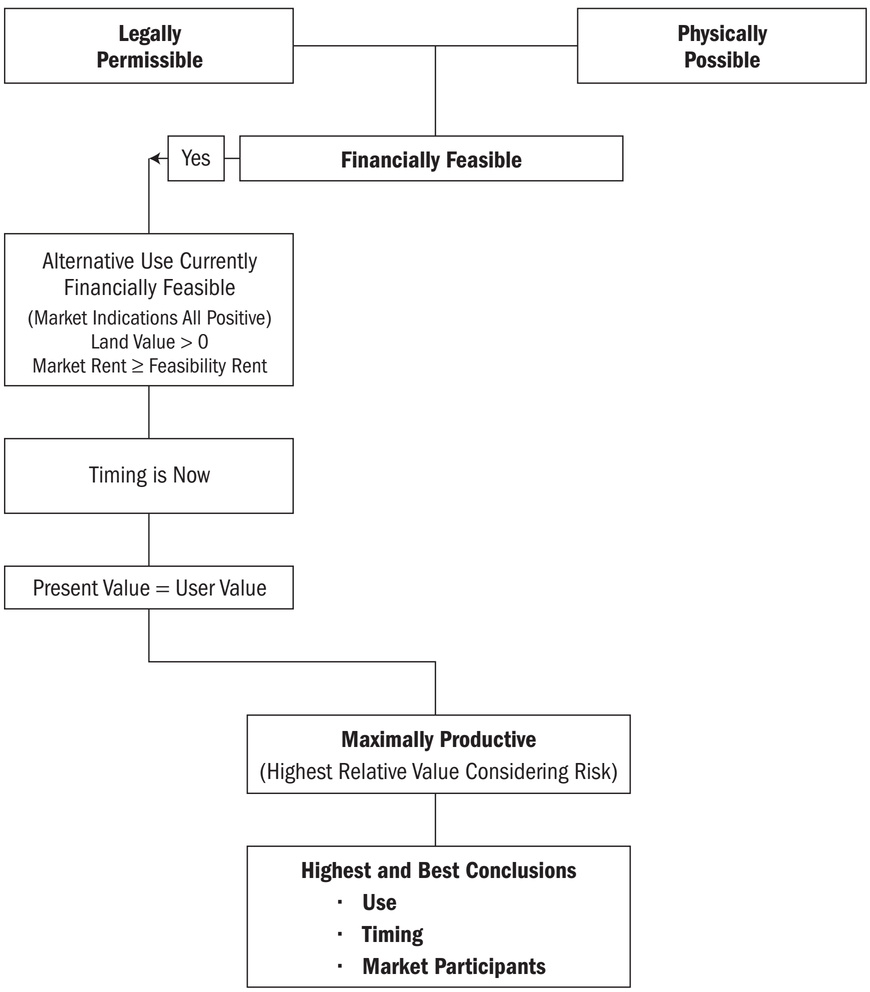
Maximum Productivity of Land As Though Vacant

Of the financially feasible uses of the land as though vacant, the highest and best use is the use that produces the highest residual land value, all else being equal. The comparison of the values of the financially feasible uses is usually straightforward.

To determine the highest and best use of land as though vacant, rates of return that reflect the associated risks are often used to capitalize income from different uses into their respective values. These are developed from previous research and reflect the rates of return that market participants apply to the range of uses being considered. Alternatively, land sales can be used to test which alternative is maximally productive.

1. In addition to its use as a test of financial feasibility, the analysis of feasibility rent is a powerful tool in the estimation of depreciation because the capitalized difference between feasibility rent and market rent represents total depreciation (if market rent is less than feasibility rent).

Figure 16.3 Financially Feasible Alternative Uses



For example, if the subject site is currently in demand for apartments and demand for retail is estimated to arise five years in the future, the highest and best use can be tested by applying comparable sales data. Suppose apartment land is selling for $3.50 per square foot today and retail land that is ready for immediate development is selling for $7.50 per square foot. If the retail land is held for five years at a discount rate of 20%, the present value of the retail land is $3.00 per square foot, which suggests that the highest and best use today is to develop apartments on the site. The use that produces the highest land value is the highest and best use.

The Ideal Improvement

If an appraiser concludes that a building improvement is appropriate for the highest and best use of a parcel of vacant land, the appraiser then determines and describes the type and characteristics of the ideal improvement to be constructed. The ideal improvement should meet the following criteria:

- It takes maximum advantage of the potential market demand for the site's highest and best use.
- It conforms to current market standards and the character of the market area.
- It contains the most suitably priced components.

If a new improvement is considered capable of supporting the highest and best use of the land as though vacant, it presumably will have no physical deterioration or obsolescence–i.e., it would be neither an underimprovement nor an overimprovement. Any difference in value between the existing improvement and the ideal improvement would be attributable to depreciation, and thus the ideal improvement identified in highest and best use analysis helps appraisers estimate depreciation in the application of the cost approach.

An appraiser's conclusion of the ideal improvement should be as specific as the market suggests, e.g., to the level of the number of stories or number of units built. The market might recognize the use of the ideal improvement of a particular site as "general retail" or as "neighborhood shopping center." The specificity of the ideal improvement affects the comparable properties that might be analyzed in the application of the approaches to value.

Highest and Best Use of Property As Improved

The concept of highest and best use of property as improved pertains to the use that should be made of an improved property in light of the existing improvements and the ideal improvement described at the conclusion of the analysis of highest and best use as though vacant. In market value appraisals of improved property, appraisers consider a number of alternative uses of the existing improvements:

- Demolish the existing improvements and redevelop the site.
- Convert, renovate, or alter the existing improvements to enhance the current use or change the use of the property to a more productive use.
- Retain the existing improvements and continue the current use. The existing improvements represent an interim use that helps defray the cost of carrying the property and demolition costs until all approvals have been obtained and actual construction may begin.

The principle of consistent use holds that land cannot be valued based on one use while improvements are valued based on another. An improved site is always valued as though vacant and available for its highest and best use. Existing improvements that do not conform with the ideal improvement may be an interim use (i.e., not the highest and best use) that contributes some value or no value or even reduces value if the costs to remove the improvements are substantial.

consistent use

The concept that land cannot be valued on the basis of one use while the improvements are valued on the basis of another use.

Even though a property was developed with one use, alternative uses are physically possible, just not always financially feasible. In the analysis of the highest and best use of the property as improved, an appraiser considers the alternative uses by applying the same tools applied in the analysis of the highest and best use of the land as though vacant, i.e., the four tests. The future economic performance of the existing improvements is the core concern in testing the alternative uses of the property as improved.

Testing Alternative Uses of the Property As Improved

All four tests of highest and best use are relevant to the analysis of the property as improved. It is self-evident that the current use of a property as improved is physically possible, and the legal permissibility of the current use is often nearly as obvious and easy to confirm. But an appraiser needs to test whether the existing improvements contribute value, rather than simply assume that the current use is the highest and best use because the improvements are already in place. In fact, the most persuasive analysis of the highest and best use of the property as improved often first tests whether the existing improvements could be demolished and the site redeveloped to the highest and best use as though vacant, instead of starting from the assumption that the current use will continue.

Demolition of the improvements can be considered the most extreme form of modification to the current use of the property as improved. If the value of the property as improved is greater than the value of the site as though vacant less demolition costs, the existing improvements contribute value to the property's highest and best use, and the improvements should not be demolished at that time. When the improvements no longer contribute to value, demolition and redevelopment of the ideal improvement would be economically supportable. Many buildings are torn down and their sites left vacant or devoted to an interim use for a variety of reasons, e.g., property taxes, liabilities, or avoidance of vandalism and criticism that the unused improvements are an "eyesore." In such cases the land is worth more vacant than as if improved. (Interim uses will be discussed more fully later in this chapter.) If demolition is ruled out, then changes to the existing improvements–which may include a change of use–should be tested next. The recognized forms of modification are

- conversion of the property to an alternative use
- renovation of the improvements
- alteration of the property

For any of these options to be financially feasible, the change must add at least as much value to the property as it costs. In other words, the value after conversion, renovation, or alteration less the costs of the modification must be greater than or equal to the value of the property as is. The costs involved in any form of modification can include an estimate of profit or entrepreneurial incentive.

Testing the feasibility of modification is a straightforward comparison of the contributory value of the change with the cost of making the change. However, any modification of the existing improvements to support a use must still meet all four tests of highest and best use. The study of property productivity in the market analysis process is likely to show what changes to the existing improvements are physically possible and legally permissible.

For legally nonconforming properties or properties with improvements that differ significantly from the ideal improvement, an appraiser should determine whether the applicable codes, ordinances, or private restrictions allow modification of the improvements that would bring them into conformity. This may involve analyzing the reasonable probability of a change in zoning as conducted in testing the highest and best use of the land as though vacant. Again, an appraiser should report any evidence supporting a reasonable probability that a change could be made to bring the improvements into conformity with a particular code, ordinance, or restriction. Such evidence could include trends in the market area, historical changes to codes or ordinances in the area, or a community's master plan.

As a simple example, consider a house situated on a major thoroughfare where adjacent properties have been rezoned to permit commercial use. A marketability study suggests that demand exists for a commercial use on the site, but the residential site would need to be rezoned for commercial use. The alternative uses of the current residential use and the potential use in the future as a commercial site can be compared. To do this, an appraiser would factor in the costs associated with the rezoning application and the construction necessary for conversion to the new use as well as the timing of the conversion (including carrying costs during the conversion period) discounted for the risk associated with the rezoning. If the property is valued "as is," the highest and best use would be for continued use as a one-unit residential property if the net present value of the residential use is higher than the net present value of the commercial use. If the net present value of the commercial use after rezoning is higher, then that use–a future use–would be the highest and best use, and a purchaser would base the present value of the property on its expected commercial use in the future.

If all the alternative uses are eliminated and the current use remains financially feasible without modification of the improvements or redevelopment of the site and retains the highest value of the alternative uses, then the current use will remain the highest and best use of the property as improved. Deferred maintenance of the improvements may need to be addressed in the analysis of the financial feasibility of the current use. Repairs may need to be made to the existing improvements for the current use to achieve the best competitive position in the marketplace.

The costs of curing physical deterioration or functional obsolescence, redesigning a building, or converting the existing improvements into an alternative use (including a provision for profit) should be analyzed in light of the value created in the market. The effect on value of implementing any changes is more important than simply how much the changes will cost. If the changes will not be economically feasible, the expenditures would not be made–a point that an appraiser should incorporate into the highest and best use analysis.

Special Situations in Highest and Best Use Analysis

In the identification and testing of highest and best use, special considerations are required to address the following situations:

- excess land and surplus land
- proposed construction
- legally nonconforming uses
- illegal uses
- a use that is not currently the highest and best use
- interim uses (including land held for investment purposes)
- mixed uses
- special-purpose uses

Excess Land and Surplus Land

The related but distinct concepts of surplus land and excess land were introduced in Chapter 12. The proper treatment of unused land on an improved site can be a confusing consideration in highest and best use analysis. As defined previously, *excess land* is the land not needed to serve or support the existing improvement; it may or may not have the same highest and best use as the improved parcel. An important characteristic of excess land is the potential for separating it from the rest of the improved parcel and selling the excess land for a separate use. In contrast, *surplus land* is defined as land that is not needed to support the existing improvement but that cannot be separated from the property and sold off.

In short, a site with excess land may be able to support two separate highest and best uses: (1) the highest and best use of the land used to support the existing improvements and (2) the highest and best use of the excess land. Surplus land, meanwhile, is currently unused land that might at best be used for the expansion of the existing improvements, i.e., a modification of the current use, if legally permissible and financially feasible. Whether unused land is deemed excess land or surplus land, the property is considered an underimprovement because the unused land could likely be put to some purpose, either as a separate use for excess land or an expansion of the current use for surplus land.

Excess land is generally perceived as being more marketable than surplus land because of the potential for selling excess land separately. However, a variety of physical, legal, and other factors can affect whether unused land can be classified as excess land. For example, a lease that covers all of the land of an underimproved property can postpone or delay development or separate use of excess land until the lease expires.

When the appraised property includes excess land, the excess portion and the improved portion are valued separately, each based on their own highest and best use. If the assignment includes valuing the two together as though sold in one transaction, the appraiser must consider whether the sum of the two values equals the value of the whole or whether an adjustment is needed to that sum to reflect a bulk sale. Also, the appraisal is based on the hypothetical condition that the excess portion and the improvement portion are two separate legal parcels, even though they are currently not separate parcels. (If, in fact, the excess land and the improved portion of the parcel are already two separate legal parcels as of the date of value, then the appraisal would not be subject to the hypothetical condition.)

Proposed Construction

Analysis of the highest and best use of the land as though vacant can often involve an analysis of proposed construction. For example, consider an assignment in which the land is vacant at the time the appraisal is prepared, and the assignment calls for the appraiser to develop an opinion of market value that is either

- subject to the hypothetical condition that the proposed improvements are built as of the current date or
- subject to the extraordinary assumption that the proposed improvements will be built as of a future date.

In this case, the appraiser analyzes the highest and best use of the property *as if improved as proposed*. This sort of extraordinary assumption is based on a conclusion developed from the appraiser's research and data, i.e., that the improvements will be completed at a certain time in the future when the market would accept that use. Because readers of the appraisal report may misunderstand the appraiser's opinion that the proposed construction is likely and not realize that the improvements do not actually exist at present, the appraiser must take care to explain the effect of the difference in the timing of the uses.

Proposed improvements may or may not represent the highest and best use of the property as improved. The four tests of highest and best use are applied just as they are for any improved property to support the appraiser's conclusion as to which use is most desired in the market. Proposed construction may be all new construction or a modification of the existing improvements, but in either case the four tests are applied to the proposed improvements and reported with a clear presentation of the appraiser's projection of the timing of the proposed use.

Legally Nonconforming Uses

A legally nonconforming use is a use that was lawfully established and maintained but no longer conforms to the land use regulations of the zone in which it is located.[2] Some legal nonconformities can be created by governmental action such as a partial taking in an eminent domain proceeding. Consider a gas station property with 20,000 square feet of land, which is the minimum amount of land area required by local zoning for gas station use. If the city acquired 1,000 square feet of the land for an intersection improvement, the site would then contain 19,000 square feet and would no longer conform to the zoning requirements for site size. Other legally nonconforming use situations can be created when codes and ordinances are changed. For example, suppose a one-unit residence on a 7,500-sq.-ft. site in the core residential district of a community zoned R-1 requires at least 7,500 square feet of land area. If the city adopts a new zoning ordinance in which the minimum site size for a lot zoned R-1 is increased to 10,000 square feet, the existing property will no longer conform. In both instances, the property uses are considered legally nonconforming uses because they were caused by an action of a governmental body.

Some communities also differentiate between (1) legally nonconforming uses and (2) properties that are legal land uses but do not conform to current development norms. In the former case, the use is nonconforming. In the latter, the property is still being used in accordance with the zoning even though the site (or the improvements) may be too small or otherwise inconsistent with development norms. Most zoning ordinances have special sections that deal with nonconforming use situations, and appraisers should be familiar with them.

Zoning changes may create underimproved or overimproved properties. A one-unit residence located in an area that is subsequently zoned for commercial use may be an underimproved property. In this case, the residence will most likely be removed so that the site can be improved to its highest and best use, or the residence will be considered an interim use until conversion to commercial use is financially feasible. A legally nonconforming property can be an overimprovement when zoning changes reduce the permitted intensity of property use. For example, the site of an older apartment building with eight units in a fully built-up neighborhood might be downzoned to a less intense use. That is, if the vacant site were developed now, the new zoning restrictions would only allow six units to be built. Nonconforming uses also commonly result from changes in development standards that affect features such as landscaping, parking, setbacks, and access.

Zoning ordinances usually permit a preexisting, or grandfathered, use to continue but may prohibit expansion or major alterations of any structures that support the nonconforming use. Some jurisdictions specify a time period for phasing out legally nonconforming uses. In many jurisdictions, a nonconforming use that is discontinued cannot be reestablished. In most jurisdictions, a nonconforming use must be

2. The traditional term *legally nonconforming use* has many synonyms constructed with similar words, e.g., *legal nonconforming use* and *legal but nonconforming use*. However, neither the words *legal* or *legally* are necessary modifiers. In plainest terms, a use that can continue is *nonconforming*, and a use that cannot continue is *illegal*.

eliminated if the property suffers major damage or if the property is abandoned for a statutory period of time. In some instances, a nonconforming use can be rebuilt to the same intensity of use that it had prior to its destruction, provided it has no more impact on the market area (e.g., a detrimental effect on neighboring properties) than it did before.

A zoning variance can create a legally nonconforming use. An area variance (less commonly known as a *use variance*) may be allowed due to special circumstances applicable to a specific property, when strict application of the provisions of a development code deprives the property of privileges commonly held by other property in the vicinity that is under the same zoning. When a variance is granted, the legally nonconforming use usually can be rebuilt without taking any unusual steps, in contrast to a grandfathered use that is legally nonconforming.

When valuing land with a legally nonconforming use, an appraiser should recognize that the current use may be producing more income, and thus have more value, than the property could produce with a conforming use. The legally nonconforming use may also produce more income and have a higher value than comparable properties that conform to the zoning. Therefore, when the value of a property with a legally nonconforming use is developed by comparing similar, competitive properties to the subject in the sales comparison approach, the appraiser should consider the higher intensity of use allowed for the subject property and also consider the risks and limitations associated with the nonconformity. In the case of the eight-unit apartment building in an area downzoned to six-unit developments, for example, the appraiser will have to determine whether sales of properties with six units are appropriate comparable transactions in applying the sales comparison and income capitalization approaches or whether the sales should be of properties with eight units.

legally nonconforming use
A use that was lawfully established and maintained, but no longer conforms to the use regulations of the current zoning in the zone where it is located; also known as a *grandfathered use*.

In some cases, a legally nonconforming use designation may affect the value of a property negatively. Appraisers must understand enough about the legal requirements affecting properties in the area to be able to identify when there are further issues to consider. For example, in many municipalities a nonconforming use cannot be rebuilt if it is completely or partially destroyed. Some lenders consider the restriction on rebuilding a risk, and lending practices or parameters for conforming and nonconforming properties may differ. As a result, some lenders require insurance against loss due to the nonconforming use, thus reducing net income to the property and therefore value.

Legally nonconforming uses that correspond to the highest and best use of the property as improved are often easy to recognize. Sometimes, however, it is not clear whether an existing legally nonconforming use is the highest and best use of the site as though vacant. The question can only be answered by carefully analyzing the income or selling price produced by the legally nonconforming use and the incomes or selling prices that would be produced by alternative uses if the property were brought into conformity with existing regulations.

Illegal Uses

Sometimes a property being appraised includes improvements that were constructed without permits. Often in these cases the client will instruct the appraiser to "just ignore" the illegal portions, but this is inappropriate. If the appraiser does "ignore" the illegal improvements, the appraisal would have to be premised on the hypothetical condition that the illegal improvements do not exist when in fact they do exist.

To value a property with illegal improvements in its "as is" state, the appraisal must reflect the cost to remedy the illegality–i.e., to either remove the illegal improvements or obtain legal permissibility. Obtaining legal permissibility might include upgrading the improvements so they conform to building codes and the payment of fees or fines. If a market exists for the illegal use, the prices paid do not necessarily represent market value because market value is based on the highest and best use of a property and the highest and best use is based on a legal use.

Use That Is Not Currently the Highest and Best Use

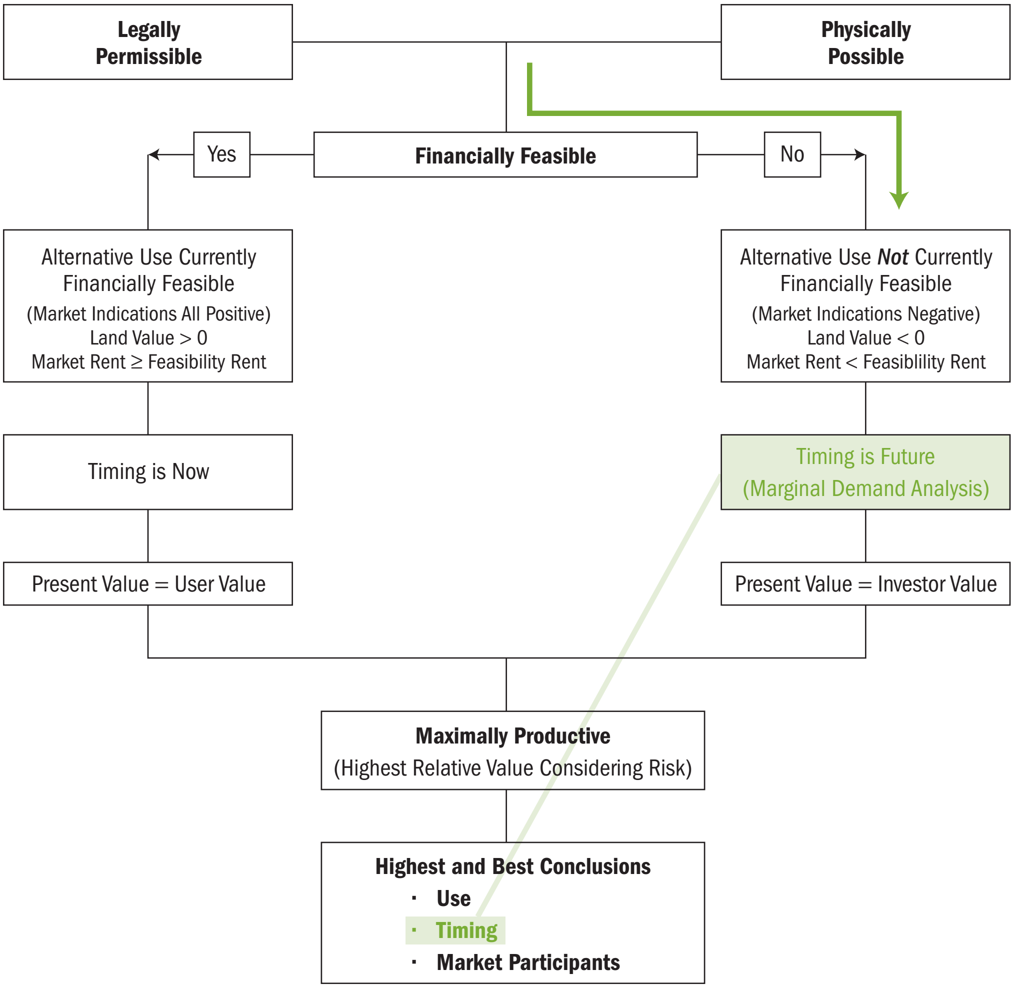
The timing of alternative uses is a consideration in highest and best use conclusions because highest and best use is subject to change. In particular, the financial feasibility of an alternative use is sensitive to the market acceptance of that use now or at a future time. When no alternative uses are currently financially feasible, an appraiser should analyze when an alternative use will, if ever, become financially feasible and therefore become a candidate for the maximally productive use. The right side of Figure 16.4 illustrates the analysis when an alternative use is not currently financially feasible.

Uses that are not currently financially feasible can be analyzed to forecast when they would be financially feasible at some point in the future, i.e., when market rent rises above feasibility rent. The marginal demand analysis that is part of the six-step market analysis process provides the information needed to forecast when a use will become financially feasible. (This is another example of the importance of market analysis throughout the valuation process.) Alternative uses that are currently financial feasible and those that are forecast to be financially feasible can be compared with discounted cash flow analysis, which is discussed in detail in Chapter 25.

The financial feasibility of a potential alternative use may not be the reason it is not currently the highest and best use. Sometimes the problem is revealed earlier in the testing process. A piece of land can be stripped of any viable economic use as a stand-alone entity by legal and physical constraints such as

- an inability to obtain a building permit
- restrictive covenants that preclude any economic use or structure

Figure 16.4 When an Alternative Use Is Not Financially Feasible



- the presence of easements
- an inability to comply with lot area, lot dimension, or setback requirements
- no legal means of access
- lack of accessibility (isolated location or abutting an unopened road allowance)
- unfavorable topographical features
- unfavorable soil conditions, including environmental contamination
- an irregular configuration
- an inability to secure essential services (water supply and sewage disposal either on site or off site)

- development rights that were previously sold

In the case of environmental contamination, the cost of environmental cleanup might be prohibitive, and the estimated cost to cure would be part of the test of financial feasibility.

Interim Uses

Highest and best uses are subject to change over time. The use that a site or improved property is put to until it is ready for its highest and best use has traditionally been known as the *interim use*. An interim use is not the highest and best use of the property at the present time, and it should not be represented as the subject property's current highest and best use. Rather, the current highest and best use of a property with an interim use would be to leave the property as is until land value rises to a level that modification of the interim use (or demolition of the improvements and redevelopment for some other use) is financially feasible.

An interim use may or may not contribute to value until the highest and best use of the property can be achieved. If an old building or other use cannot produce gross revenues that exceed reasonable operating expenses, it does not contribute to property value. Many outmoded improvements clearly do not resemble the ideal improvement, but they do create increments of value over the value of the vacant land. If the net return of the property as improved is less than the amount that could be earned by the vacant land, the improvements do not have contributory value (although some property owners may understandably prefer to retain the structure–e.g., a single-family dwelling on commercial land in transition–rather than leave the land vacant). Indeed, the value of an improved property may be less than the value of the land as though vacant when demolition costs and real estate taxes are considered. The market value of the land is based entirely on its highest and best use. At the same time, the interim use may have value to the property user to the extent that the income generated by the improvements defrays the costs of carrying the property and the cost of demolishing the improvements.

Land that is held primarily for future sale, with or without an interim use, may be regarded as a speculative investment.[3] The purchaser or owner may believe that the market value of the land will increase, but there is a risk that the expected appreciation will not occur. The appraiser may be able to predict the general type of future use and the timing for the use based on the land's site, legal, locational, and market demand characteristics compared to competitive vacant tracts. The timing for a speculative use is usually estimated in a range, which can be broad in areas of long-term growth and tighter in areas with more current development potential.

interim use
The temporary use to which a site or improved property is put until a different use becomes maximally productive.

3. In general usage, the term *speculative investment* can carry negative implications of high risk or uncertainty. In the language of real estate appraisal, *speculation* is defined as the purchase or sale of property motivated by the expectation of realizing a profit from a rise in its price.

Mixed Uses

Highest and best use often comprises more than one use for a parcel of land or an improved property. A large tract of land might be suitable for a planned unit development with a shopping center in front, condominium units around a golf course, and one-unit residential sites on the remainder of the land. Business parks often have sites for retail stores in front and warehouse or light manufacturing structures in the rear.

One parcel of land may serve many functions. Timberland or pastureland may also be used for hunting, recreation, and mineral exploration. Land that serves as a right of way for power lines can double as open space or a park or may be used for agricultural purposes. Public streets with railroad sidings are also considered multiple-use land.

A single building can have multiple uses as well. A hotel may include a restaurant, a bar, and retail shops in addition to its guest rooms. A multistory building may contain offices, apartments, and retail stores. A "single-family," owner-occupied home may, where permitted, have an upstairs or basement apartment.

If the highest and best use of a property is for more than one use on the same parcel or in the same building, the appraiser must analyze the contributory value of each use. If, for example, the market value of a timber tract that can be leased for hunting is compared on a unit basis with the value of another timber tract that cannot, the difference should be the value of the hunting rights. In the opinion of market value, the appraiser would have to account for both the value of the hunting rights and the value of the timber operation on the site. In oil-producing areas, appraisers are often asked to segregate the value of mineral rights from the value of other land uses. Properties with mineral rights value can be compared with properties that do not have such rights.

Special-Purpose Properties

Because special-purpose properties are appropriate for only one use or for a limited number of uses, appraisers may encounter practical problems in specifying highest and best use. The highest and best use of a special-purpose property as improved is probably the continuation of its current use if that use remains viable and there is sufficient market demand for that use. The highest and best use conclusion would likely include some forecast of continued economic demand, which may be demand for the finished product more than demand for the real estate. If the current use of a special-purpose property is physically, functionally, or economically obsolete and no alternative uses are feasible, the highest and best use of the land might be realized by demolishing the structure and selling the remains for their scrap or salvage value, if possible. This may be true even if the improvements are relatively new and they were costly to build.

Whenever multiple highest and best uses are analyzed, an appraiser must be careful to develop each value opinion appropriately and be very clear in reporting the assignment results. An opinion of market value requires that there be a market for the property. If there are no buyers for the subject property in its current use, an alternative use must be considered. Using the cost approach to value a special-use property where no market exists will usually overstate the market value of the property unless a deduction is made to reflect the lack of a market.

Conclusions of Highest and Best Use

Conclusions for both the land as though vacant and the property as improved are reported in terms of

- use
- timing
- market participants, i.e., users or most probable buyers or tenants

Traditionally, appraisers have emphasized the physical use in the conclusion of highest and best use, but all three considerations are necessary to identify the highest and best use fully.

As mentioned previously, an appraiser's research will determine how specific the conclusion of the highest and best use of a property should be to accurately represent how the market considers the appraised property. General categories such as "an office building," "a commercial building," or "a one-unit residence" may be adequate in some situations, but in other situations the particular use demanded by market participants should be specified, such as "a suburban office building with 10 or more floors" or "a three-bedroom residence with at least 2,500 square feet." In any case, an appraiser should provide market evidence that leads the reader of the appraisal report to an understanding of the use or uses.

The intensity of use is an important and often overlooked consideration in highest and best use analysis. The present use of a site may not be its highest and best use. The land may be suitable for a much higher, or more intense, use. For instance, the highest and best use of a parcel of land as though vacant may be for a 10-story office building, while the office building that currently occupies the site has only three floors. Conversely, it is possible the highest and best use could be less intensive than the current use, perhaps due to a downturn in demand. As recent experience has shown, land zoned and platted for residential development prior to the financial crisis and the ensuing economic downturn may no longer have a highest and best use as the site for new homes or apartments, and the demand for new housing may not return in the foreseeable future. In such a case, the highest and best use may simply be to leave the land vacant, holding it until demand for some other use of the land appears. It would be incorrect to say that the highest and best use is for residential development when there is no demand.

In addition to the nature of the land use itself, the timing of a specified use is an important consideration of the conclusion of highest and best use. In many instances, a property's highest and best use may change in the foreseeable future. For example, consider the present use of a farm in the path of urban growth. If the land is ripe for development at the time of the appraisal, the highest and best use would likely be for some alternative use, not the site's present use. If the land has no subdivision potential, its highest and best use would be for continued agricultural use. In such situations, a supportable forecast of when it would be financially feasible to develop the land or convert the improved property to a different use is critical for the conclusion of highest and best use.

Another important consideration is who among the market participants would be attracted to the use deemed to be the highest and best use. In the market delineation step of the market analysis process (Step 2), appraisers determine the most likely users for a specified use as well as probable buyers, who may have different motivations for purchasing the property.

The development of those conclusions in the market analysis process is integral to highest and best use analysis, which in turn is integral to the valuation of the property. The most probable buyer is a critical conclusion used in choosing comparable sales in the sales comparison approach; the probable user is critical in choosing comparable leases in the income capitalization approach.

Reporting Highest and Best Use Conclusions

When an appraisal report includes an opinion of the market value of the subject property, the report must address highest and best use. A logically structured study of the four tests of highest and best use forms the foundation for the opinion of value. Certain conditions of an appraisal assignment may alter the information that should appear in the appraisal report regarding highest and best use, as illustrated in Table 16.2.

As illustrated in this chapter, much of the information required to perform highest and best use analysis is developed using the six-step market analysis process. A discussion of, or reference to, a separate marketability study (of either inferred demand or fundamental demand) may need to precede the discussion of the highest and best use determination to provide context for the highest and best use conclusions.

Table 16.2 Highest and Best Use Statements in Appraisal Reports

If...	The land is already improved to the highest and best use.
Then the report should include...	A discussion of the appraiser's analysis and conclusion.
If...	A separate estimate of land value is not presented, and continued use of the property as improved is an appropriate limiting condition of the appraisal.
Then the report should include...	Discussion of only the highest and best use of the property as improved, unless the highest and best use of the land as though vacant is relevant to the analysis of highest and best use as improved.
If...	The highest and best use of the land as though vacant and highest and best use of the property as improved are different.
Then the report should include...	Discussion of the analysis of each highest and best use separately.

In addition, highest and best use analysis often incorporates techniques and data from the application of all three approaches to value. In many appraisal assignments, the final tests of financial feasibility and maximum productivity require information that is obtained from the application and development of the approaches. Therefore, even though the discussion of highest and best use traditionally precedes the approaches to value in an appraisal report, the conclusion of highest and best use often can be finalized only after a preliminary analysis of alternative land uses has been performed. The conclusions reported in the highest and best use section of a report should be consistent with conclusions and applications in the other parts of the report.

Common Errors and Issues in Reporting Highest and Best Use

- One misconception is that it is acceptable to simply state the highest and best use conclusion. Appraisals typically require some analysis of highest and best use. Just providing data is not addressing highest and best use—the data must be analyzed.
- Another misconception is that it is unnecessary to discuss excess land or functional issues relating to highest and best use.
- Because sections of appraisal reports are related, the market analysis and other report sections must support the highest and best use conclusions as well as the sections discussing the application of the approaches to value.
- When the existing use is legal but nonconforming and this is obviously the highest and best use, it is appropriate to acknowledge in the report that the highest and best use is the current use and that it is legal but nonconforming.

Land and Site Valuation

Land has value because it provides potential utility as the site for a structure, recreational facility, agricultural tract, right of way for transportation routes, water storage, and other uses. Land may have value because the owner can extract valuable minerals (e.g., oil, coal, gravel, sand, iron ore) from it. In some locales, the ability to extract water from a site is very valuable, and that right will dwarf all other forms of utility. In other areas, the ability to build in the air space above a parcel of land may have as much or more value than the potential uses of the surface or subsurface of the land. In sum, if land has utility for a specific use and there is demand for that use, then the land has value to a particular category of users. Beyond the basic utility of land, however, many principles and factors must be considered in the process of land valuation.

Relation to Appraisal Principles

Value Concepts and Principles

The appraisal principles of anticipation, change, supply and demand, substitution, and balance all influence land value. Anticipation means that value is created by the expectation of benefits to be derived in the future. For example, if buyers anticipate that raw land in a certain location will be in demand for office use within the next five years, they may be motivated to acquire land for future development even though the development of office space is not presently feasible. The competition among the buyers in the market for raw land creates a price level for the land that may have little to do with the current use.

In comparison to most commodities, the supply of land is relatively stable. Although vast changes have occurred in the earth's surface over the ages and slight modifications in the supply and quality of land may occur over a lifetime, these changes usually occur over such a long term that their effects are imperceptible in real estate markets. There are, however, a few notable exceptions to the permanence of land, such as the accretion or erosion of land along a shoreline, the pollution of land with harmful wastes, the exhaustion of agricultural land through improper farming methods, and the transformation of arable land into arid land due to ecological imbalances or climate change. Earthquakes may change the surface of the earth, faults beneath the surface can create vast sinkholes, and old underground mines can cause subsidence. Fortunately, these occurrences that change the supply of land are rare.

The principle of substitution, which holds that a buyer will not pay more for one property than for an equivalent property, applies to raw land and developable sites just as it does to improved property. The principle of substitution indicates that the greatest demand will be generated for the lowest-priced site with similar utility. The principle of balance is also applicable to the value of land and sites. When the various elements of a particular economic mix or a specific environment are in a state of equilibrium, land value is sustained. When the balance is upset, values change. For example, if an industrial district has too much industrially zoned land and a declining number of industrial users, then the value of industrial land will probably fall or remain the same over a period of time. On the other hand, if the industrial district is in transition to other uses and there is a reasonable probability of a zoning change, the value of a particular site could be higher than sales of comparable industrial sites would indicate.

Property Rights and Public Controls

An appraiser's analysis of the value of a parcel of land focuses on the physical parcel and the accompanying property rights. These rights may include the right to

- develop the land to its highest and best use
- lease the land to others
- farm the land
- mine the land
- alter the land's topography
- subdivide the land
- assemble the parcel of land with other parcels
- hold the land for future use
- construct or alter building improvements

Whenever possible, appraisers consult title reports, public records, or available land survey information to identify easements, rights of way, and private or public restrictions that affect the subject property.

In an effort to encourage planned growth and compatibility among different land uses, governments regulate how land can be used. Most municipalities and counties have some form of zoning regulations that specify how a parcel of land can be developed. In addition to zoning, many jurisdictions have master plans or comprehensive land use plans that specify long-term development goals. Frequently, real estate developers must have amenities such as open space, streets, and off-site public improvements in place or dedicated before a proposed development receives approval from the appropriate public agency. Usually, developers will proceed with development only after they have submitted detailed development plans and obtained building department approval. In many areas, citizen groups will protest a development they do not like, and their objections can influence the type of development that is finally approved. Typically, after site plan approval has been achieved and permitting has been obtained for a development, the value of the land increases substantially. At that point, the site has full entitlements for immediate development.

Through the power of eminent domain, the government can acquire land from the private sector to be used for public and sometimes nonpublic projects, to augment the supply of public land, and to encourage economic development or eliminate blight in a specific area. The taking of private land for economic development, and particularly for private sector development, has come under greater public scrutiny since 2005 when the US Supreme Court issued its decision in *Kelo v. City of New London.*

In some jurisdictions, land value is based on development rights, which may be transferable. In urban areas, development rights are often very valuable, and discrete markets have formed in which these rights trade. In some rural areas, governmental agencies compensate farmers for retaining land in agricultural use, and the agencies then shift or sell the benefit of those development rights to other locations. Lower ad valorem taxes on agricultural land also affect rural land use. This form of tax subsidy tends to extend the duration of agricultural uses.

A relatively recent trend in the United States has been the acquisition of land through open space or conservation easements that are held in perpetuity by qualified agencies. These permanent encumbrances limit or prohibit the development potential of land. The potential uses of land subject to perpetual open space or conservation easements are usually restricted, as specified in the deed of easement, and thus the value of the land is affected. Open space is also preserved through the donation of specified easement rights to a qualified recipient such as a land trust.

Water, mineral, and air rights can be important in an appraiser's consideration of the relevant property rights in the valuation of land.[1]

1. See also Appendix G of American Society of Farm Managers and Rural Appraisers and Appraisal Institute, *The Appraisal of Rural Property*, 2nd ed. (Denver and Chicago, 2000).

Water rights cover the flow of water, usually for stated times and in stated quantities, for irrigation and hydroelectric power generation. Water rights also can take the form of riparian rights that, under common law, grant a landowner the ownership of waters that share a border with the parcel of land. In certain areas, these rights can be critical to real estate valuation. Mineral rights cover the underground portion of the land and usually refer to the right to extract underground minerals or to use underground caverns or reefs for storage. The valuation of mineral rights usually requires specialized research, but appraisers should understand if mineral rights are excluded from land ownership. Real estate developments established on air rights, usually over railways, can be found in older urban areas, particularly where the density of the built environment is already high and less land is available for new construction.

Physical Characteristics and Site Improvements

In the common parlance of valuation, raw land becomes a *site* when the parcel of land is improved and ready to be used for a specific purpose. The physical characteristics of a site, the utilities available, and the site improvements affect the use and value of the land. The physical characteristics of a parcel of land that an appraiser must consider include

- size
- shape
- frontage
- soils
- location
- view
- topographical characteristics such as contour, grade, and drainage

A site may have both on-site and off-site improvements that make it suitable for its intended use or for new construction. The availability of water, sewers, electricity, natural gas, and telephone and data lines also influences the use and development potential of a parcel of land (see Chapter 12). Off-site improvements may have an effect on the value of a site, even though they are not a part of the site. In contrast, a site's on-site improvements are subject to physical deterioration and functional obsolescence like buildings and other structures when the site is valued as improved.

Highest and Best Use

The valuation of land draws directly from the conclusions of highest and best use analysis. Even if a site is already improved, the site is valued as though vacant and available for development to its highest and best use. Consideration of the site as though vacant facilitates the orderly analysis and solution of appraisal problems that require land to be valued separately. The highest and best use of a competitive site on the date of sale is the basis of the comparability of that site to the property being appraised. Regardless of how physically similar a potentially comparable site is to the subject site, the sale property is not truly comparable if it does not have a similar highest and best use as the subject property, and in that case the potentially comparable site should be dismissed from further consideration in the analysis of the subject property.

The highest and best use of the property as improved is affected by how much the existing improvements contribute to the value of the property as a whole. The value contribution of the improvements can be estimated by subtracting the market value of the site from the market value of the property as improved. Site value may be equal to or greater than the value of the property as improved even when substantial improvements are located on the site. Demolition of existing improvements is usually appropriate when those improvements do not contribute to the overall property value. In that situation, the cost of converting the property into vacant land is deducted from the value indication for the site.

Sometimes the highest and best use of a property is to keep the land vacant until land values rise to support new development. In that situation, the only appropriate comparable properties would be other vacant sites being held for future development.

Excess and Surplus Land

As first discussed in Chapter 12, excess land is land that may be sold off separately from the rest of a property. An area of excess land may have a different highest and best use from the rest of the site, which must be addressed in the highest and best use analysis by testing alternate uses of the excess land for physical possibility, legal permissibility, financial feasibility, and maximum productivity in the market. Furthermore, excess land has to be treated separately in the valuation process. An entirely different set of comparable data may be required to analyze the value influences on the excess land, and the value indication of the excess land must be reported separately. Adding the value indication of the excess land to the value indication of the rest of the property may or may not be appropriate because the sum of the parts may or may not equal the value of the whole.

In contrast, surplus land does not have a separate value from the rest of the site because it cannot be sold separately. It is extra land that may or may not contribute value to the overall property. The primary distinction between excess land and surplus land is that surplus land does not have an independent highest and best use from the rest of the site. Surplus land may have the same value per unit of comparison (e.g., value per square foot, value per acre) as the rest of the site, or it may contribute less value per unit of comparison.

Possibility of Assemblage

Certain parcels can achieve a higher value as a part of an assemblage. In such cases, appraisers must either determine the feasibility and probability of assembly or consider whether the appraisal should be based on the assumption that such an assembly would be made. For example, suppose a large petrochemical plant could be built on a site that has been created by assembling several smaller tracts. The individual tracts may not have had the potential for such a large-scale industrial use separately, and therefore they may have had lower unit values for alternative uses.

If an appraiser concludes that the appraisal should be based on the assumption that the site will be assembled with other parcels of land, the costs and timing of achieving the assemblage and the economic demand for the assembled property must be taken into consideration. In the example of the petrochemical plant, assembling the complete site might take several years. Although the assemblage would allow the smaller parcels to accommodate the larger use, the time delay may be too long for the developer or user of the proposed petrochemical plant.

Appraisers should also recognize that a buyer who purchases a site with the intent to assemble it with other parcels might have to pay a higher-than-market value for that site, particularly for properties acquired near the end of the assemblage period, sometimes called *holdouts* or *hold-out parcels*. Appraisers should avoid summing the costs of the component parts (i.e., the smaller parcels) to develop an opinion of the market value of the whole (i.e., the larger assembled parcel). Conversely, they should avoid assigning the unit value of the whole to the components without other market evidence to support those conclusions.

Applicability and Limitations of Valuation Techniques

Sales comparison is usually the preferable methodology for developing an opinion of site value. When this method is used, most of the techniques for selecting comparable sales and making adjustments that are described in Chapter 18 can be applied to site valuation. When there are not enough sales of similar parcels for the application of sales comparison, alternative methods such as market extraction, allocation, and various income capitalization techniques may be used. The income capitalization techniques applied can be divided into direct capitalization techniques (i.e., land residual and ground rent capitalization) and yield capitalization techniques (i.e., the subdivision development method using discounted cash flow analysis).

Sales Comparison

Sales comparison may be used to value land that is actually vacant or land that is being considered as though vacant for appraisal purposes. Sales comparison is the most common technique for valuing land, and it is the preferred method when comparable sales are available. To apply this method, data on sales of similar parcels of land is collected, analyzed, compared, and adjusted to provide a value indication for the site being appraised. In the comparison process, the similarity or dissimilarity of the parcels is considered.

Table 17.1 Applicability and Limitations of Land Valuation Methods

Sales Comparison	
Procedure	Sales of similar, vacant parcels are analyzed, compared, and adjusted to provide a value indication for the land being appraised.
Applicability	Sales comparison is the most common technique for valuing sites, and it is the preferred method when comparable sales are available.
Limitations	A lack of sales and the comparability of the available data may weaken support for the value estimate.
Market Extraction	
Procedure	An estimate of the depreciated cost of the improvements is deducted from the total sale price of the property to arrive at the land value.
Applicability	This technique is most applicable when · The contribution of the improvements to total property value is generally small and relatively easy to identify. (The technique is frequently used in rural areas.) · The improvements are new, their cost is known, and there is little or no depreciation from any causes.
Limitations	The appraiser must be able to determine the value contribution of the improvements, estimated at their depreciated cost.
Allocation	
Procedure	A ratio of site value to property value is extracted from comparable sales in competitive locations and applied to the value of the improved subject property or comparable properties to develop the site value.
Applicability	This technique is applicable when · Valuing one-unit residential lots where ample sales of both lots and improved homes are available for comparison purposes. This method tends to be less accurate for commercial properties, especially when the number of vacant land sales is inadequate. · For commercial properties or where relatively few sales are available, allocation can provide a check for reasonableness rather than a formal opinion of site value.
Limitations	The allocation method does not produce conclusive value indications unless ample sales data is available. The method is rarely used as the primary land valuation technique for properties other than residential subdivision lots. Also, land-to-property value ratios can be difficult to support.
Income Capitalization Methods	
Direct Capitalization: Land Residual Method	
Procedure	The net operating income attributable to the land is capitalized at a market-derived land capitalization rate to provide an estimate of value.
Applicability	This technique is most applicable in testing the feasibility of alternative uses of a particular site in highest and best use analysis or when land sales are not available.
Limitations	The following conditions must be met: 1. Building value is known or can be accurately estimated. 2. Net operating income to the property is known or can be estimated. 3. Both building and land capitalization rates are available from the market.
Direct Capitalization: Ground Rent Capitalization	
Procedure	A market-derived capitalization rate is applied to the ground rent of the subject property.
Applicability	This method is useful when · Comparable rents, rates, and factors can be developed from an analysis of sales of leased land.
Limitations	An adjustment to the value indication for property rights may be necessary when current rent under the existing contract does not match market rent.
Yield Capitalization: Subdivision Development Method (Discounted Cash Flow Analysis)	
Procedure	Direct and indirect costs and entrepreneurial incentive are deducted from an estimate of the anticipated gross sales price of the finished lots, and the net sales proceeds are discounted to present value at a market-derived rate over the development and absorption period. If entrepreneurial incentive is not deducted as a line-item expense, then the discount rate must reflect the full effect of any profit.
Applicability	This technique is applicable when · Subdivision development is the highest and best use of the land and there is market support for immediate absorption.
Limitations	Discounted cash flow analysis requires significant amounts of data such as development costs, profit margins, sales projections, and the pricing of developed lots, together with a supportable forecast of market absorption.

Note: Certain US states do not recognize subdivision development analysis as a valid valuation method for litigation valuation or other purposes.

Appraisers perform several tasks in developing an opinion of site value:

- Gather data on actual sales as well as listings, offers, and options based on highest and best use.
- Identify the similarities and differences in the data.
- Identify the highest and best use and other characteristics of each potential comparable sale and then choose the appropriate sales for analysis.
- Identify units of comparison that explain market behavior.
- Adjust the appropriate unit prices of the comparable sales to account for the dissimilar characteristics of the site being appraised.
- Form a conclusion as to the market value of the subject site.

The objective of sales comparison is to select the most comparable sales and then adjust the comparable sales for differences that cannot be eliminated within the selection process. Elements of comparison may include property rights, financing terms, conditions of sale (motivation), expenditures immediately after purchase, market conditions (changes over time), location, physical characteristics, available utilities, and zoning. The physical characteristics of a parcel of land include, but are not limited to, its size, shape, frontage, topography, soil conditions, location, and view. (For a detailed discussion of elements of comparison, see Chapter 19.) Unit prices may be expressed as price per square foot, front foot, acre, lot, dwelling unit, floor area ratio (FAR), or other unit used in the market.

If sale prices have been changing rapidly over the past several years and an adequate amount of sales data is available, the sales selected for comparison should take place as close as possible to the effective appraisal date. When current data on local sales is not available, appraisers may need to expand the search to another market area, which may call for an adjustment for location, or extend the search back in time in the same market area, which usually calls for an adjustment for market conditions. The decision to use sales from another market area or older sales should be based on which adjustment has more support–the location adjustment or the market conditions adjustment.

Among generally similar sales, size may be less important as an element of comparison than date and location. Most land uses have an optimal site size. If the site is too large, the value of the surplus land tends to decline at an accelerating rate. Because sales of different sizes may have different unit prices, appraisers ordinarily give more weight to comparables that are approximately the same size as the subject property.

Sales comparison is the most commonly used and preferred method of valuing land. Data on sales of similar parcels of land is collected, analyzed, compared, and adjusted to reflect the similarity or dissimilarity of those parcels to the subject property.

Zoning is a basic criterion in selecting comparables. Sites zoned the same as the subject property generally have the same or a similar highest and best use and may be the most appropriate comparables. However, zoning can be less important than utility or highest and best use in areas that are in transition or targeted for redevelopment. If sufficient sales in the same zoning category are not available, data from similar zoning categories can be used and adjustments may be necessary.

In addition to recorded sales and signed contracts, appraisers may consider offers to sell (listings) and offers to purchase. Offers provide less reliable data than signed contracts and completed sales. Often, but not always, the final sale price is lower than the initial offer to sell but higher than the initial offer to buy. Negotiations can take place in several stages.

Additionally, appraisers may choose to use a recent sale of the subject property as a comparable sale. For example, if the subject site sold 18 months ago for $545,000 in a market that is increasing at 3% per year (on a straight-line basis, i.e., not compounded), the appraiser would derive an indication of market value by adjusting the prior sale for the changes in the market:

$$545{,}000 \times [1 + (1.5 \times 0.03)] = \$569{,}525$$

This assumes that the property has not changed since the prior sale, the prior sale meets all the requirements of a market sale, and the prior sale occurred within a reasonable period from the effective date of value. It also assumes that there have been no material physical changes to the property during the intervening period and that applicable zoning and land use regulations have not changed.

Data on land sales is available from sources such as data services, newspapers, and deed and assessment records. Interviews with the parties involved in transactions–i.e., the buyers, sellers, lawyers, and brokers–provide more direct information and may reveal adjustments that should be made for conditions of sale or sale concessions. These interviews should also identify the intended use and the status of approvals and entitlements. After comparable data is collected and categorized and the comparable properties are examined and described, sales data can be assembled in an organized, logical manner. Sales are commonly arrayed in a market data grid that identifies the elements of comparison that may require adjustments. Appropriately developed adjustments for significant differences between the subject property and the comparable properties may be made to the sale or unit prices of the comparables using a variety of techniques. (Techniques for making adjustments in sales comparison analysis are discussed in Chapter 19.[2])

Generally, separate adjustments are made to the comparable sales for each element of comparison. The magnitude of each adjustment is indicated by the data and the judgment of the appraiser. Land parcels of different sizes sell at different unit prices because the optimal size of a parcel depends on its use. Unit prices also vary with the date of sale and location. If the data selected is not sufficient to support the required adjustments, the appraiser should gather and analyze additional comparable data.

A sale price adjustment may be a precise dollar amount or percentage developed from market evidence. Adjustments can be totaled and

2. See also James H. Boykin, *Land Valuation Adjustment Procedures and Assignments* (Chicago: Appraisal Institute, 2001).

factored into the comparable sale prices as part of the initial data gathering process. Typically, adjustments are made in a preferred order–i.e., transactional adjustments for property rights, financing, and sale and market conditions are made before property adjustments for location and physical characteristics. All adjustments should be presented in the appraisal report in a logical and understandable manner. Alternatively, if adjustments cannot be supported by market evidence, the comparative analysis of sale prices still can still help appraisers understand a comparable property's relative superiority or inferiority to the subject property.

Alternative Methods

Vacant parcels of land in densely developed urban locations may be so rare that their values cannot be estimated reliably by direct comparison. Similarly, sales of vacant parcels of land in remote areas may occur so seldom that sufficient comparable data is not available. In such cases land value can be estimated by market extraction, allocation, or one of the income capitalization techniques.

Market Extraction

Market extraction is a valuation technique in which land value is extracted from the sale price of an improved property by deducting the contributory value of the improvements. The remaining value represents the value of the land. Improved sales in rural areas are frequently analyzed in this way because the building and site improvements contribute little value in comparison to the underlying land value. The improvement contribution is typically small and relatively easy to quantify.

Given the necessary market data, the application of market extraction is a straightforward process. However, its actual application is often far more complicated. As an example, consider a vacant subject site in an area where few sales of comparable sites have occurred recently. The sales summarized in Table 17.2 involve sites that are similar to the subject property except for the improvements. The estimated value of the improvements is subtracted from each sale price to calculate value indications for the sites of the comparable properties (Table 17.3). Those value indications can, in turn, be analyzed using sales comparison techniques and reconciled into a value indication for the subject site. In this case, the value indications range from $407,000 to $435,000.

Table 17.2 Comparable Sales for Market Extraction

Sale	Sale Price	Description
1	$450,000	Includes storage building that contributes $15,000
2	$465,000	Includes 1,500-sq.-ft. building valued at $32 per square foot
3	$432,000	Includes permits and approvals for construction worth $25,000
4	$448,000	Includes a temporary sales building that contributes $32,000

Table 17.3 Market Extraction of Site Value

	Sale 1	Sale 2	Sale 3	Sale 4
Sale price	$450,000	$465,000	$432,000	$448,000
Less contribution of improvements	– $15,000	– (1,500 × $32)	– $25,000	– $32,000
Value indication	$435,000	$417,000	$407,000	$416,000

Allocation

The allocation method is based on the principle of balance and the related concept of contribution. Both affirm that there is a normal or typical ratio of land value to property value for specific categories of real estate in specific locations. Meaningful support for an allocation ratio may be derived from a variety of sources such as observed patterns over time in an area and consultation with developers who sell improved properties and can allocate sale prices between the land and the improvements based on their costs.

In situations where there is limited sales data, the allocation method does not produce credible value indications, but it can be used to establish approximate land value when the number of vacant land sales is inadequate. For example, an appraiser could use allocation to value the site for a new one-unit home in a large, newly developed subdivision where few sales of vacant land have occurred but credible data from several recent sales of improved properties is available. The sale prices of new homes in the development range from $275,000 to $315,000, and the developer reports that site values within the subdivision range from 15% to 20% of sale prices. Based on these figures, a reasonable range for site values would be from $41,250 to $63,000.

Because of the relatively large number of sales needed to support a credible value opinion when many adjustments for transactional and property differences are necessary, allocation is rarely used as the primary method of site valuation for commercial properties. The most common application is in residential subdivision lot sales analysis, where the appraiser can directly measure the ratio of lot value to total property value. Allocation is not used often for commercial properties because parcel size and intensity of use vary widely. Parcels that have more land than is necessary for the existing improvements are also difficult to value using allocation.

The allocation method, and sometimes the market extraction method, can be difficult to use in markets where the highest and best use and land value ratios of comparable parcels are not similar to the subject property. For example, consider a subject site that is zoned for commercial use but is improved with a residence. The commercial land value is $500,000 and the improved property value is $550,000. In this case, if the comparable sites did not have similarly high land value ratios, the allocation and extraction methods would give a misleading indication of value. The allocation and extraction methods should be used with extreme care and only when lack of market data prevents application of more direct methods and procedures.

Income Capitalization Procedures

The various income capitalization procedures used to estimate land values rely on information that is often difficult for an appraiser to obtain (e.g., reliable capitalization rates for the land residual technique). Therefore, these techniques are generally not used as primary valuation techniques except in special situations such as subdivision development analysis. (Direct capitalization and yield capitalization techniques are discussed in more detail in Chapters 23, 24, and 25, and examples of land valuation using discounted cash flow analysis are shown in Chapter 26.)

Direct Capitalization: Land Residual Method

Historically, the land residual method was used to estimate land value when sales data on similar parcels of vacant land was not available. Techniques like extraction and allocation have superseded the land residual method in land valuation because these other techniques rely on fewer variables and thus are more credible. In current practice, the land residual method is used almost exclusively in highest and best use analysis to test the productivity of alternate uses of the site as though vacant (see Chapter 16).

The land residual method requires that the following conditions be met:

1. Building value is known or can be accurately estimated.
2. Net operating income to the property is known or can be estimated.
3. Both building and land capitalization rates can be extracted from the market.

Small variations in any of these variables can result in a dramatic change in the land value estimate. For this reason, courts have shown a clear disdain for the land residual method. (Chapter 28 discusses procedures for estimating building costs, Chapter 22 discusses the development of income and expense estimates, and Chapter 23 discusses the extraction of land and building capitalization rates.)

To apply the land residual method, an appraiser first determines what actual or hypothetical improvements represent the highest and best use of the site as though vacant. Then the net operating income (*NOI* or I_O) of the property is estimated from market rents and operating expenses as of the date of the appraisal. Next, the appraiser calculates how much of the income is attributable to the building and subtracts this amount from the net operating income. The remainder is the residual income attributable to the land, which is capitalized at a market-derived land capitalization rate to provide an estimate of site value.

The land residual method is a technique for estimating land value in which the net operating income attributable to the land is isolated and capitalized to produce an indication of the land's contribution to the total property.

As a simple example, suppose the subject property's net operating income is $150,000, the land capitalization rate is 5.5%, the capitalization rate for the building is 7.5%, and the value of the improvements is $900,000. The calculations of the residual land value would be as follows:

$$\begin{aligned}
\text{Net Operating Income } (I_O) &= \$150{,}000 \\
\text{Income to the Building } (I_B) &= \text{Building Value } (V_B) \times \text{Building Capitalization Rate } (R_B) \\
&= \$900{,}000 \times 0.075 = \$67{,}500 \\
\text{Income to the Land } (I_L) &= I_O - I_B \\
&= \$150{,}000 - \$67{,}500 = \$82{,}500 \\
\text{Site Value} &= \frac{\text{Income to the Land}}{\text{Land Capitalization Rate}} \\
&= \frac{I_L}{R_L} \\
&= \$82{,}500/0.55 = \$1{,}500{,}000
\end{aligned}$$

Direct Capitalization: Ground Rent Capitalization

Ground rent is the amount paid for the right to use and occupy the land according to the terms of a ground lease. Market-derived capitalization rates are used to convert ground rent into market value. The basic calculations are straightforward, as shown in the following example of a 1-acre plot leased for $2.25 per square foot with a market-derived land capitalization rate of 5.5%:

$$\begin{aligned}
\text{Income to the Land } (I_L) &= \text{Ground Rent} \times \text{Land Area} \\
&= \$2.25 \text{ per sq. ft.} \times 43{,}560 \text{ sq. ft.} = \$98{,}010 \\
\text{Site Value} &= \frac{\text{Income to the Land}}{\text{Land Capitalization Rate}} \\
&= \frac{I_L}{R_L} \\
&= \$98{,}010/0.055 = \$1{,}782{,}000
\end{aligned}$$

The ground rent capitalization procedure is useful when an analysis of comparable parcels of leased land indicates a range of rents and capitalization rates. If the current rent of a parcel corresponds to market rent for comparable parcels with similar highest and best uses, the value indication obtained is likely to be equivalent to the market value of the fee simple estate of the land. If the ground rent paid under the terms of the existing contract does not correspond to the prevailing market rent, the value estimate given the current ground rent must be adjusted for the difference in property rights (i.e., the leased fee or leasehold interest in the property not at market rent) to obtain an indication of the market value of the fee simple estate. Ground leases can have different terms and escalation clauses that affect the income stream, so appraisers should consider all the benefits to the lessor during the term of a lease and any option periods and forecast when the reversion of the property will take place.

> Market-derived capitalization rates are used to convert ground rent into an indication of land value.

Yield Capitalization: Subdivision Development Method (Discounted Cash Flow Analysis)

Subdivision development analysis may involve tracts of residential, commercial, or industrial land (or a mix of land uses) that are large enough to be subdivided into smaller lots or parcels and sold to builders or end users.[3] Subdivision is the opposite of assemblage, as described earlier in the chapter. A planned subdivision can create a more intense use of the property when zoning, available utilities, access, and other influential elements are favorably combined.

As a tool in land valuation, the subdivision development method is primarily used to provide a bulk sale value for a group of subdivision lots, either proposed or existing.[4] The method can also be used to estimate the value of vacant land or finished lots in a proposed subdivision development scenario. The subdivision development method relies on discounted cash flow analysis and requires that the property have a highest and best use for development consistent with the proposed development plan in order to reflect the current value of the vacant land. The technique may also be used to test several potential development scenarios in determining the highest and best use of the site as though vacant.

For subdivision development analysis to be useful in developing an opinion of current land value, the land must support a highest and best use for immediate development at the time of the appraisal or there must be evidence of market demand to support financially feasible subdivision development. Market analysis provides the evidence necessary to support absorption estimates, retail lot values, and other components required to calculate land value using subdivision development analysis.

Valuing finished lots in a subdivision is a common assignment for real estate appraisers, but subdivision development analysis is a complex procedure. When there is sufficient reliable market data, the subdivision development method provides credible results. The technique is most useful for reporting the market value of a group of subdivision lots, whether existing or proposed. The method uses what is known as a *bulk sale scenario* to develop the value of all the lots to one purchaser. The value indication is most persuasive when the sales comparison method of estimating land value provides additional support.

In essence, the subdivision development method uses the yield capitalization techniques of the income capitalization approach to perform a discounted cash flow analysis. To use discounted cash flow analysis to estimate raw land value, appraisers must thoroughly understand the land development process and all the factors influencing the subject property's market area.

The development of any project involves three phases of development:

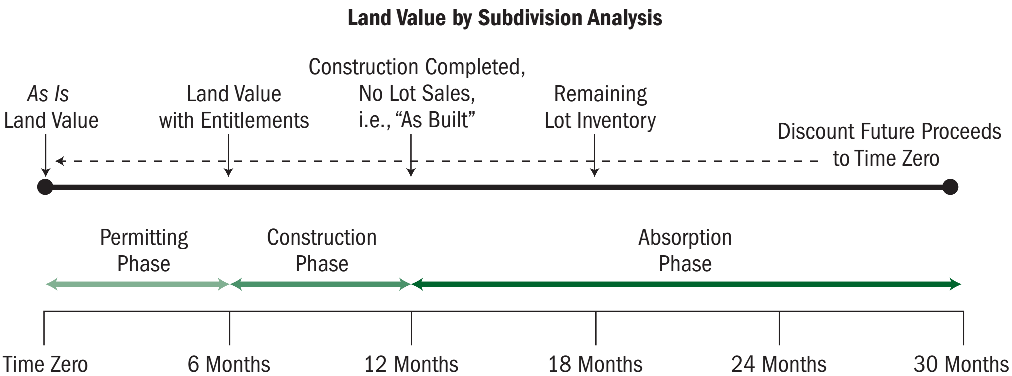
- the permitting stage

3. Subdivision development analysis can be applied to completed homes within a subdivision, condominiums, super pads, and other property types, but in this chapter the focus is on parcels of land within a subdivision.
4. For an in-depth discussion of subdivision development analysis, see Don M. Emerson Jr., *Subdivision Valuation* (Chicago: Appraisal Institute, 2008).

- the construction stage
- the absorption stage

Data on sales and costs for the developed lots must be available. The real estate developer usually provides the necessary project information, including the subdivision plat, the costs of development, a feasibility, marketability, or absorption study, and a schedule of lot prices. When the developer supplies the information, an appraiser has a responsibility to compare this information with other relevant market data. The market data and all conclusions in the analysis are the responsibility of the appraiser.

Figure 17.1 Income Capitalization Approach Timeline



Source: Don M. Emerson Jr., *Subdivision Valuation* (Chicago: Appraisal Institute, 2008). 208.

Many appraisers attempt to perform subdivision analysis without adequately supported development cost estimates or an adequate investigation of the available market demand needed to support the absorption of lots over time or competition from competing projects. The development costs and time required for the market to absorb the lots are some of the most sensitive components of the analysis and can have a significant effect on the land value conclusion. In markets that are oversupplied or experiencing an economic downturn, appraisers must not simply assume that market demand will stabilize at some arbitrary point in the future. Future market conditions and demand forecasts must be supported by relevant market data.

To estimate raw law value using the subdivision development method for a proposed development, an appraiser performs the following steps:

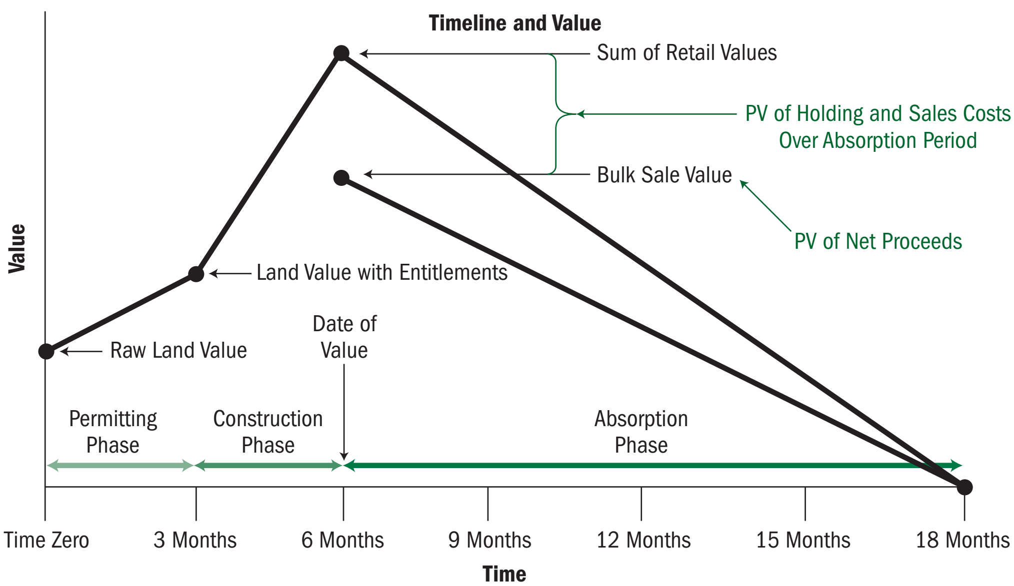
- Accurately assess the highest and best use of the site (e.g., the mix and intensity of uses).
- Create or affirm a supportable subdivision development plan.

- Determine the timing and cost for approval and development (including mitigation needs and the costs of obtaining development entitlements during the permitting stage).
- Forecast a realistic lot price or schedule of values over the absorption stage.
- Critically review available data as necessary to forecast the lot absorption and price mix using inferred or fundamental demand and supply analysis (including properly supported projections of community or market growth over the absorption period).
- Estimate a market-supported timeline for the permitting, construction, and absorption phases.
- Forecast marketing and related holding and sales expenses over the permitting, construction, and absorption period.
- Estimate the annual real estate taxes and any other miscellaneous expenses over the three stages of development.
- Consider management supervision or administrative costs as part of development expenses.
- Choose an appropriate yield capitalization method.

This process can be modified to account for a date of valuation after the preliminary permitting phase of the development process even further along the timeline (see Figure 17.2).

In simplified form, an appraiser begins the analysis of a subdivision development by determining the number and size of the lots that can

Figure 17.2 Typical Value Pattern of a Proposed Project



be created on the appraised parcel of land physically, legally, and economically. The proposed lots must conform to jurisdictional and zoning requirements with regard to size, frontage, topography, soil quality, and off-site improvements (e.g., water facilities, drainage, sewage, streets, curbs, and gutters). The lots must also meet the demands of the market in which the property is located. Without surveys and engineering studies, an appraiser cannot know exactly how many lots can be created from a particular parcel of land. Still, this analysis is often significant to the scope of work of the appraisal assignment. A reasonable estimate of the number of potential lots can often be deduced from zoning information, subdivision ordinances, or, preferably, the number of lots or typical unit density reflected in similar subdivision developments in the subject's market area. Allowances must also be made to account for the land needed for streets, green space, water retention facilities, and any common areas.

If available, a preliminary development plan for the hypothetical subdivision of the vacant land being appraised will specify much of the data an appraiser needs:

- number and size of the lots
- land development or construction work to be accomplished
- direct (hard) and indirect (soft) construction costs
- probable time required to subdivide the land and construct the on-site and off-site infrastructure
- expenses and holding costs that will be incurred during the relevant stages of development

The appraiser then undertakes a preliminary marketability study to assess the supply and demand situation and the probable capture and absorption rates to produce a supportable absorption forecast for the lot inventory. Well-supported forecasts of product demand and competitive supply can increase the credibility of the absorption forecast. They are critical to the analysis because the raw land value can vary widely depending on the rate at which lots are absorbed over time.[5] The appraiser estimates the projected retail prices of the lots by applying the sales comparison method.

The next step in subdivision development analysis requires an appraiser to forecast the income and expenses associated with the permitting, construction, and eventual sellout or absorption of the lots over time. The time period used for the analysis ends when the last lot is sold. Depending on the project size and sales velocity, annual, semiannual, or quarterly discounting periods are commonly used. The projection period begins with the property in its current "as is" condition and, if permitting is required, will include the time frame needed to achieve permitting, construction, and the absorption of all lots. If permitting is already in place as of the date of valuation, then the time period con-

5. Robert W. Owens, "Subdivision Development: Bridging Theory and Practice," *The Appraisal Journal* (July 1998): 274-281.

sidered in the discounting calculation consists of the construction and absorption phases only. For a raw land value conclusion, the net cash flows from each period are discounted to time period zero to arrive at a present value of the net proceeds.

The Sales Comparison Approach

In the sales comparison approach, the appraiser develops an opinion of value by analyzing closed sales, listings, or pending sales of properties that are similar to the subject property. The comparative techniques of analysis applied in the sales comparison approach are fundamental to the valuation process. Estimates of market rent, expenses, land value, cost, depreciation, and other value parameters may be derived in the other approaches to value using comparative techniques. Similarly, in applying the sales comparison approach appraisers often analyze conclusions derived in the other approaches to determine the adjustments to be made to the sale prices of comparable properties.

In the sales comparison approach, an opinion of market value is developed by comparing properties similar to the subject property that have recently sold, are listed for sale, or are under contract (i.e., for which purchase offers and a deposit have been recently submitted). A major premise of the sales comparison approach is that an opinion of the market value of a property can be supported by studying the market's reaction to comparable and competitive properties.

sales comparison approach
The process of deriving a value indication for the subject property by comparing similar properties that have recently sold with the property being appraised, identifying appropriate units of comparison, and making adjustments to the sale prices (or unit prices, as appropriate) of the comparable properties based on relevant, market-derived elements of comparison. The sales comparison approach may be used to value improved properties, vacant land, or land being considered as though vacant when an adequate supply of comparable sales is available.

Comparative analysis of properties and transactions focuses on similarities and differences that affect value, called *elements of comparison*, which may include variations in property rights, financing terms, market conditions, and physical characteristics, among others. Appraisers examine market evidence using paired data analysis, trend analysis, statistics, and other techniques to identify which elements of comparison within the data set of comparable sales are responsible for value differences.

This chapter focuses on the theory and concepts underlying the sales comparison approach. Chapters 19 and 20 further the discussion with a deeper examination of the methodologies employed by appraisers to analyze comparable sales and sample applications of sales comparison techniques.

Relation to Appraisal Principles

The concepts of anticipation and change, which underlie the principles of supply and demand, substitution, balance, and externalities, are basic to the sales comparison approach. Guided by these principles, appraisers consider all issues relevant to the valuation problem in a manner that is consistent and reflects local market conditions.

Supply and Demand

Property prices result from negotiations between buyers and sellers. In a market with many buyers and sellers acting in their own interests, buyers make up the market demand and the properties offered for sale currently or in the foreseeable future make up the supply.[1] To estimate demand, appraisers consider the number of potential users of a particular type of property, their purchasing power, and their tastes and preferences. To analyze supply, appraisers focus on existing properties on the market as well as properties that are being constructed, converted, or planned.

Shifts in any of these factors may cause the prices of properties in the market area to vary. Lenders also influence sales activity because most real estate purchases involve some form of financing, which affects purchasing power. When interest rates drop, market activity tends to accelerate and prices tend to rise because more buyers qualify for higher mortgage amounts. When interest rates rise, market activity tends to slow down and prices tend to fall. When loan money becomes scarce, either due to higher interest rates or restrictive underwriting standards, market activity can be severely reduced. The inability of buyers to obtain affordable financing is an impediment to additional demand in most markets.

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1. Market value is based on conventional economic theory, which predicts a unique market-driven price at the point where supply equals demand in a competitive market. Even in a *monopoly*, with only one seller, or a *monopsony*, with only one buyer, a unique price is predictable. But as soon as the market consists of only one seller and one buyer, called *bilateral monopoly*, economic theory can no longer predict a unique price. Bilateral monopoly theory predicts a minimum sale price and a maximum sale price, but no unique price, and suggests that any observed transaction price depends not on supply and demand but on the negotiating or bargaining skills of the buyer and the seller.

Substitution

The principle of substitution holds that the value of property tends to be set by the cost of acquiring a substitute or alternative property of similar utility and desirability within a reasonable amount of time.

Balance

The forces of supply and demand tend toward equilibrium, or balance, in the market, but absolute equilibrium is almost never attained. Due to shifts in population, purchasing power, and consumer tastes and preferences, demand varies greatly over time. The construction of new buildings, conversion of existing buildings to other uses, and demolition of old buildings cause supply to vary as well.

The principle of balance also holds that both the relationship between land and improvements and the relationship between a property and its environment must be in balance for a property to achieve its optimum market value. For example, a property that has too much land in relation to its improvements (known as an *underimprovement*) or too many expensive amenities for its location (known as an *overimprovement*) is out of balance. Appraisers must watch for imbalances in the market and within specific properties because those imbalances can cause the market to ascribe different prices to otherwise comparable properties. Overimprovements and underimprovements can lead to functional obsolescence that may need to be accounted for in sales comparison, income capitalization, and cost approach analyses, but differently in each approach.

Externalities

External forces affect all types of property in positive or negative ways. Periods of economic growth and economic decline influence property values. An appraiser analyzes the market area of the subject property to identify all significant external influences. To a great extent, the adjustments made to the sale prices of comparable properties for differences in location reflect these external forces. That is, two competitive properties with identical physical characteristics may have quite different market values if one of the properties has less attractive surroundings. The condition and lighting of streets, the convenience of transportation facilities, the adequacy of police protection, the enforcement of municipal regulations, real estate tax burdens, and the proximity to shopping and restaurant facilities can all vary with location, making one location more or less attractive than another.

Market Analysis and Highest and Best Use

The conclusions of market analysis and highest and best use analysis are fundamental to the sales comparison approach. Analyzing the subject property's highest and best use and market area helps appraisers identify and analyze the competitive supply and demand factors that influence value in the market. In addition, an adequately supported determination of the subject property's highest and best use provides the basis for the research and analysis of comparable sales, answering questions such as

- Which comparable properties match the highest and best use of the subject property?
- Do the improvements contribute value to the comparable property?
- Is the comparable property as improved an interim or transitional use?
- How much time must pass before development is feasible on the unimproved subject and comparable properties?

Applicability and Limitations

The sales comparison approach is applicable to most types of real property interests when there are sufficient recent, reliable transactions to indicate value patterns or trends in the market. For property types that are bought and sold regularly, the sales comparison approach often provides a credible indication of market value. When data is available, sales comparison can be the most straightforward and simple way to explain and support an opinion of market value.

If the appraisal assignment is to develop an opinion of market value but no sales are available, the appraiser must question whether a market for the subject property exists at all. The common definitions of *market value* all assume a sale of the subject property, which implies the existence of a market. The market for a specific property may not be for the property as it is currently improved or configured. For example, in most markets a parcel of land improved with a building that formerly served as the county jail is unlikely to attract a buyer as presently improved, so the market value would be what a typical buyer would pay for the land (less demolition costs) or for any economic use to which the building could be converted.

Typically, the sales comparison approach provides a credible indication of value for commercial and industrial properties suited for owner occupancy, i.e., properties that are not purchased primarily for their income-producing characteristics. These types of properties are generally suitable for application of sales comparison because similar properties are commonly bought and sold in the same market.

> The sales comparison approach is applicable when sufficient data on recent market transactions is available. If no sales are found, the appraiser may have to use other approaches to value but only after the appraiser is convinced there is actually a market for the property. Essential information on income-producing properties derived through sales comparison may be used in the income capitalization and cost approaches.

Buyers of income-producing properties usually concentrate on a property's economic characteristics and typically put more emphasis on the conclusions of the income capitalization approach. Thoroughly analyzing the leased fee interest in comparable sales of large, complex, income-producing properties can be difficult because information on the economic factors influencing the decisions of buyers may not be readily available from public records or interviews with buyers and sellers. For example, an appraiser may not have sufficient knowledge of all the existing leases applicable to a neighborhood shopping center that is potentially comparable to the subject. The sale of a property encumbered by a lease involves rights other than the complete fee simple estate, and valuation of those rights requires knowledge of the terms of all leases and an understanding of the tenant or tenants occupying the premises.

Some transactions may include sales of other physical assets or business interests. In each instance, if the sale is to be useful for comparison purposes, it must be dissected into its various components. The most reliable method for determining components of value is to interview the buyer. Even when the components of value can be allocated, the sale may be less reliable as an indicator of the subject's real property value because of the complexity of the mix of factors involved.

At times the use of the sales comparison approach may be limited, but the analysis of comparable sales can still be a significant and essential part of the valuation process. Although appraisers cannot always properly identify and quantify how the factors affecting property value are different, they can still analyze comparable sales to assist in supporting the conclusions of the other approaches, i.e., to develop a value bracket for the value indications derived from the cost and income capitalization approaches. In addition, the analysis of comparable sales can provide information used in the other approaches such as overall capitalization rates for the income capitalization approach or depreciation estimates for the cost approach. Income multipliers, capitalization rates, and yield rates are applied in the income capitalization approach to value, but appraisers often extract these rates and factors from comparable properties.

Procedure

To apply the sales comparison approach, appraisers follow a systematic procedure:

1. Research the competitive market for information on properties that are similar to the subject property and that have recently sold, are listed for sale, or are under contract. Information on agreements of sale, options, listings, and bona fide offers may also be collected. The characteristics of the properties such as property type, date of sale, size, physical condition, location, and land use constraints should be considered. The goal is to find a set of comparable sales or other evidence such as property listings or contracts as similar as possible to the subject property to ensure they reflect the actions of similar buyers. Market analysis and highest and best use analysis set the stage for the selection of appropriate comparable sales.
2. Verify the information by confirming that the data obtained is factually accurate and that the transactions reflect arm's-length market considerations. Verification should elicit additional information about the property such as buyer motivation, economic characteristics (if the property is income-producing), value component allocations, and other significant factors as well as information about the market to ensure that comparisons are credible.

3. Select the most relevant units of comparison used by participants in the market (e.g., price per acre, price per square foot, price per front foot, price per dwelling unit) and develop a comparative analysis for each unit. The appraiser's goal is to define and identify a unit of comparison that explains market behavior.
4. Look for differences between the comparable sale properties and the subject property using all appropriate elements of comparison. Then adjust the price of each sale property, reflecting how it differs, to equate it to the subject property or eliminate that property as a comparable. This step typically involves using the most similar sale properties and then adjusting for any remaining differences. If a transaction does not reflect the actions of a buyer who would also be attracted to the subject property, the appraiser should be concerned about comparability.
5. Reconcile the various value indications produced from the analysis of comparables into a value conclusion. A value opinion can be expressed as a single point estimate, as a range of values, or in terms of a relationship (e.g., more or less than a given amount).

Researching Transactional Data

In the first step of the sales comparison approach, appraisers gather data on sales, listings, contracts, offers, refusals, and options relating to properties considered competitive with, and comparable to, the subject property. Data from completed transactions is considered a very reliable value indicator. Appraisers must thoroughly research the prices, real property rights conveyed, financing terms, motivations of buyers and sellers, expenditures made immediately after purchase, and dates (i.e., the market conditions) of the property transactions. Appraisers must also consider details on each property's location, physical condition, functional utility, economic characteristics, use, and non-realty components of value. Because conclusions must be market-derived, appraisers will rely heavily on interviews, personal contacts, and proprietary research. Personal verification with a party to the transaction is an important step in the sales comparison approach.

Regardless of the number of sales analyzed, appraisers must understand each sale used for comparison to draw credible conclusions. For example, the conditions of sale in a transaction of real property between family members may not be consistent with the definition of market value. It may be possible to determine the relationship between the reported sale price and market value only after the sale, the comparable property, and its market are researched and understood. After excluding non-arm's-length sales, the remaining sales that cannot be effectively used for direct comparison are still part of the market at large and can be used for bracketing, understanding general market activity, and other analytical purposes. Thus, market data is classified and weighted for its importance, relevance, and reliability.

Changing market conditions may reduce the validity or applicability of older sales that do not reflect the market's changes. Trends indicated by changing market conditions can be useful, but appraisers must be careful not to project trends without current, reliable market support. Historical sales may be valuable in retrospective valuations and may assist in time series analysis. However, significant changes in market conditions make the use of historical sales less reliable for current valuations. Legal changes comprise a broad array of possibilities including new tax laws, zoning, moratoriums, and building codes. Appraisers must look for possible changes that may be imposed on the market, thus changing the applicability of historical data. Also, some sales may reflect the anticipation of change and may be evidence of market attitudes in advance of the actual change. The availability and reasonableness of financing is also important in the analysis of comparable sale properties in the market.

As explained in Guide Note 11 of the Appraisal Institute's Standards of Professional Practice, it may be necessary to expand the geographic area of research for comparable sales in markets where there have been few sales. It is also important to determine a class or subclass of sales that dominate the market. For example, during periods of severe economic downturns, REO sales or foreclosures may dominate the market.

Data Sources

Appraisers have a large variety of potential sources of sales data. Primary sources include

- public records (e.g., courthouse records, government sales tax records, assessors' records)
- commercially available data from multiple listing and subscription services
- published articles in local newspapers, real estate periodicals, online newsletters, or other credible online sources
- interviews with market participants (e.g., the parties to transactions, attorneys, appraisers, counselors, brokers, property managers, lenders)

All raw data obtained from a general source (e.g., assessors' records, data services) will need further research and verification with a party to the transaction.

Appraisers should exercise caution when someone who is not a party to the transaction provides sales data because the motivation of the parties to the transaction is an important consideration. Sometimes brokers will be able to provide more reliable information than the buyer or seller. Similarly, errors can result if anticipated income and expense schedules are inaccurate or if potential changes in use that buyers are planning are not considered.

Much property and transaction information is available online and in easily accessed public records, but experienced appraisers still maintain data files with the details of important and unique market transactions and add information as new transactions occur.

> To apply the sales comparison approach, the appraiser first gathers data from sales, listings, contracts, and offers relating to competitive properties. Sources of this information include public records, multiple listing services, subscription services, real estate brokers, real estate periodicals, and interviews with the parties involved in market transactions.

The geographic limits of the appraiser's search for sales data depend on the nature and type of real estate being valued and the available sales information. Certain types of properties have regional, national, and even international markets. For example, an investment-grade property that would appeal to a REIT may sell in a regional or national market, but a smaller income-producing property may need to be compared to completely different properties. Using the two as comparable properties may be inappropriate. As another example, an appraiser may find little comparable data for a property that is the first to be renovated in an area of deteriorated buildings or for the only property of a given type in a market area. In such a situation, the appraiser must establish the comparability of other areas and the competitiveness of the properties located there with the subject property. Similarly, an appraiser may gather data from a wide geographic area to find competitive properties for a regional shopping mall, large office building, resort hotel, large multiuse complex, or large industrial property.

In addition to sales of competitive properties, prior sales of the subject property must be considered in market value appraisals. The Uniform Standards of Professional Appraisal Practice (USPAP) require appraisers to analyze and report all agreements of sale, options, and listings of the subject property current as of the effective date of the appraisal and to analyze sales that occurred within the three years prior to the effective date of the appraisal. It is not sufficient to simply report the subject's sales history. In fact, simply reporting prior sales does not meet the USPAP requirements on this issue. When an opinion of market value is to be developed, appraisers must *analyze* all sales of the subject property that occurred in the three years prior to the date of value. Appraisers must also analyze any agreements of sale (contracts), options, or listings that are current as of the effective date of appraisal. Listing the sales or other agreements is just a start.[2]

The three-year sales history is a minimum requirement. Ideally, the appraiser would analyze all relevant historical sales data from which a market conditions adjustment could be developed. If the information is not available, the analyst must explain the efforts taken to uncover it. This analysis is particularly significant when the comparable sales are limited and are either vastly superior or inferior to the subject property. When the information is available, the appraiser may want to present a chart of the subject's sales, contracts, listings, and offers in the sales comparison analysis alongside information on the comparable sales. USPAP has no requirement to analyze the sales history of each comparable sale. However, Fannie Mae and certain other government bodies require comparable sales histories. This regulation is applicable to lenders, and it is reflected on the standard residential appraisal report form.

It is imperative that the appraiser identify and analyze the strengths and weaknesses of the quantity and quality of the data compiled and the extent of the comparative analyses undertaken in the sales comparison

2. See Standards Rule 1-5, the reporting requirements in Standards Rule 2-2, and Advisory Opinion 1: Sales History in the Uniform Standards of Professional Appraisal Practice. Note that USPAP applies to US appraisers. Market and regulatory requirements exist in other countries as well. For valuations outside the United States, practitioners should research local requirements and expectations.

Inbreeding Data

Appraisers strive to collect information about the sales that best reflect the market for the subject property because a pool of the most representative data will yield the most accurate insight into the value of a property and the magnitude of property adjustments. When an appraiser derives all adjustments using a limited data set, a single erroneous sale price or figure in that data set can cause errors in the adjusted sale prices of all the comparable sales, leading to an erroneous indication of value for the subject property. This type of situation in which the independence of the sales data is lost is known as *inbreeding*.

Verifying data will help eliminate the erroneous data that can have an injurious effect on adjustment amounts and ultimately the value indication. A practical technique for avoiding inbreeding is to develop adjustment amounts using data from outside the data set, which may require additional market research.

The larger the number of adjustments made within a small data set, the greater the probability that the results of the analysis will be affected by data collection errors. Of course, transactional and property data should be checked for errors that could affect the conclusions of the sales comparison approach.

approach. The appraiser must consider all relevant facts and opinions in the analysis and report them in the amount of detail required given the intended use of the appraisal as identified in the scope of work. The reliability of the data, the analyses performed, and the final conclusion of value should be presented in both the sales comparison approach and, where appropriate, the final opinion of value.

Verifying Transactional Data

Appraisers should verify information with a party to the transaction to ensure its accuracy and to gain insight into the motivation behind each transaction. The buyer's and seller's views of precisely what was being purchased at the time of sale are important. Sales that are not arm's-length market transactions (in accordance with the definition of *market value* used in the appraisal) should be identified and rarely, if ever, used. To verify sales data, the appraiser confirms statements of fact with the principals to the transaction, if possible, or with the brokers, closing agents, or lenders involved. Owners and tenants of neighboring properties may also provide helpful information.

Sometimes income and expense data for income-producing properties is unobtainable. If data on a particular sale is unavailable, assigning rents and expenses "based on market parameters" may be improper, especially for properties with existing leases. Referencing public records and data services does not verify a sales transaction. It simply confirms that a transaction was recorded. Similarly, referencing the source of secondary data only confirms its existence and does not verify the transaction. Generally, secondary sources do not provide adequate information about sale concessions, whether the sale was an arm's-length transaction, if multiple properties were involved in the sale, if personal property was included, and other factors influencing price. This underscores the importance of personal verification with persons knowledgeable about the details of the transaction.

arm's-length transaction
A transaction between unrelated parties under no duress. The common definitions of *market value* usually set out the criteria for an arm's-length sale in detail.

Selecting Units of Comparison

After sales data has been gathered and verified, systematic analysis begins. Like units must be compared, so each sale price should be stated in terms of appropriate units of comparison. The units of comparison selected depend on the appraisal problem and nature of the property, as illustrated in Table 18.1.

Appraisers use units of comparison to facilitate comparison of the subject and comparable properties. The sales should be analyzed to determine which units of comparison indicate the least amount of variance when applied to the comparable sales. This analysis will identify the proper unit of comparison to be used, such as price per acre or price per square foot, which is especially important for properties located in markets that are in transition.

Table 18.1 Typical Units of Comparison

Property Type	Typical Units of Comparison
Single-unit residential property	Total property price Price per square foot of gross living area
Apartment properties	Price per apartment unit Price per room or per bedroom Price per square foot of gross building area Price per finished square foot of building area Price per net square foot of building area
Warehouses	Price per cubic foot of gross building volume Price per truck door
Factories	Price per square foot of gross building area
Office properties	Price per square foot of gross building area Price per square foot of rentable area Price per square foot of usable area
Hotels and motels	Price per guest room
Restaurants, theaters, and auditoriums	Price per seat Price per square foot
Hospitals	Price per square foot of gross building area Price per bed
Golf courses	Total revenue multiplier Golf revenue multiplier Price per round (annual number of rounds played) Price per membership Price per hole Greens fee and rounds multiplier
Tennis and racquetball facilities	Price per playing court
Mobile home parks	Price per parking pad
Marinas	Price per slip Price per linear foot
Automobile repair facilities	Price per bay Price per square foot of gross building area
Agricultural properties	Price per acre Price per animal unit (for pastureland) Price per board foot (for timberland)
Vacant land	Price per front foot Price per square foot Price per acre Price per buildable square foot Price per buildable unit

As a simple example, suppose the subject property of an appraisal is a 90,000-sq.-ft. distribution center with 10 loading docks. The following four properties have been sold in the last year:

Property	Sale Price	Building Area (Sq. Ft.)	Building Area (Cu. Ft.)	Site Area (Acres)	Number of Loading Docks
125 W. Afton Road	$8,500,000	100,000	2,200,000	5.00	10
Burberry Glen Commerce Center	$10,200,000	150,000	3,000,000	6.80	12
6700 Northwest Highway	$9,625,000	125,000	2,000,000	5.00	11
Northwest Crossing Business Center	$8,600,000	86,000	2,150,000	4.30	10

Converting the sale prices to unit prices gives the appraiser a better picture of what unit of comparison the market is likely to use to compare these transactions:

Property	Sale Price	Price per Square Foot of Building Area	Price per Cubic Foot of Building Area	Price per Acre of Site Area (Acres)	Price per Loading Dock
125 W. Afton Road	$8,500,000	$85.00	$3.86	$1,700,000	$850,000
Burberry Glen Commerce Center	$10,200,000	$68.00	$3.40	$1,500,000	$850,000
6700 Northwest Highway	$9,625,000	$77.00	$4.81	$1,925,000	$875,000
Northwest Crossing Business Center	$8,600,000	$100.00	$4.00	$2,000,000	$860,000

In this example, the narrow range indicated for price per loading dock ($850,000-$875,000) suggests that buyers and sellers would be likely to analyze competitive distribution centers based on their price per loading dock. If more comparable data were available, more sophisticated statistical tests could be run on each variable to analyze the variation among the unit prices. The variable with the least variation would be a likely candidate for the best unit of comparison. Any final decisions regarding units of comparison, however, should only be made after personal verifications have confirmed that market participants use those units of comparison.

Prices of comparable properties are not usually adjusted based on differences in the net operating income per unit because rents and sale prices tend to move in relative tandem. A value indication developed using net operating income per square foot as a unit of comparison is not independent of a value indication developed using direct capitalization, which negates the checks and balances provided by using more than one approach to value. In effect, the results suffer from circular logic.

Nevertheless, the appraiser should consider why the income per unit varies among the sale properties. Sensitivity and trend analyses

units of comparison

The components into which a property may be divided for purposes of comparison, e.g., price per square foot, front foot, cubic foot, room, bed, seat, apartment unit.

may be performed to gain an understanding of this variance for use in the income capitalization approach. For example, an appraiser may analyze sales of income-producing properties to derive potential and effective gross income multipliers, overall and equity capitalization rates, and even total anticipated property yield rates. These factors are not adjusted quantitatively except for any necessary transactional adjustments when atypical financing or the transfer of certain property rights affects a sale price. Instead, the appraiser considers the range of multipliers and rates and the similarities and differences between the subject and comparable sale properties that cause the multipliers and rates to vary. The appraiser then selects the rate from within the refined value bracket that is most appropriate to the property being appraised.

Analyzing and Adjusting Comparable Sales

If all comparable properties are identical to the subject property, no adjustments to sale prices will be required. However, this is rarely the case. After researching and verifying transactional data and selecting the appropriate unit of comparison, the appraiser adjusts for any differences.

After sales information has been collected and confirmed, it can be organized in a variety of ways. One convenient and commonly used method is to arrange the data on a market data grid (see Figure 18.1). Each important difference between the comparable properties and the subject property that could affect property value is considered an element of comparison. Each element of comparison that is found to affect sale prices in the market is assigned a row on an adjustment grid, and total property prices or unit prices of the comparable properties are adjusted to reflect the value impact of these differences. The use of the grid is a way for appraisers to model typical buyer actions and to analyze sales data to quantify the impact of certain characteristics on value. While not necessary, grids are also a good way for appraisers to communicate their logic clearly and efficiently to readers of appraisal reports.

Identification and Measurement of Adjustments

A sale price reflects many different elements that affect a property's value in varying degrees. Quantitative and qualitative techniques are employed to estimate the relative significance of these factors. Appraisers analyze market data using mathematical applications to derive quantitative adjustments.

Quantitative adjustments are developed as either dollar or percentage amounts. Adjustments made in a qualitative analysis vary. Examples of the techniques used in quantitative adjustments and qualitative analyses are shown in Table 18.2 and are discussed more fully in Chapter 19.

Adjustments can be made either to total property prices or to appropriate units of comparison. Often the transactional adjustments–property rights conveyed, financing, conditions of sale (motivation),

Figure 18.1 Sample Adjustment Grid: Comparison and Adjustment of Market Data

Element	Subject	Sale 1	Sale 2	Sale 3	Sale 4
Sale price	unknown	______	______	______	______
Transactional adjustments	______	______	______	______	______
Real property rights conveyed adjustment	______	______	______	______	______
Adjusted price*	______	______	______	______	______
Financing adjustment	______	______	______	______	______
Adjusted price†	______	______	______	______	______
Conditions of sale adjustment	______	______	______	______	______
Adjusted price‡	______	______	______	______	______
Expenditures made immediately after purchase	______	______	______	______	______
Adjusted price§	______	______	______	______	______
Market conditions adjustment	______	______	______	______	______
Adjusted price**	______	______	______	______	______
Property adjustments	______	______	______	______	______
______________	______	______	______	______	______
______________	______	______	______	______	______
______________	______	______	______	______	______
______________	______	______	______	______	______
______________	______	______	______	______	______
Subtotal	______	______	______	______	______
Final adjusted sale price	______	______	______	______	______
For reconciliation purposes:					
Net adjustment††	______	______	______	______	______
Net adjustment as % of sale price	______	______	______	______	______
Gross adjustment††	______	______	______	______	______
Gross adjustment as % of sale price	______	______	______	______	______

* Sale price adjusted for property rights conveyed
† Sale price further adjusted for financing
‡ Sale price further adjusted for conditions of sale
§ Sale price further adjusted for expenditures made immediately after purchase
** Sale price further adjusted for market conditions
†† Net and gross adjustments include all transactional and property adjustments

The sample adjustment grid above reflects the initial elements of comparison in a typical sequence. Blank lines are provided for additional property-related adjustments. The first five adjustments (for real property rights conveyed, financing terms, conditions of sale, expenditures made immediately after purchase, and market conditions) are considered transactional adjustments; the last five (for location, physical characteristics, economic characteristics, legal characteristics, and non-realty components of value) are considered property adjustments. If the comparable properties are similar to the subject property in regard to a specific element of comparison, no adjustment is required for that element. The sample grid includes separate lines for each element of comparison and adjustment to ensure that adjustments are made in a consistent manner. It is important to make adjustments only for those factors that materially influence the decision-making process of market participants. In addition, appraisers should exercise care to ensure that adjustments are not being made twice for the same factor and that all material influences have been considered.

Actual adjustment grids will vary depending on the nature and type of property and the units and elements of comparison used by market participants. Adjustments may be made in terms of percentage or dollar amounts.

The section labeled "For reconciliation purposes" is provided to help the appraiser analyze the comparability of each sale, which indicates the relative reliability of the separate value indications derived. The final adjusted sale price of each transaction is a potential value indication for the subject property. Together the adjusted sale prices of the comparable properties suggest a range of values within which the value of the subject property should fall. Each adjusted sale price can be analyzed to show the total, or absolute, adjustment made to the sale price of the comparable property and the percentage or dollar amount of the sale price that is reflected by this total adjustment. With these value estimates, the appraiser can rank the comparability of the sales to the subject and select an appropriate opinion of value, assuming the value conclusion is to be reported as a point estimate. The sale that requires the least significant or lowest total adjustment (i.e., the absolute adjustment based on the sum of the adjustments regardless of sign) is often the most comparable and is frequently given the most weight in reconciling the value indications from the sales comparison approach. Simply averaging the results of the adjustment process to develop an averaged value fails to recognize the relative comparability of the individual transactions as indicated by the size of the total adjustments and the reliability of the data and methods used to support the adjustments. Final conclusions are always contingent on the quality and availability of data.

Table 18.2 Techniques Used in Quantitative and Qualitative Analysis

Quantitative Analysis	Qualitative Analysis
· Paired data analysis (sales and resales of the same or similar properties)	· Trend analysis
· Grouped data analysis	· Relative comparison analysis
· Secondary data analysis	· Ranking analysis
· Statistical analysis including graphic analysis and scenario analysis*	
· Cost-related adjustments (cost to cure, depreciated cost)	
· Capitalization of income differences	

* Note that forms of statistical analysis can also serve as qualitative techniques.

expenditures made immediately after purchase, and market conditions (date of sale)—are made to the total sale price. The adjusted price is then converted into a unit price and adjusted for property-related elements of comparison such as physical and legal characteristics.

Elements of Comparison

Elements of comparison are the characteristics of properties and transactions that help explain the variances in the prices paid for real property. The appraiser determines the elements of comparison for a given appraisal through market research and supports those conclusions with market evidence. When properly identified, the elements of comparison describe the factors that are associated with the prices paid for competing properties. The market data, if analyzed properly, will identify the elements of comparison within the comparable sales that are market-sensitive.

The basic elements of comparison that should be considered in sales comparison analysis are as follows:

real property rights conveyed	fee simple estate, leased fee interest, leasehold interest
financing terms—i.e., cash equivalency	all cash, market financing, seller-financing, special or atypical terms
conditions of sale—i.e., motivation	short sale, bank-owned real estate (REO)
expenditures made immediately after purchase	new roof, renovation costs
market conditions	changes in supply and demand
location	interior lot, waterfront
physical characteristics	size, soils, access, construction quality, condition
economic characteristics	expense ratios, lease provisions, management, tenant mix
legal characteristics	zoning, environmental regulations, building codes, flood zones
non-realty components of value	personal property, furniture, fixtures, and equipment (FF&E), franchises, trademarks

Other possible elements of comparison include governmental restrictions, such as conservation or preservation easements, and off-site improvements required for the development of a vacant site. The differences in some of these elements of comparison can be so large or so significant that the sale is no longer comparable.

Often a basic element of comparison is broken down into subcategories that specifically address the property factor being analyzed. For example, physical characteristics may be broken down into subcategories for age, condition, size, and so on. (Adjustment techniques for each of the standard elements of comparison are illustrated in Chapter 19.) There is no limit to the number of elements of comparison that may be found in a market, so it is important to remember that another line can always be added to an adjustment grid for an additional item recognized in the market. For example, an appraiser may need to add "deck" as an element of comparison if the market makes distinctions in sale price based on the presence or absence of a deck. However, note that adding elements of comparison for adjustment may lead to multiple adjustments for the same factor, a common error that is discussed in Chapter 19.

elements of comparison
The characteristics or attributes of properties and transactions that cause the prices of real estate to vary; include real property rights conveyed, financing terms, conditions of sale, expenditures made immediately after purchase, market conditions, location, physical characteristics, and other characteristics such as economic characteristics, legal characteristics, and non-realty components of value as indicated by market participants. Elements of comparison are analogous to the lines of adjustment shown on a sales comparison adjustment grid.

Sequence of Adjustments

The sequence in which adjustments are applied to the comparable sales is determined by the market data and the appraiser's analysis of that data. As mentioned earlier, the first five elements of comparison in the list are considered transactional adjustments, while the latter five are considered property adjustments (see Figure 18.2). The transactional adjustments are generally applied in the order listed. The property adjustments are usually applied after the transactional adjustments, but in no particular order. The five categories of property adjustments–location, physical characteristics, economic characteristics, legal characteristics, and non-realty components–correspond to the criteria of highest and best use:

- physical possibility–location and physical characteristics
- legal permissibility–legal characteristics such as zoning
- financial feasibility–economic characteristics and non-realty components that influence the value of the real property

The sequence of adjustments presented in Table 18.3 is provided for purposes of illustration only. The sequence of adjustments shown in Figure 18.2 is not the only order in which quantitative adjustments can be made. Adjustments may be applied in other sequences if the market and the appraiser's analysis of the data so indicate. Using the adjustment sequence, the appraiser applies successive adjustments to the prices of comparable properties.

Figure 18.2 Transactional and Property Adjustments

1. Real property rights conveyed
2. Financing terms
3. Conditions of sale
4. Expenditures made immediately after purchase
5. Market conditions

Transactional adjustments

6. Location
7. Physical characteristics
8. Economic characteristics
9. Legal characteristics
10. Non-realty components of value

Property adjustments

Most property types are adjusted on a unit price basis. Property adjustments for location, physical characteristics, economic characteristics, legal characteristics, and non-realty components are typically applied to a unit price.

Reconciling Value Indications in the Sales Comparison Approach

Reconciliation is necessary in nearly all sales analyses because the appraiser will usually analyze many sales that may lead to several different conclusions.[3] These value indications are resolved into a range of value or a single value indication (i.e., a point estimate). It is important that the appraiser consider the strengths and weaknesses of each comparable sale, examining the reliability and appropriateness of the market data compiled and the analytical techniques applied in the comparative analysis. The appraisal report should clearly communicate how the appraiser arrived at the value indication using the sales comparison approach:

- What does the data show and how did the appraiser come to the value conclusion?
- What data was good, bad, missing, and so on?
- How and why did the appraiser come to the conclusion in the sales comparison approach?

In reconciling value indications in the sales comparison approach, the appraiser evaluates the number and magnitude of adjustments and the importance of the individual elements of comparison in the market to judge the relative weight a particular comparable sale should have in the comparative analysis. For example, location is the most important element of comparison for some properties and other factors are of lesser importance. For such a property, comparable sales that required less adjustment for differences in location are likely to be given more weight in the reconciliation than comparables sales that may have had fewer adjustments for other, less-important elements of comparison.

3. In addition to reconciliation within the sales comparison approach, reconciliation is also required when value indications are derived using two or more approaches to value. At that point in the valuation process, reconciliation results in the opinion of value identified in the definition of the appraisal problem. Reconciliation of the final opinion of value is discussed in Chapter 30.

Table 18.3 Sequence of Adjustments

	Market-Derived Adjustment	Adjustment Applied to Sale Price of Comparable Property
Sale price of comparable property*		$400,000
Element of Comparison		
Transactional adjustments		
Adjustment for property rights conveyed	+ 5%	+ 20,000
Adjusted price		$420,000
Adjustment for financing terms	– 2%	– 8,400
Adjusted price		$411,600
Adjustment for conditions of sale†	+ 5%	+ 20,580
Adjusted price		$432,180
Adjustment for expenditures immediately after purchase	+ $20,000	+ $20,000
Adjusted price		$452,180
Adjustment for market conditions	+ 5%	+ 22,609
Adjusted price		$474,789
Property adjustments		
Adjustment for		
Location		+ 14,250
Physical characteristics		– 23,750
Economic characteristics		– 24,000
Legal characteristics		+ 9,500
Non-realty components		+ 12,000
Indication of value		$462,789

* In the market data grid, the sale price could be converted into a unit price, such as price per square foot of leasable area, and adjustments made to the unit price rather than the sale price.

† Although in this case the adjustment for conditions of sale is independent of the adjustment for financing terms, sometimes the adjustment amount for financing terms can reflect some of the influence of a difference in conditions of sale. Chapter 19 includes discussion of how to avoid double-counting for the effect of these two elements of comparison.

If a comparable transaction requires fewer adjustments than the other comparable transactions and the magnitude of the adjustments is approximately the same, an appraiser may attribute greater accuracy and give more weight to the value indications obtained from the transaction with the fewest adjustments. Similarly, the gross adjustment amount can be a significant factor in the reconciliation of various value indications. Even though the number of adjustments made to the sale prices of the comparable properties may be similar, the gross dollar amount of the total adjustments might vary considerably. For example, suppose an appraiser analyzes five comparable properties, each of which require several adjustments. However, the gross dollar amount of adjustments for one comparable property totals 15% of the sale price, while the gross dollar adjustment for each of the other four properties is less than 5% of the sale price. If the sales are similar otherwise, less accuracy may be attributable to the comparable property that required the larger adjustment as a percentage of the sale price.

Reconciliation Checklist

In the reconciliation process, the appraiser often asks several questions about the data and techniques used in the sales comparison approach such as, but not limited to, the following:

- Is the comparable property similar in terms of physical characteristics and location?
- Does the comparable property have the same highest and best use?
- Was it developed, rented, or sold in the same market as the subject property?
- Are the characteristics of the transaction similar to those expected for the subject property?
- Would a potential buyer of the subject property consider the comparable property as a reasonable alternative to the subject?
- Is one method preferred over another given the data available for each analysis?

In some cases the appraiser may ask additional questions:

- Are the expenses of the comparable properties appropriate indicators of the expenses of the appraised property?
- Are the estimates of depreciation in the appraised improvements justified?

The magnitude of net adjustments is often a less reliable indicator of accuracy. The net adjustment is calculated by totaling the positive and negative adjustments. A net adjustment figure may be misleading because the appraiser cannot assume that any inaccuracies in the positive and negative adjustments will cancel each other out. For example, if a comparable property is 20% superior to the subject in some characteristics and 20% inferior in others, the net adjustment is zero but the gross adjustment is 40%. Another comparable sale may require several adjustments, all positive or all negative, resulting in a net adjustment of 30%. This property may well be a more accurate indicator of the subject's value than the comparable sale with the 0% net adjustment, which had large positive and negative adjustments that cancel each other out mathematically.

It is also good practice in the reconciliation process to reexamine the major elements of comparison for which no adjustments were made and to explain why these elements of comparison did not require any adjustments.

Even when adjustments are supported by comparable data, the adjustment process and the indicated values should reflect judgment. Small inaccuracies can be compounded when several adjustments are added or multiplied, and thus seemingly precise arithmetic conclusions derived from adjusted data might contradict the appraiser's judgment. The sales comparison approach is not formulaic. It does not lend itself to detailed mathematical precision. Rather, it is based on judgment and experience as much as quantitative analysis.

Units of Comparison and Real Property Interests in the Reconciliation Process

Two related points should be stressed in any discussion of the reconciliation process. In arriving at a final value indication in the sales comparison approach, the appraiser must ensure that the value concluded is consistent with the value indications derived from the other approaches to value. This is especially important in regard to the date of an opinion of prospective value. For example, an appraiser may seek an opinion of the market value of an income-producing property at two different points in the future–e.g., when the project is completed and when occupancy reaches a point of stabilization. The only market data available, however, may pertain to comparable properties at or near stabilized occupancy. Typically, this data is appropriate only for an analysis of the market value of the subject property at the point of stabilized occupancy. As a result, the appraiser has to reconcile the prospective value indication based on this data with value indications derived from the other approaches for the corresponding date of stabilized occupancy. In these cases, care must be exercised in the reconciliation process.

The appraiser must also consider any differences in the property rights appraised between the comparable properties and the subject property because the comparable sales may include the transfer of a leased fee interest. If the data is not properly analyzed in the sales comparison approach, the value indication concluded for the leased fee interest in the subject property upon the achievement of stabilized occupancy might be lower or higher than the value for the fee simple estate. This value indication would not be compatible with the corresponding value indications derived from the cost and income capitalization approaches for the fee simple estate of the subject property unless adjustments have been made. Failure to recognize that the value indications may apply to different property rights would likely result in an inaccurate value conclusion.

Comparative Analysis

Comparative analysis is the general term used to identify the process in the sales comparison approach in which quantitative and qualitative techniques are applied to comparable sales data to derive a value indication. An appraiser may use both quantitative adjustments and qualitative analysis in comparative analysis.

The process of researching and applying adjustments involves a thorough analysis of the comparable sales to identify the elements of comparison that affect the value of the type of property being appraised. Quantitative adjustments derived in comparative analysis and applied to the sale prices of the comparable properties may be expressed in numerical amounts (e.g., dollars, percentages). The conclusions of qualitative analysis may be described in terms that clearly convey the relative difference between the comparable property and the subject in regard to each element of comparison (e.g., inferior, superior, similar). The evidence that supports a numerical adjustment and the source of all value conclusions must be readily understood by the intended users of the appraisal report.

When quantitative differences cannot be identified for a specific element of comparison, qualitative analysis is used to determine which comparable sales are inferior, similar, or superior to the subject property for that element of comparison. The adjusted prices of the inferior and superior groups bracket the value of the

comparative analysis
The process by which a value indication is derived in the sales comparison approach. Comparative analysis may employ quantitative or qualitative techniques, either separately or in combination.

subject and indicate a probable range of values. The appraiser concludes a single value indication for the subject property from this range of values.

In applying quantitative adjustments, qualitative analysis, or both, appraisers must ensure that their reasoning is clear and adequately explained in the appraisal report. The extent of narrative explanation required also depends on the complexity of the property being appraised. The more complex the property, the more factors that must be considered in the analysis and then explained to intended users of the appraisal.

Quantitative Adjustments

Several techniques are available to quantify adjustments to the sale prices of comparable properties:

- data analysis techniques such as paired data analysis, grouped data analysis, and secondary data analysis
- statistical analysis, including graphic analysis and scenario analysis
- cost-related adjustments (cost to cure, depreciated cost)
- capitalization of income differences

Appraisers can usually find some logic to support most quantitative adjustments given the number of tools available to them. Of course, the value indication supported by quantitative adjustments may differ from the results of cost or income capitalization analysis, and the appraiser will have to reconcile the results of the sales adjustment process with the results of the other approaches to value. Above all, the appraiser must be careful to ensure that mathematical adjustments reflect the reactions of market participants.

Data Analysis Techniques

Paired data analysis is based on the premise that when two properties are equivalent in all respects but one, the value of the single difference can be measured by the difference in price between the two properties. For example, two residential properties are similar in all respects except for location–one property has a corner lot while the other is on an interior lot. If both properties sell at a similar time so that there is no difference in market conditions, the difference in sale price can be attributed to the different locations of the properties, and that identifiable difference can be used in the adjustment process. If the home on the corner lot sold for $30,000 more than the home on the interior lot, that difference could be used to adjust the sale prices of other comparable sales in the market for location on a corner lot or an interior lot.

Paired data analysis should be developed with extreme care to ensure that the properties are truly comparable and that other differences do not exist, such as improvements made subsequent to the sale or additional approvals that had to be obtained.

A related technique, grouped data analysis, involves grouping data by an independent variable such as date of sale and calculating equivalent typical values. The grouped sales are studied in pairs to identify the effect on a dependent variable such as the unit price of comparable properties. To apply this technique to the market used in the example described above, the appraiser would compare a group of comparable homes all on interior lots to a different group of residences all on corner lots rather than comparing just one property of each type. The sales would be used to develop a range and then reconcile the value indications.

paired data analysis
A quantitative technique used to identify and measure adjustments to the sale prices or rents of comparable properties; to apply this technique, sales or rental data on nearly identical properties except for one characteristic is analyzed to isolate the single characteristic's effect on value or rent.

Paired data and grouped data analysis are variants of sensitivity analysis, which is a method used to isolate the effect of individual variables on value. Often associated with risk analysis, sensitivity analysis studies the impact of variables on different measures of return.

Although paired data analysis of sales or rents is a theoretically sound method, it may be impractical and produce unreliable results when only a narrow sampling of sufficiently similar properties is available. This is particularly true for commercial and industrial properties and properties that do not sell or lease frequently in the market. A lack of data can make quantifying the adjustments attributable to all the variables a difficult process. An adjustment derived from a single pair of sales is not necessarily indicative, just as a single sale does not necessarily reflect market value.

Special care must be taken when relying on pairs of adjusted prices because the difference measured may not represent the actual difference in value attributable to the characteristic being studied. The difference may include other aspects of the property, not just the one characteristic being studied. Pure pairings may be analyzed first. For example, data on a sale and resale of the same property may be compared to derive a market conditions adjustment. Pairings of adjusted sales should only be used as an analytical tool when truly pure pairings are unavailable. When more than one element of comparison is involved, additional pairs can be studied to isolate and extract the differing elements of comparison.[1] However, in such cases care must be exercised to ensure the process accurately reflects differences considered by market participants.

When sufficient data is available for "pure" pairings (i.e., pairs of sales or rental data from properties that are identical except for the single element being measured), paired data analysis may be a foundation for quantitative adjustments.

Grouped data analysis extends the logic of paired data analysis to larger data sets. In this technique, comparable sales are grouped by an independent variable such as date of sale and then the groups are studied as pairs. For example, sales of units in an industrial park

1. Comparable properties that contain different unit or inventory mixes should be adjusted for this difference before pairing analysis is conducted. Examples of properties with different unit or inventory mixes include apartment buildings with one-, two-, and three-bedroom units and agricultural lands with different types of soil. A unit or inventory mix adjustment is required to ensure that the comparables and subject are commensurate. The appraiser may be able to extract this adjustment by investigating the value relationships among the different classes of properties within the same property type.

Examples of applications of paired data analysis in this chapter include the following:

- The comparison of sales and resales of homes to determine a market conditions adjustment
- The analysis of incremental rent in Table 19.4

that occurred in 2012 are grouped together, and the average sale price for that year is compared to the average sale price of another group of sales that occurred in 2013. Analyzing the pairs of average sale prices gives a measure of the change in sale prices from 2012 to 2013. This type of analysis is used with other techniques.

A third form of data analysis, secondary data analysis, is used to support adjustments derived by other methods. This technique makes use of data that does not directly pertain to the subject or comparable properties. This secondary data describes the general real estate market and is usually collected by a data vendor research firm or government agency like the county assessor. Secondary data may need verification.

Statistical Analysis

Statistical methods may also be applied to calculate adjustments to comparable sales. To use any form of statistical analysis, the appraiser must understand (and properly apply) fundamental statistical concepts as well as the particular methodology selected.[2] In applying statistical analysis, the appraiser must be careful not to develop a result that is mathematically precise yet logically meaningless or inappropriate for the particular appraisal. As with other adjustment techniques, statistical analysis must reflect the thought processes and conclusions of market participants to serve as a useful, persuasive valuation tool.

In one common application, an appraiser can develop a series of adjustment factors to control for different tract sizes by creating a simple linear regression model and then use the results of the regression analysis as a means of inferring the size adjustment for properties within the range of the data. If a reasonable pattern emerges, the model can be applied to a group of sales with differing land sizes to test its accuracy, although the process might also demonstrate that the indicated adjustments are incorrect.

Appraisers should recognize the differences between statistical processes in the collection and description of data and should be able to distinguish between descriptive and inferential statistics. Without an understanding of these basic issues, any use of statistical calculations is dangerous or ill-advised. It is improper to mix a value of a single regression coefficient that is developed for a given statistical model with other market adjustments developed from paired sales analysis or other market data comparison techniques.[3]

Examples of applications of statistical analysis in this chapter include the following:

- The regression analysis shown in Figure 19.4

2. Full discussion of the statistical methods applicable to the sales comparison approach is beyond the scope of this text. Chapter 14 provides a review of basic statistical techniques. In addition, *The Appraisal Journal*, *Assessment Journal*, *The Journal of Real Estate Research*, *Real Estate Economics*, and other scholarly journals have published many articles on advanced statistical applications.

3. The difficulty in applying regression analysis to real estate appraisal is discussed in Gene Dilmore, "Appraising with Regression Analysis: A Pop Quiz," *The Appraisal Journal* (October 1997): 403–404. See Appendix B for a more detailed discussion of appropriate applications of regression analysis.

Scenario analysis is a form of modeling in which the conditions created by future events are forecast to test the probability or correlation of alternative outcomes. In the adjustment process, alternative scenarios can be created and then modeled to test the influence of changes in various elements of comparison on sale price. The technique allows the appraiser to forecast best, most-likely, and worst-case scenarios (such as the potential performance of proposed improvements) or to create other scenarios testing a range of values rather than a single point estimate. Scenario analysis is often used to measure the risk associated with certain market events and investment decisions.

Graphic Analysis

A simple graphic display of grouped data may illustrate how the market reacts to variations in the elements of comparison or may reveal submarket trends. In curve fit analysis, different formulas may be employed to determine the best fit for the market data being analyzed. The most reliable equation for the best-fitting curve can be plotted, or the most appropriate equation of those commonly used to solve for an adjustment can be identified.

Examples of applications of graphic analysis in this chapter include the following:

- The analysis of a sale price trend shown in Figure 19.1
- The comparison of property locations shown in Figure 19.3

Cost Analysis/Cost-Related Adjustments

In cost analysis, adjustments are based on cost indicators such as depreciated building cost, cost to cure, or permit fees. Cost-related adjustments are most persuasive in markets with limited sales activity. The appraiser should be able to provide market support for cost-related adjustments because cost and value are not necessarily synonymous.

Buyers are clearly conscious of the cost of repairs, additions, or conversions as can be seen in the application of the cost approach (see Chapters 27, 28, and 29). However, the cost of an improvement does not

Examples of applications of cost analysis in this chapter include the following:

- The adjustment for expenditures made immediately after purchase in the valuation of an industrial building

descriptive statistics
A branch of statistics concerned only with characterizing, or describing, a set of numbers; the measures used to characterize a set of data (e.g., average, maximum, coefficient of dispersion) or charts and tables depicting the data.

inferential statistics
The process of drawing conclusions about population characteristics through analysis of sample data.

statistical analysis
Quantitative techniques used to estimate value and identify and measure adjustments to the sale prices of comparable properties; techniques include statistical inference and linear and multiple regression analyses.

scenario analysis
An analytical technique that measures the sensitivity of a performance variable to concurrent changes in a group of variables, such as rate, sale price per unit, and occupancy. Unlike sensitivity analysis, scenario analysis recognizes that a change in one variable is likely to affect other variables. For example, if the market softens, rents may decline and vacancy rates may increase.

graphic analysis
Quantitative techniques used to identify and measure adjustments to the sale prices of comparable properties; a variant of statistical analysis in which an appraiser interprets graphically displayed data visually or through curve fit analysis. Graphs can also be used to support and exhibit value trends for comparison elements in qualitative analysis.

always result in an equal increase in value for the property as a whole. For example, adding a swimming pool to a residential property at a cost of $50,000 may only add $25,000 to the value of the property. On the other hand, the swimming pool might be worth more to the property than the $50,000 cost to install it if few existing residential properties have swimming pools and the demographics in the market support the addition of that amenity. As another example, a potential buyer of a refrigerated warehouse may also look at buildings without refrigeration that can be converted into refrigerated space and factor into an offer the cost of conversion (as well as other cost considerations such as the time the building would be unavailable for use during the conversion).

Capitalization of Income Differences

Differences in net operating income can be capitalized to derive an adjustment when the income loss incurred by a comparable property reflects a specific deficiency in the property, e.g., the lack of an elevator in a low-rise office building or inadequate parking for a convenience store. Alternatively, a comparable property may enjoy a competitive advantage over the subject property, in which case the adjustment to the sale price of the comparable property would reflect the income premium the property enjoys. For example, an investor may decide to purchase a building with an elevator or one without an elevator based on the difference in potential rental rates.

Capitalization of income differences is easier to support than many other methods of quantifying adjustment amounts, and the technique is recognized by investors as a valid method of comparison. Sufficient data must be available and carefully verified. It is commonly used in eminent domain assignments to illustrate a loss in value, e.g., the difference between the rental income a property generates before and after an event such as a government taking of a portion of the property. Capitalization of rent differences can also be used in the valuation of residential property through the application of a gross rent multiplier if there is adequate information on rents and rent differences.

Examples of applications of capitalization of income differences in this chapter include the following:

- The adjustment for real property rights conveyed in the sale of an office building
- The adjustment for income loss due to the physical characteristics of an apartment building
- The comparison of net operating incomes to calculate an adjustment for economic characteristics

Personal Interviews

Personal interviews are part of the foundation of the adjustment process. That is, they can reveal the opinions of knowledgeable individuals participating in the subject's market such as trends in sale prices. Although data gathered through personal interviews is primary data, the opinions of market participants, however valuable, should not be used as the sole criterion for estimating adjustments or reconciling value ranges if an alternative method that relies on direct evidence of market transactions can be applied.

Qualitative Analysis

Qualitative analysis recognizes the inefficiencies of real estate markets and the difficulty of expressing adjustments with mathematical precision. It is essential, therefore, that the appraiser explain the analytical process and logic applied in reconciling value indications using qualitative analysis techniques such as

- trend analysis
- relative comparison analysis
- ranking analysis

Statistical analysis and graphic analysis may serve as qualitative techniques when the results of those analyses do not support a precise adjustment amount but do support qualitative conclusions about value trends. Likewise, when trend analysis yields enough evidence to support a precise adjustment amount, the technique could be considered a quantitative adjustment technique. The nature of the data analyzed with the various statistical techniques will dictate how the results of the analysis can be used, either as an adjustment or as a qualitative indicator.

Trend Analysis

Trend analysis is applicable when a large amount of market data is available. Such analyses are often useful in a variety of applications. They are especially useful when there is a limited number of closely comparable sales but a large number of properties with less similar characteristics. The various elements of comparison influencing a sale price can be tested to determine their market sensitivity. Once the appraiser has determined which elements of comparison show market sensitivity, price patterns can be analyzed to support other analyses.

In the application of market analysis, the term *trend analysis* refers specifically to inferred demand analysis, i.e., using historical data and statistics to draw inferences about the future, assuming that a property or property type will perform in the future as it has in the past. In the context of statistical theory, *trend analysis* is often defined as analysis of a time series. In the context of sales comparison, the term simply refers to the use of statistical techniques to make comparisons of variables other than time.

trend analysis
A qualitative technique used to identify and measure trends in the sale prices of comparable properties; useful when sales data on highly comparable properties is lacking, but a broad database on properties with less similar characteristics is available. Market sensitivity is investigated by testing various factors that influence sale prices.

relative comparison analysis
A qualitative technique for analyzing comparable sales; used to determine whether the characteristics of a comparable property are inferior, superior, or similar to those of the subject property. Relative comparison analysis is similar to paired data analysis, but quantitative adjustments are not derived.

Relative Comparison Analysis

Relative comparison analysis is the study of the relationships indicated by market data without recourse to quantification, i.e., the data reveals an ordinal relationship between elements of a data set. Many appraisers use this technique because it reflects the imperfect

Examples of applications of relative comparison analysis in this chapter include the following:

- The comparison of ranges of lot sizes shown in Table 19.3
- The analysis of varying maximum buildable areas for office properties shown in Table 19.6

Examples of applications of ranking analysis in this chapter include the following:

- The analysis of corner and interior lot locations shown in Table 19.1

bracketing
A process in which an appraiser determines a probable range of values for a property by applying qualitative techniques of comparative analysis to a group of comparable sales. The array of comparables may be divided into three groups—those superior to the subject, those similar to the subject, and those inferior to the subject. The adjusted sale prices reflected by the sales requiring downward adjustment and those requiring upward adjustment refine the probable range of values for the subject and identify a value bracket in which the final value opinion will fall.

ranking analysis
A qualitative technique for analyzing comparable sales; a variant of relative comparison analysis in which comparable sales are ranked in descending or ascending order of desirability and each is analyzed to determine its position relative to the subject.

nature of real estate markets. To apply the technique the appraiser analyzes comparable sales and identifies whether the characteristics of the comparable properties are inferior, superior, or similar to those of the subject property.

Reliable results can usually be obtained by bracketing the subject between comparable properties that are superior and inferior to it. If the comparable properties are either all superior or all inferior, however, only an upper or lower limit of values is set and no range (or bracket) of possible values for the subject can be defined. For example, if all the comparable properties are inferior in terms of qualitative factors, the only conclusion the appraiser can draw is that the value of the subject property is higher than the highest value indication for the comparable properties. The appraiser must search the market diligently to obtain and analyze sufficient pertinent data to bracket the value of the subject property. If the available comparable sales do not bracket the subject's value, the appraiser should consider employing other analytical techniques to establish such a bracket. Quantitative adjustments to the comparable sales can often serve this purpose.

Ranking Analysis

Ranking analysis is used to sort the comparable data for differences in specific elements of comparison, e.g., size, corner or interior lot, frontage. The technique can be used to test the specific elements of comparison for their market sensitivities. The comparable sales are ranked according to overall comparability or by some other element of comparison so that the relative position of each comparable sale to the subject property is clear. Specific value trends can thereby be established for elements of comparison that are market-sensitive, and those that show no discernible or reasonable trends will be discarded.

Elements of Comparison

As indicated in Chapter 18, elements of comparison are the characteristics of properties and transactions that help explain the variances in the prices paid for real property. The basic elements of comparison considered in comparative analysis are

- real property rights conveyed
- financing terms

- conditions of sale
- expenditures made immediately after purchase
- market conditions
- location
- physical characteristics
- economic characteristics
- legal characteristics
- non-realty components of value

Each of the basic elements of comparison should be analyzed to determine whether an adjustment is required. If sufficient information is available, a quantitative adjustment may be made. If there is insufficient support for a quantitative adjustment, the element of comparison may be better addressed using qualitative analysis.

Adjustments for differences in the elements of comparison are made to the price of each comparable property. Adjustments may be made to the total property price, to a common unit price, or to a mix of both, but the unit prices used must be applied consistently to the comparable properties at the appropriate points in the adjustment process. The magnitude of the adjustment made for each element of comparison depends on how much that characteristic of the comparable property differs from the subject property.

Appraisers should consider all appropriate elements of comparison and avoid double-counting adjustments for the same difference reflected in multiple elements of comparison. This requires an awareness of situations in which the influence of differences in one element of comparison may have an effect on an adjustment derived for a different element of comparison. (This relationship, called *multicollinearity*, is discussed in Chapter 14.) For example, an adjustment made to the sale of a comparable residential property for the number of bedrooms in the house might be related to or be duplicative of an adjustment that has already been made for the size of the house. The size difference may be reflected in both elements of comparison–a classic multicollinearity problem.

Transactional Adjustments

The transactional adjustments are generally applied in a specific sequence:

1. Real property rights conveyed
2. Financing terms
3. Conditions of sale
4. Expenditures made immediately after purchase
5. Market conditions

Real Property Rights Conveyed

When real property rights are sold, they may be the sole subject of a contract, or the contract may include other rights, less than all of the real property rights, or even rights to another property or properties. Before a comparable sale property can be used in sales comparison analysis, the appraiser must first ensure that the sale price of the comparable property applies to property rights that are similar to those being appraised. This may require one or more adjustments to the price of the comparable property before specific differences in the physical real estate can be compared. For example, the rights conveyed by a quitclaim deed for real property may or may not include the complete bundle of rights that make up the fee simple estate.[4] If a comparable sale involves a quitclaim deed, the appraiser must determine if the buyer and seller considered the transaction to be equivalent to a fee simple transaction or must seek other supporting evidence before using the transaction for the appraisal of the fee simple estate in the subject property. It is possible that the transaction cannot be used for direct comparison purposes at all because there is no way to make an adjustment for the difference in rights or the quitclaim deed may be for purposes of clearing the title. Some sale contracts call for the sale of real property rights but add deed restrictions or other forms of limitations on the purchaser or future users of the property. That sort of title or use limitation may limit the transaction's use to a general market indicator or render the transaction unusable for direct market comparison because the real property rights conveyed are less than fee simple.

Income-producing real estate is often subject to an existing lease or leases encumbering the title. By definition, the owner of real property that is subject to a lease no longer controls the complete bundle of rights, i.e., the fee simple estate. If the sale of a leased property is to be used as a comparable sale in the valuation of the fee simple estate of another property, the comparable sale can only be used if reasonable and supportable market adjustments for the differences in rights can be made. For example, consider the appraisal of the fee simple estate in real estate that is improved with an office building. A similar improved property was fully leased at the time of sale, the leases were long-term, and the credit ratings of the tenants were good. To compare this leased fee interest to the fee simple estate of the subject property, the appraiser must determine if the contract rent of the comparable property was above, below, or equal to market rent. The appraiser must also determine whether contract rent represents income attributable to increases in rent under existing leases resulting from stated escalations in the leases or tenant reimbursement of expenses. If the market rent for office space is $25 per square foot net and the average contract rent for the comparable property is $20 per square foot net, then the difference between market and contract rent is $5 per square foot. However, this difference only reflects the disparity in property rights if the lease term is very long.

Calculating an adjustment for differences in real property rights is also necessary when the subject property involves the fee simple estate but the comparable sale involves the leasehold interest. Although it is

4. A quitclaim deed is a method of conveying title to real property in which any interest the grantor possesses in the property described in the deed is conveyed to the grantee without warranty of title.

usually not recommended that the sale of a leasehold interest be compared to a fee simple estate, the limited availability of sales of directly comparable interests sometimes makes this necessary. For example, consider an office building that is owned and sold separately from its site, which is subject to a 99-year ground lease. The 100,000-sq.-ft. building, which is leased at market rent, sold for $22 million, or $220 per square foot. To develop an indication of the value of the fee simple estate of the total property, the value indication for the leased fee interest must be added to that of the leasehold interest.

One method of developing a value indication for the leased fee interest (land only) is to capitalize the rent that accrues to the land. Suppose that the annual ground rent is $200,000, which is consistent with current market rents, and that market evidence supports a land capitalization rate (R_L) of 5%. The calculation is

Income to the land (I_L) divided by R_L	$200,000/0.05
Value of the leased fee interest	$4.0 million

Typically, the capitalization rate for the land will be lower than the rate for the building because the building incurs physical deterioration or obsolescence. In this case, an upward adjustment of $4.0 million for property rights conveyed would be shown in the sales comparison grid.

In comparing properties that are encumbered by long-term leases or are essentially fully leased with quality tenants, the appraiser must recognize that these leased properties may have significantly less risk than a competitive property that has shorter-term tenants at market rental rates. On the other hand, the reverse may be true in expanding markets. The ability to demand higher rental rates and the ready availability of tenants may favor the shorter-term lease strategy. The market position of a fully leased building is clearly different from that of a building with no leases at all. The buyer of a multitenant property that has a good cash flow in place may not be the same buyer who is interested in a property that is only one-third occupied. In the case of the property with two-thirds vacancy, the buyer may need a 20% down payment and another 20% to cover the shortfalls created by the lease-up period. It is quite common for buyers of nearly empty buildings to have to invest capital for many years until the properties reach stabilized occupancy. The period over which the property leases up to a stabilized level is easily reflected in the income capitalization approach but often needs to be adjusted for in the sales comparison approach. Appraisers should also be aware that the adjustment applied to the sale of a partially vacant property would be different if users favor empty buildings over those encumbered by leases.

Calculations of appropriate adjustments reflecting differences in property rights may be difficult to develop and support. Properly developed adjustments require significant research and diligence. Ideally, the comparables selected for analysis include the same types of property rights as the subject property, so adjustments are not needed.

Financing Terms

The transaction price of one property may differ from that of an identical property due to different financing arrangements. For example, the purchaser of a property may have assumed an existing mortgage at a favorable interest rate. In another case, a developer or seller may have arranged a buydown, paying cash to the lender so that a mortgage with a below-market interest rate could be offered. In both cases the buyers probably paid higher prices for the properties to obtain below-market financing. The general availability of financing and the loan-to-value ratio can be significant factors that influence property value, and the specific financing terms in a transaction can also affect the price.

Other non-market financing arrangements include installment sale contracts, in which the buyer pays periodic installments to the seller and obtains legal title only after the contract is fulfilled, and wraparound loans, which are superimposed on existing mortgages to preserve their lower interest rates. These loans offer below-market or blended interest rates to borrowers (i.e., the buyers). Below-market rates are sometimes extended to individuals who have substantial net worth and are therefore especially creditworthy.

In cash equivalency analysis an appraiser investigates the sale prices of comparable properties that appear to have been sold with non-market financing to determine whether adjustments are needed to reflect typical market terms at the time of sale. First, sales with non-market financing are compared to other sales transacted with market financing to determine whether an adjustment for cash equivalency can be made.

The typical definition of *market value* recognizes cash-equivalent terms provided that the calculation of these terms reflects the market. Conditions of sale may reveal other interests on the part of buyers or sellers that are not related to financing terms. Confirmation of the intent of buyers and sellers is one way to verify a cash equivalency adjustment.

Cash equivalency calculations vary depending on the kind of financing arrangement that requires adjustment. Appraisers may calculate adjustments for atypical financing by analyzing renegotiated contracts on the same property (e.g., a sale is negotiated at a price subject to the buyer securing new market financing and, while still under contract, the deal is renegotiated at a different face value with the seller providing terms), by using paired data sets, or by discounting the cash flows (e.g., payments and balloons) created by the mortgage contract at market interest rates. If discounting is used, the appraiser should not assume that the buyer will always hold the property for the life of the mortgage. Market evidence often indicates otherwise. A mortgage is often discounted for a shorter term, but the balloon payment must still be included. In addition, the benefit of a lower interest rate loan may not be as significant in future years as it is now. In other words, buyers who are able to arrange favorable financing may claim that the mortgage with the lower rate obtained through the sale will only benefit them until the mortgage interest rates come back down.

Calculating a cash equivalency adjustment by discounting cash flows can be accomplished in different ways. When a seller finances a mortgage at a below-market interest rate, the appraiser can estimate the present value of the mortgage by applying a present value factor to the monthly mortgage payment at the market interest rate for the stated term of the mortgage. For example, an appraiser finds a comparable sale of a one-unit residence that was sold for $220,000 with a down payment of $50,000 and a seller-financed mortgage of $170,000 for a 20-year term at 3.0% interest. Homes in the market area are typically held for the full 20-year term and the market-derived rate is 3.5%. The cash equivalency adjustment is calculated as follows:

Mortgage:	$170,000, 20 years, 3%
Monthly Payment:	$942.82
Present Value of $942.82 per Month for 20 Years @ Market Rate of 3.5%:	$162,566
Indicated Adjustment for Cash Equivalency:	$7,434
$170,000 – $162,566 = $7,434	

The cash-equivalent sale price would then be $212,566 ($220,000 – $7,434).

Discounting cash flows to calculate a cash equivalency adjustment may also take into account the expectation of a balloon payment. For example, consider a house that sells for $250,000 with a down payment of $50,000 and a seller-financed $200,000 mortgage at an interest rate of 3.5% when the market rate is at 6.0%. The mortgage is amortized over 25 years with a balloon payment due at the end of 8 years The present value of the mortgage is computed as the sum of two components:

1. The present value of the mortgage payments at the market interest rate for the expected life of the mortgage
2. The present value of the future mortgage balance at the market interest rate

The calculations are as follows:

Mortgage:	$200,000, 25 years, 3.5%
Monthly Payment:	$1,001.25
Present Value of $1,001.25 per Month for 8 Years @ 6.0%:	$76,190.34
Mortgage Balance in 8 Years:	$153,777.38
PV of Mortgage Balance in 8 Years @ 6.0%:	$95,268.76
PV of Mortgage:	$171,459.10
$76,190.34 + $95,268.76 = $171,459.10	
Indicated Adjustment for Cash Equivalency:	$28,540.90
$200,000 – $171,459.10	

The cash-equivalent sale price would then be $221,459.10 ($250,000 – $28,540.90).

Transactions involving mortgage assumptions can be adjusted to cash equivalency with the same method applied to seller-financed transactions. Other atypical mortgage terms include mortgages that call for interest-only payments followed by payments that include the repayment of the principal. This type of mortgage can also be adjusted to its cash-equivalent value using the adjustment procedure described here. The present values of the payments (monthly, quarterly, semiannual, or annual) at the market rate, year by year, are derived using present value factors. If balloon payments are involved, present value factors may be applied to isolate the contributory market value of the unpaid balance of the mortgage.

Financing adjustments derived from precise, mathematical calculations of cash equivalency must be rigorously tested against market evidence. Strict mathematical calculations may not reflect market behavior. It is necessary for the appraiser to talk with the buyers and sellers to determine if the financing terms affect value. Market evidence must support the adjustment made. If the cash discount indicated by the calculations is not recognized by buyers and sellers, the adjustment is not justified.

Appraisers should also recognize that in some situations financing and conditions of sale are interdependent, and they should be careful not to double-count the influence of these factors when making quantitative adjustments.

Conditions of Sale

The definition of *market value* used in most assignments requires "typical motivations of buyers and sellers" with no pressure on either party to consummate the sale. An adjustment for conditions of sale usually reflects the motivation of either a buyer or a seller who is under undue duress to complete the transaction. In many situations the conditions of sale significantly affect transaction prices. These atypically motivated sales are not considered arm's-length transactions. For example, a developer may pay more than market value for lots needed in a site assemblage because of the plottage value or enhanced development economies expected to result from the greater utility of the larger site. A sale may be transacted at a below-market price if the seller needs cash in a hurry. A financial, business, or family relationship between the parties to a sale may also affect the price of property. Interlocking corporate entities may record a sale at a non-market price to serve their business interests. One member of a family may sell a property to another member of the family at a reduced price, or a buyer may pay a higher price for a property because it was built by his ancestors.

When non-market conditions of sale are detected in a transaction, the sale can be used as a comparable sale but only with care. The circumstances of the sale must be thoroughly researched before an adjustment is made, and the conditions must be adequately disclosed in the appraisal report. Any adjustment should be well supported with data. If the adjustment cannot be supported, the sale probably should be discarded.

Although conditions of sale are often perceived as applying only to sales that are not arm's-length transactions, some arm's-length sales may reflect atypical motivations or sale conditions due to unusual tax considerations, lack of exposure on the open market, or the complexity of eminent domain proceedings. If the sales used in the sales comparison approach reflect unusual situations, an appropriate adjustment (supported by market evidence) should be made for motivation or conditions of sale. Again, the circumstances of the sale must be explained in the appraisal report.

In some markets with limited data, the appraiser cannot discard any sales and must use comparable sales with unusual conditions of sale. As an example, suppose the appraiser finds that all the comparable sales were reported to have sold with the sellers under duress to sell because of a high rate of foreclosures. Too much competition or a poorly performing market could cause a similar situation. (See Guide Note 11 to the Standards of Professional Practice of the Appraisal Institute for further information.)

Making direct comparisons is more difficult when the motivations of market participants are atypical. If the buyer is related to the seller, the sale price paid may not reflect the price that would be paid

Concessions

Often a seller may give some sort of financial incentive to induce a buyer to make an offer on the seller's property rather than on a competitor's property. Some appraisers will identify this sort of financial "concession" offered by the seller as an adjustment to be made under the "conditions of sale" element of comparison, but other appraisers will label concessions as "financing terms." The label itself is less important than recognizing the effect of concessions on the sale price of a comparable sale, compensating for that effect, and not double-counting the effect of the concession.

A concession is a financial payment, special benefit, or non-realty item included in the sale contract or rental agreement as an incentive to the sale or lease. Concessions occur when the seller or lessor agrees to pay an inducement or to give some credit or property to a buyer or lessee, who in turn agrees to pay a higher price than the seller or lessor would otherwise receive for the property. Concessions usually result in artificially inflated sale prices or lease rates. Concessions often allow financing that would otherwise not be possible. Concessions may be disclosed as part of the sale or lease, but they are usually not. Examples include

- A sale that includes personal property items such as automobiles, motorcycles, cruise tickets, or furnishings.
- A sale in which the seller contributes to the buyer's portion of the closing costs. This lowers the amount of money the buyer needs at closing. The seller usually raises the selling price by the amount of the extra costs.
- A transaction in which the seller of the real property purchases a piece of personal property from the buyer at an inflated price. For example, the buyer has a used car worth $2,000, but the seller buys it for $20,000 (as part of the real property transaction), in effect giving the buyer a down payment. The price (but not the value) of the real property is increased by $18,000.
- A sale in which the seller subsidizes the buyer's mortgage, e.g., buys down the interest rate, pays the buyer's mortgage payments for a stated number of months, or provides some other arrangement. If the interest rate of the new loan is lower, some lenders will underwrite the loan at the discounted rate, which allows the buyer to take out a larger loan.
- A seller-financed sale in which the seller takes back a mortgage at a below-market rate, which will give the buyer lower payments unless the seller raises the sale price to compensate.
- A free month's rent as part of a one-year apartment lease.
- A new lease in which the landlord pays the tenant's moving costs.
- Points paid by the seller.
- Personal property, furniture, fixtures, and equipment (FF&E), or other non-realty items included in the sale.

Verification is key to assessing the impact of concessions. Appraisers should adjust for these items because a value that includes the impact of concessions is usually not in compliance with commonly used definitions of *market value*.

on the open market. Likewise, if a seller needs the proceeds of the sale quickly to avoid bankruptcy, a shrewd buyer may be able to purchase the property for less than what it would bring if it were on the market for a reasonable exposure time, allowing more potential buyers to participate in negotiations.

Interviewing the participants involved in the transaction usually provides an indication of the magnitude of the adjustment, but sometimes the direction of an adjustment for conditions of sale may be all that can be determined. In the case of a distressed seller, an upward adjustment may be necessary to reflect the value the seller is not recapturing by accepting a below-market offer. The direction of a conditions of sale adjustment in transactions involving related parties may be more difficult to determine. If the details of the transaction are too difficult to verify, an adjustment for conditions of sale may not be usable but it can still be discussed and may be useful in reconciliation.

Expenditures Made Immediately After Purchase

A knowledgeable buyer considers expenditures that will have to be made upon purchase of a property because these costs affect the price the buyer agrees to pay. Such expenditures may include

- costs to cure deferred maintenance
- costs to demolish and remove a portion of the improvements
- costs for additions or improvements to the property
- costs to petition for a zoning change
- costs to remediate environmental contamination

These costs are often quantified in price negotiations and can be discovered through verification of the sale transaction data. The relevant figure is not the actual cost that was incurred but the cost that was anticipated by both the buyer and seller.

Generally an adjustment for expenditures made immediately after purchase is simple to quantify when transaction data is being verified with the market participants. For example, consider a 15,000-sq.-ft. warehouse that is comparable to the property being appraised and was recently sold for $850,000. The new owner-occupant expected to spend $65,000 to install an additional door and loading dock, which was a market-driven decision. In an interview with the new owner of this comparable property, the appraiser learns that the demolition and new construction actually cost $105,000. The value indication for that comparable property would be $915,000 ($850,000 + $65,000) rather than $955,000 ($850,000 + $105,000) because the $65,000 expenditure anticipated by the buyer was deducted from the price the property would command in the market if no expenditures were necessary. If the actual cost of the renovation had been $40,000, the buyer would have enjoyed a $25,000 savings ($65,000 – $40,000) from the expected cost, but those savings would not be reflected in the price the buyer was willing to pay either, which is already an established fact.

Adjustments for deferred maintenance can be handled similarly, but the appraiser should make sure that the buyer and seller were aware of any items needing immediate repair. If the seller was not required to disclose that the roof of the warehouse had a leak and needed repairs, the buyer may not have anticipated those expenditures after the purchase, and there would be no adjustment to the recorded sale price for that item of deferred maintenance. Such factors are always determined through the personal interviews that are part of the verification process. Other items that a buyer may need to budget for as expenses immediately after purchase include

- cost of obtaining entitlements (permissions)
- demolition and removal costs
- environmental remediation costs
- large capital improvements needed at the time of sale

In sales comparison analysis, costs incurred by the new owners of comparable properties are reflected as positive adjustments to the sale prices of those properties. If the subject property requires some expenditure immediately after the purchase to reach its full utility, the adjustment amount is subtracted from the sale prices of all comparable sales that do not require a similar expenditure to adjust those transactions for differences from the subject property.

An adjustment for expenditures made immediately after purchase is distinct from an adjustment for the physical condition of a property. The expenditures adjustment is included among the transactional adjustments because it reflects those items that a buyer would have considered part of the price at the time of the sale. For example, a buyer bought a property that included a 6.75-acre site improved with a 122,000-sq.-ft. industrial building with many environmental problems. The buyer told the appraiser the cost of removing the building and the environmental problems was $750,000. The sale price of the property was only $225,000. The appraiser is considering using this as a comparable land sale, but the buyer actually has $975,000 ($750,000 + $225,000) invested in the property, not just the $225,000 sale price. In the sequence of adjustments, an adjustment for expenditures made immediately after purchase is shown above the market conditions line, which means the market conditions adjustment would be made on the $975,000 price, not the $225,000 price.

Another application of this adjustment is for items that would affect the sale price but not necessarily the rental income. For example, the subject property is a 55,000-sq.-ft., three-story office building that has a new roof covering and three new HVAC units. The cost of these items is $252,000. A nearly identical comparable property just sold for $5 million, but this property needed a new roof covering and three new HVAC units. The rental rates of both buildings are the same, but the maintenance expense for the comparable property is much higher. The adjustment for the deferred maintenance items found in the comparable property could be made on the condition line of the adjustment grid or on the expenditures made immediately after purchase line. An adjustment made on the condition line would affect the capitalization rate that might be extracted from this sale. In other words, the capitalization rate would be a reflection of a sale with good income levels but deferred maintenance. If this adjustment is made prior to extracting the capitalization rate, the result would be an "apples to apples" comparison rather than the skewed amount that would result if the capitalization rate were extracted from a sale with the needed repairs.

Market Conditions

Comparable sales that occurred under market conditions different from those applicable to the subject on the effective date of appraisal require adjustment for any differences that affect their values. An adjustment for market conditions is made if general property values have increased or decreased since the transaction dates.

Although the adjustment for market conditions is often referred to as a "time" adjustment, time is not the cause of the adjustment. Market conditions that change over time create the need for an adjustment, not time itself. In other words, increases or decreases in property values in the market over time are the cause of the adjustment and time is the basis of the adjustment. If market conditions have not changed, no adjustment is required even though considerable time may have elapsed.

The timing of comparable sales can provide the basis for a market conditions adjustment. For example, the highest and best use analysis of vacant land parcels provides information that can be used to estimate an adjustment for changes in market conditions. Comparable tracts of vacant land may have been sold under market conditions different from those on the date of the appraisal. The best sales data available is often historical sales to purchasers who bought the land with a specific use in mind. These sales provide an indication of the anticipated land value under the specific use. By studying marginal demand, an appraiser can establish the time horizon for development of the subject, and the prospective value of the subject under the specific use plan can be estimated. Discounting the prospective value yields an estimate of the present value of the subject land, which can be compared to the values indicated by past sales.

Changes in market conditions may also result from changes in income tax laws, building moratoriums, the availability of financing, employment, interest rates, and fluctuations in supply and demand. Sometimes several economic factors work in concert to cause a change in market conditions. A recession tends to deflate all real estate prices, but specific property types or submarkets may be affected differently. A decline in demand may affect only one category of real estate. If the demand for a specific type of property falls during a period of inflation, sales transacted during that period may not provide a reliable indication of the value of a similar property in a different period unless appropriate adjustments are made. In a depressed economy, recent sales are often difficult to find. Older sales, occurring prior to the onset of the depressed economy, should be used with great caution because they may not reflect the problems associated with the depressed economy. In some instances when current sales of improved properties do not exist, upward or downward shifts in rent and rent terms or land values may help the appraiser identify the direction of market activity.

Appraisers must also recognize that the sale of a property may be negotiated months or even years before the sale closes. The buyer and the seller make an agreement as of the contract date, but the agreement does not become effective until the closing date, and changes to the agreement are often made in the interim. An adjustment for changes in market conditions between the date the contract is signed and the effective date of value may be appropriate. Also, sometimes appraisers are called on to develop an opinion of retrospective or prospective value, which requires a close study of changes in market conditions.[5]

An adjustment for changes in market conditions is usually measured as a percentage of previous prices. While change is continuous, it is typically measured and quoted in specific intervals. If the physical and economic characteristics of a property remain unchanged, analyzing two or more sales of the same property over a period of time will indicate the percentage of price change. In other words, an appraiser can measure the difference in sale prices of the same or similar properties over time to extract the rate of change, which can be used as the basis for adjustment in the sales comparison analysis. An appraiser should always attempt to examine several sets of sales to arrive at an appropriate adjustment. An adjustment supported by just one set of sales may be unreliable.

Sales and resales of the same properties may provide a good indication of the change in market conditions over time. However, such an analysis must be approached with caution because it is possible that a resale of a property involved non-market conditions. For example, if similar properties are typically held for seven years and the resale occurred after only two years, is it possible that the seller was compelled to sell? As long as both the sale and resale were based on market conditions, such an analysis may prove useful. Consider a three-bedroom house that sold three years ago for $250,000 and then sold again recently for $242,500. The indicated average annual decline in value of the house would be 1% ([($250,000 – $242,500)/$250,000]/3). In the same market area, another three-bedroom home with similar characteristics sold for $260,000 three years ago and then sold again last year for $250,000. The average annual change for that comparable property is 1.92% per year ([($260,000 – $250,000)/$260,000]/2). The results of additional calculations made using sale and resale data and paired sales of comparable properties can be reconciled to support an estimated market conditions adjustment. The transactions used in these additional calculations

5. For guidance on the development of retrospective and prospective value opinions, see Statements Nos. 3 and 4 of the Uniform Standards of Professional Appraisal Practice.

should be similar in terms of markets, land-to-building value ratios, and other elements of comparability.

Appraisers must remember that supply and demand are dynamic forces, and periods of decline are just as probable as periods of growth in real estate markets. For example, in recent years many property markets saw falling prices, and negative market conditions adjustments were needed in sales comparison analysis involving sales data from that period of market decline. Also, in volatile markets an adjustment for market conditions may be needed to account for periods of time in which sale prices go up and down. For example, an appraiser studying mid-rise office building sales in a metropolitan market finds that steadily rising prices between 2006 and 2007 were followed by a period of volatility in 2008, then a sharp decline in 2009, then a slow rise to 2006 levels by late 2010, and then another period of stability. Comparable sales that occurred between 2008 and 2010 will require scrutiny because of the changing market conditions during that period, whereas comparable sales occurring before and after the dramatic dip in the market may not require a significant market conditions adjustment.

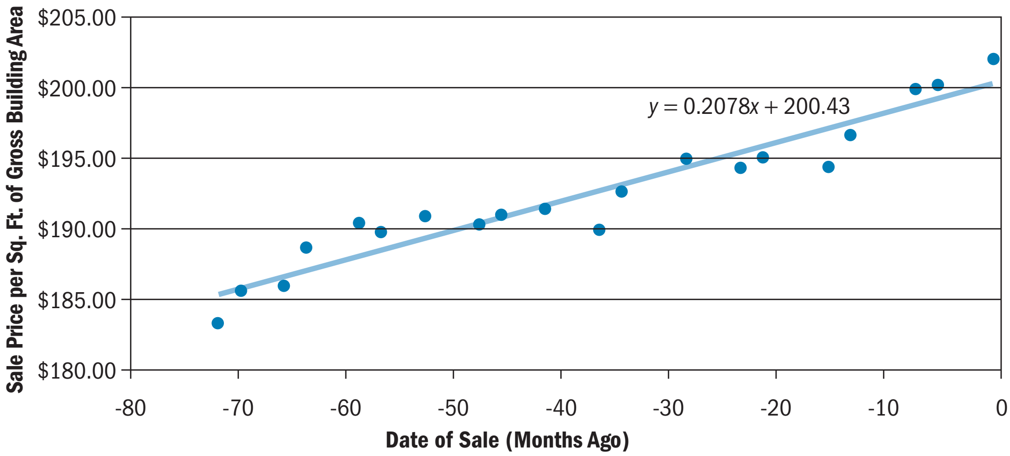
The appreciation or depreciation in average sale prices in a market does not necessarily follow a linear pattern. Changes in sale price can also be irregular or stepped, they can increase or decrease on a compounded basis, or they may require identifying inflection points or dates on which changes in trends occurred. Statistical tools such as regression analysis and extrapolation are useful in determining precise mathematical relationships. However, any statistical model generated from the available data must reflect market thinking to be useful in the adjustment process.

Sorting and plotting sale and resale data or paired sales data on a graph is another way to determine patterns of change. The reliability of such analyses is affected by the number of market transactions studied. With sufficient data, unit prices can be graphed over time to indicate the trend in the market. Rents can also be plotted on scatter diagrams to show differences over time (see Figure 19.1).

If sales of comparable properties are not available, other evidence of shifting market conditions may include changes in

- the ratio between sale prices and listing prices or between lease contracts and lease offering rates
- exposure time
- listing prices
- trends in rents
- the number of offers a seller receives and the frequency of backup offers
- the proportion of accepted offers that actually close
- the number of foreclosures
- the number of available properties
- the number of building permits issued and their aggregate value

Figure 19.1 Scatter Diagram



- terms of available institutional financing
- use of seller financing
- changing market demographic patterns
- demolition and new construction

Property Adjustments

Unlike the transactional adjustments, property adjustments do not need to be applied in a specific sequence. The typical property adjustments include

- location
- physical characteristics
- economic characteristics
- legal characteristics (use/zoning)
- non-realty components of value

Location

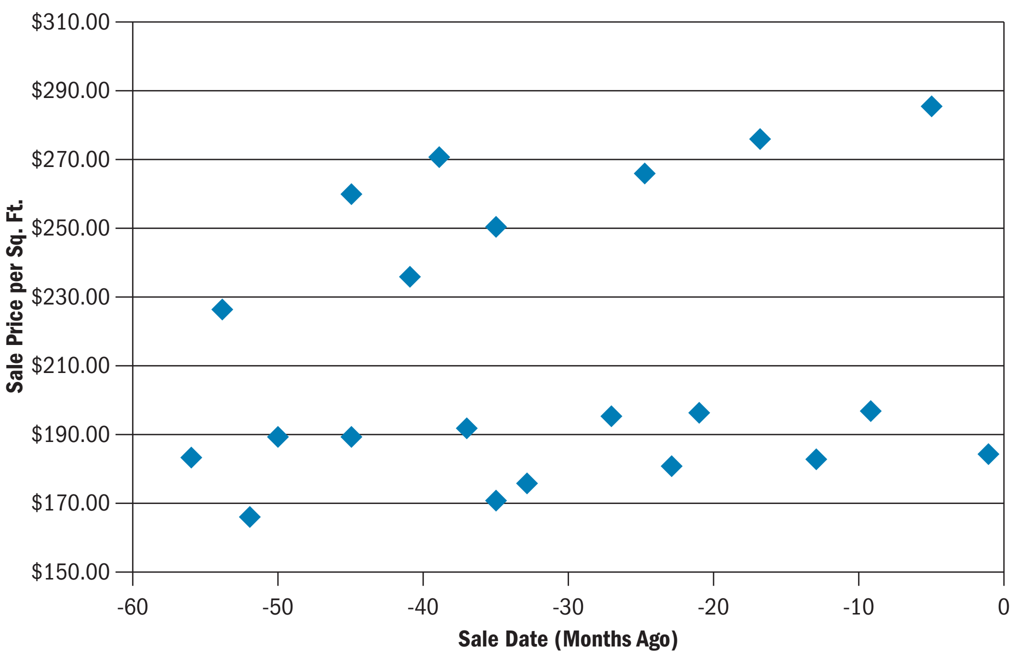
An adjustment for location within a market area may be required when the locational characteristics of a comparable property are different from those of the subject property. Excessive locational differences may disqualify a property from use as a comparable sale.

Most comparable properties in the same market area have similar locational characteristics, but variations may exist within that area of analysis. Consider, for example, the difference between a residential property with a pleasant view of a park and one located two blocks away with a less attractive view. Adjustments for location may also be needed to reflect the difference in demand for various office suites within a single building, the retail advantage of a corner location, the privacy of the end unit in a residential condominium project, or the value contribution of an ocean view. The comparison can also be shown with statistical and graphical analysis. For example, consider the 21 industrial sales shown in Figure 19.2 as a scatter plot and in Figure 19.3 as a set of linear regression lines sorted by location within the metropolitan area. The regression lines in Figure 19.3 are more descriptive and clearly show trends in sale price over time for each of the four locations. The vertical intercepts along the regression lines also illustrate differences in sale price attributable to locational differences that can be used to support adjustments for location.

As another example of the analysis of locational differences, consider the ordered array of data in Table 19.1, which illustrates a definite value trend difference between the interior and corner locations of comparable convenience stores in a market. The ranking analysis shows the market is reacting differently than expected. The common perception is that corner locations are superior to interior locations, but the table shows otherwise and the appraiser must investigate why the data contradicts conventional wisdom. In this case, intersection congestion seems to be restricting access to corner locations. The property being appraised has an interior location, so comparable sales with corner locations would require upward adjustments. Comparable sales with interior locations would require no location adjustment.

To take the analysis further, suppose the unit sale prices in Table 19.1 are also affected by other elements of comparison that could not be measured by quantitative analysis. Qualitative analysis does not

Figure 19.2 Scatter Plot



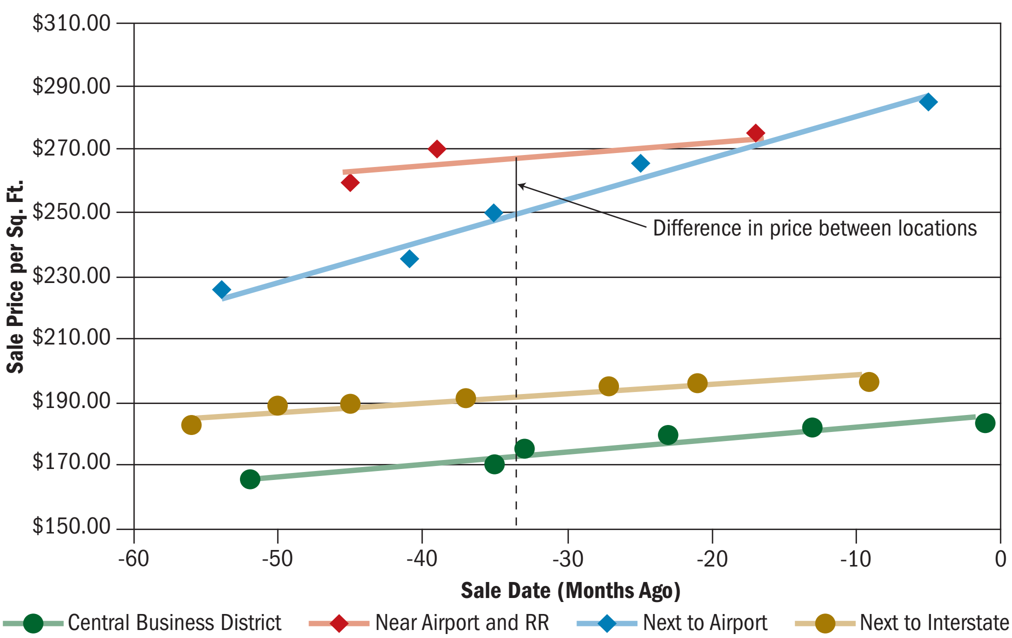
measure those differences, but does identify discernible value trends for different elements. The same comparable sales are tested for value differences attributable to lot size in Table 19.2.

As shown in Table 19.3, the properties with 10,000 to 20,000 square feet require downward adjustment to the subject property, while the properties with 41,000 to 43,000 square feet require upward adjustment. The sales with 25,000 to 30,000 square feet require no adjustment. An Excel linear

Table 19.1 Ranking Analysis of Location

	Location	
Sale No.	**Interior**	**Corner**
1	$150.00	
2		$100.00
3	$130.00	
4	$140.00	
5		$120.00
6		$110.00
7		$125.00
8	$130.00	
Mean:	$137.50	$113.80
Subject:	Interior	
Comparison:	Similar	Inferior

Figure 19.3 Data Grouped by Location



regression summary output and scatter plot (Figure 19.4) show the market trend. The process can be continued to test and apply additional adjustments for other physical, economic, and legal elements of comparison.

Physical Characteristics

If the physical characteristics of a comparable property and the subject property differ, each of the differences may require comparison and adjustment. Physical differences include differences in size, soils, site access, topography, quality of construction, architectural style, building materials, age, condition, functional utility, attractiveness, amenities, and other characteristics.

The value added or lost by the presence or absence of an item in a comparable property may not equal the cost of installing or removing the item. The market dictates the value contribution of individual components to the value of the whole. Buyers may be unwilling to pay a higher sale price that includes the extra cost of adding an amenity. Conversely, the addition of an amenity sometimes adds more value to a property than its cost. In other cases there may be no adjustment to value for the

Table 19.2 Lot Size of Comparable Properties

Sale No.	Size (Square Feet)	Unit Price
1	11,000	$150.00
2	43,000	$100.00
3	19,000	$130.00
4	13,000	$140.00
5	30,000	$120.00
6	41,000	$110.00
7	27,000	$125.00
8	26,000	$130.00

Table 19.3 Relative Comparison Analysis of Lot Size

	Size		
Sale No.	10,000–20,000 sq. ft.	25,000–30,000 sq. ft.	41,000–43,000 sq. ft.
1	$150.00		
2			$100.00
3	$130.00		
4	$140.00		
5		$120.00	
6			$110.00
7		$125.00	
8		$130.00	
Mean:	$140.00	$125.00	$105.00
Subject:		26,000 sq. ft.	
Relative comparison:	Superior	Similar	Inferior

existence or absence of an item. For example, an extra bathroom in an apartment unit may contribute an additional $15 per month to market rent, and this amount could be capitalized to reflect the value attributable to the extra bathroom and to estimate an appropriate adjustment to comparable sales without an extra bathroom. The cost of adding a new bathroom to an existing apartment unit could be quite different.

As another example, consider an apartment complex with both one-bedroom and two-bedroom units. Average monthly rents for competitive apartment properties are shown in Table 19.4.

Figure 19.4 Linear Regression Analysis of Lot Size

SUMMARY OUTPUT

Regression Statistics	
Multiple *R*	0.971743
R Square	0.944284
Adjusted *R* Square	0.934998
Standard Error	0.405632
Observations	8

ANOVA

	df	*SS*	*MS*	*F*	Significance *F*
Regression	1	16.73153	16.73153	101.6883	5.52E-05
Residual	6	0.987224	0.164537		
Total	7	17.71875			

	Coefficients	Standard Error	*t* Stat	*P*-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	16.00385	0.370176	43.23314	1.03E-08	15.09807	16.90964	15.09807	16.90964
X Variable 1	-0.00013	1.3E-05	-10.0841	5.52E-05	-0.00016	-9.9E-05	-0.00016	-9.9E-05

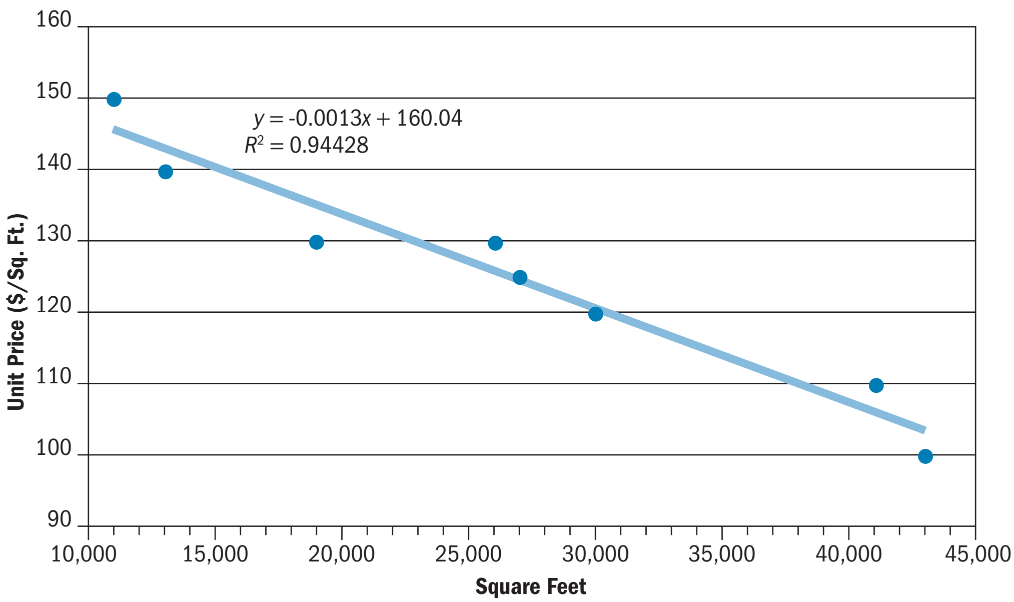


Table 19.4 Comparable Apartment Properties

Comparable Property	One-Bedroom Unit	Two-Bedroom Unit	Incremental Rent for Second Bedroom
A	$650	$700	$50
B	$675	$728	$53
C	$700	$752	$52
D	$710	$760	$50
E	$714	$766	$52
F	$720	$771	$51

If the apartment buildings are otherwise comparable, the incremental rent attributable to a second bedroom could be reconciled at approximately $51 per month. Given a 5% annual vacancy and collection loss, operating expenses of 35% of rent collections, and a market-derived overall capitalization rate of 6%, the value of a second bedroom can be calculated as follows:

Rent per Month	$51
Gross Income per Year ($51 × $12)	$612
Less 5% Vacancy and Collection Loss	– 31
Subtotal	$581
Less Operating Expenses (35%)	– 203
Annual Net Operating Income Attributable to Second Bedroom	$378
Capitalized @ 6%	$6,300

Based on this analysis, an adjustment could be applied to sales of comparable properties with unit mixes that differ from the subject property. Note that an extra bedroom also increases the overall size of a unit. Appraisers often adjust for the size of the unit, which may be all that is needed to compensate for the extra bedroom. Adjusting for both size and configuration may be appropriate, but adjusting for the size of the unit and then also for the extra area included in an extra room would likely be double-counting the influence of the larger unit.

Economic Characteristics

Economic characteristics include all the attributes of a property that directly affect its income. This element of comparison is usually applied to income-producing properties. Characteristics that affect a property's income include operating expenses, quality of management, tenant mix, rent concessions, lease terms, lease expiration dates, renewal options, and lease provisions such as expense recovery clauses. Appraisers must take care not to attribute differences in real property rights conveyed or changes in market conditions to different economic characteristics.

Paired data analysis may provide the only persuasive support for adjustments for differences in the attributes of a property that affect its income such as operating expenses, management quality, tenant mix, rent concessions, and other characteristics. Some of these characteristics may already be reflected in the adjustment for location. For example, a warehouse in a municipality with low property tax rates may have a higher value than a comparable warehouse in a neighboring community with higher tax rates, but the difference in value attributable to the tax rates may already be reflected in the adjustment for location.

Some appraisers analyze net operating income (*NOI* or I_O) per unit to account for differences in economic characteristics, but the technique is not widely used. Some criticize this method as an example of circular logic. To apply this technique the ratio of the subject property's net operating income to a comparable property's net operating income is calculated and applied to the unit price of the comparable property to calculate a value indication for the subject property. For example, the subject property has net operating income of $100,000 and a comparable property has net operating income of $125,000. The comparable property's unit price of $50 per square foot is multiplied by 0.80, the net operating income ratio of 100,000/125,000, which results in a value indication of $40 per square foot. Income ratios for other comparable properties can also be calculated and those results reconciled into an indication of a unit price for the subject property.

Critics of net income multiplier analysis point out that the algebraic manipulation of sales and income data essentially repeats the calculations used in direct capitalization. So when net income multiplier analysis is used in the sales comparison approach and direct capitalization is used in the income capitalization approach, potential errors are duplicated in two of the three approaches to value and these errors will be hard to identify in the final reconciliation of the value indications.[6]

Given the problems associated with net income multiplier analysis and the possibility of double-counting for value influences reflected in other elements of comparison, appraisers must take great care in estimating and supporting adjustments for economic characteristics.

Legal Characteristics

To qualify as comparables, the highest and best use of the properties should be very similar, if not the same, as that of the subject property. If comparable sales are scarce, comparable properties with a different current use or highest and best use may be analyzed and the sales prices may be adjusted accordingly. Quantitative adjustments for differences in highest and best use are difficult to support.

In the valuation of vacant land, zoning is one of the primary determinants of the highest and best use of the property because it serves as the test of legal permissibility. Thus, zoning or the reasonable probability of a zoning change is typically a primary criterion in the selection of market data. When comparable properties with the same zoning as the subject are lacking or scarce, parcels with slightly different zoning

6. For further discussion of the applicability and limitations of net operating income multiplier analysis, see Mark W. Galleshaw, "Appropriate Uses of Economic Characteristics in the Sales Comparison Approach," *The Appraisal Journal* (January 1992): 91-98; the letters to the editor in the July 1992 issue of *The Appraisal Journal*; and Mark Rattermann, "Considerations in Gross Rent Multiplier Analysis," *The Appraisal Journal* (Summer 2006): 226-231.

but a highest and best use similar to that of the subject may be used as comparable sales. These sales may have to be adjusted for differences in utility if the market indicates that this is appropriate. On the other hand, a difference in the uses permitted under two zoning classifications does not necessarily require an adjustment if the parcels have similar potential. It is important for appraisers to consider all known restrictions imposed on development, which may include not only zoning but other land use restrictions as well.

Sometimes, differences in the sale prices of properties with similar, but not identical, uses can be reduced to compatible units–e.g., price of land per square foot of permissible building area–and the difference can be attributed to the different zoning classification requirements. For example, because of differences in parking requirements or landscaping requirements, site development costs for two parcels under different zoning classifications may differ even if the parcels have the same highest and best use. These dissimilarities will be considered by potential buyers and therefore should be considered by the appraiser. Other legal considerations that could affect value may include environmental requirements, water rights, access, easements, and flood zones.

In many situations it may be impossible to support a quantitative adjustment for the different highest and best uses of otherwise comparable sites. In these cases, market data can be used to support qualitative analysis of the different intensities of use allowed by zoning. For example, consider a 100,000-sq.-ft. office building on a 3.0-acre site where the current zoning allows for a maximum floor area ratio (FAR) of 0.50. The existing improvements predate a zoning change. The zoning regulations allow for improvements of equal size to be built if the existing improvements are razed or destroyed. Most of the comparable properties are in areas zoned for a maximum FAR of 1.0. A quantitative adjustment may be difficult to calculate using paired data analysis, but if a strong relationship between the zoning and sale price can be determined, the comparable sales can still be analyzed. The recent land sales in the subject's market area listed in Table 19.5 are already adjusted for other elements of comparison.

The price per square foot of potential building area has a closer correlation (1.03) than the price per square foot of site area (5.47). The market evidence supports use of the price per square foot of potential building area as the unit of comparison. The primary remaining difference is size. The relative comparison analysis shown in Table 19.6 illustrates a value difference attributable to size. The ranking analysis supports a value estimate similar to the value of Sale D, or $20.96 per square foot of buildable area.

Non-realty Components of Value

Non-realty components of value include chattel, business concerns, and other items that do not constitute real property but are included in either the sale price of the comparable property or the ownership interest in the subject property. These components should be analyzed separately

Table 19.5 Recent Land Sales

Sale	Sale Price	Price per Sq. Ft.	Size (Sq. Ft.)	Maximum FAR	Maximum Building Area	Price per Sq. Ft. Building Area
A	$738,000	$22.00	33,541	1.00	33,541	$22.00
B	$450,000	$10.87	41,382	0.50	20,691	$21.75
C	$690,000	$11.31	60,984	0.50	30,492	$22.63
D	$2,100,000	$20.96	100,188	1.00	100,188	$20.96
E	$2,810,000	$19.97	140,699	1.00	140,699	$19.97
Subject			130,680	0.77	100,000	
Standard deviation:		5.46473				1.025757581

Table 19.6 Relative Comparison Analysis for Office Building

	Size		
Sale	20,691–30,492 sq. ft.	100,188 sq. ft.	140,699 sq. ft.
A	$22.00		
B	$21.75		
C	$22.63		
D		$20.96	
E			$19.97
Mean:	$22.13	$20.96	$19.97
Subject:		100,000 sq. ft.	
Comparison:	Superior	Similar	Inferior

from the real property.[7] In most cases the economic lives, associated investment risks, rate of return criteria, and collateral security for the non-realty components differ from those of the real property.

Furniture, fixtures, and equipment in a hotel or restaurant are typical examples of personal property that may be included in a comparable sale. In appraisals of properties in which the business operation is essential to the use of the real property, the contributing value of the non-realty component must be analyzed. If the contributing value of the non-realty component cannot be separated from the value of the real property as a whole, the appraiser should make clear that the value indication using the sales comparison approach reflects both the contributing value of the real estate and the value of the business operation. Properties such as hotels and timeshare condominium units, which have high expense ratios attributable to the business operation, may include a significant business value component.

7. Standard 1 of the Uniform Standards of Professional Appraisal Practice, 2012-2013 ed., states that in developing a real property appraisal, an appraiser must identify the characteristics of the property that are relevant to the type and definition of value and intended use of the appraisal, including any personal property, trade fixtures, or intangible items that are not real property but are included in the appraisal.

Applications of the Sales Comparison Approach

Chapters 18 and 19 described the basic theory and procedures of the sales comparison approach and introduced a number of specific techniques. The examples presented in this chapter illustrate the most commonly used techniques of sales comparison. Quantitative and qualitative techniques may both be employed in the application of the sales comparison approach. If adjustments can be derived by quantitative techniques, they are generally applied first. Differences in specific elements of comparison that elude precise mathematical adjustment are then considered in qualitative analysis. The two methods are complementary and are often used in combination.

Other techniques can also be used to identify and estimate adjustments. Appraisers should consider all applicable techniques to determine which ones are most appropriate to the appraisal.

Office Building Example

The property being appraised is the leased fee interest in a five-year-old, mid-rise, multitenant office building with 36,000 square feet of gross building area (GBA) and 31,800 square feet of rentable area (88% of GBA). Its occupancy rate is 90%, which is considered stable in the subject market area. The amount of space occupied by individual tenants ranges from 2,500 square feet to 7,000 square feet. The building is of average construction quality and is in average condition. The ratio of rentable area to gross building area (88%) is low in comparison to the average ratio in the subject market area, which is approximately 91%. The site is appropriately landscaped. The open-space parking provided is both adequate and in compliance with the zoning code. The location, which may also be considered average, is an interior site accessed from a major arterial highway.

Current base rents range from $12.00 to $13.00 per square foot of rentable area per year. Rent for the overall building averages $12.60 per square foot and the quality of the tenants is good. With the exception of telephone service, the landlord pays all expenses, including janitorial and electrical service. Operating expenses are typical for the market. The leases have three- and four-year terms and contain an option to renew for three more years at the then-current market rent. All leases were signed less than 18 months ago, and the rents and terms they specify are standard for the current market. Leasehold positions in the subject property do not have any particular advantage. The leased fee interest in the property is the interest to be appraised.

Five comparable sales are used in the analysis. All the comparable properties are mid-rise, multitenant office properties located in the subject's market area, and all were financed at market rates with conventional loan-to-value ratios. All the transactions involved the sale of a leased fee interest. The unit of comparison employed in this analysis is price per square foot of rentable area. The five comparable sales are described below (as of the date of sale), and the analysis is summarized in Table 20.1.

- Sale A sold nine months ago for $2,930,000. The improvements are six years old and in average condition. The building contains 40,000 square feet of gross building area and 37,600 square feet of rentable area (94% of GBA). The indicated price per square foot of rentable area is $77.93. Average rent is $12.80 per square foot of rentable area. The landlord pays all expenses, and occupancy is 87%. The rents, lease terms, and expenses of the property are at market terms. The site is located at the intersection of a major arterial highway and a collector road. Parking is adequate. The ratio of parking spaces to rentable area in Sale A is approximately the same as that of the subject.
- Sale B sold four months ago for $2,120,000. The building is four years old and contains 32,000 square feet of gross building area and 29,700 square feet of rentable area (93% of GBA). Its unit price is $71.38 per square foot of rentable area. Site improvements are average, and the ratio of parking spaces to rentable area is similar to that of the subject property. The property is in average condition. The leases provide tenants with full services. Occupancy is 85% and the average rent is $11.80 per square foot of rentable area, which is slightly below the market rate. The lengths of the leases are considered to be at market terms. The total expenses for the building are slightly higher than is typical for the market because two tenants who occupy 15% of the total space use excessive electricity and do not pay additional rent to compensate for the extra expense. The property is

Table 20.1 Market Data Grid

	Subject Property	Sale A		Sale B		Sale C		Sale D		Sale E	
Sale price/unit price (rentable area)	–	$2,930,000/$77.93		$2,120,000/$71.38		$2,450,000/$76.09		$2,160,000/$80.90		$2,470,000/$73.08	
Age	5 years	6 years		4 years		5 years		6 years		4 years	
Gross building area	36,000	40,000		32,000		35,000		30,000		38,000	
Rentable area	31,800	37,600		29,700		32,200		26,700		33,800	
Rental area ratio	88%	94%		93%		92%		89%		89%	
Occupancy rate	90%	87%		85%		90%		95%		90%	
Elements of comparison											
Property interest conveyed	Leased fee	Leased fee	–	Leased fee	–	Leased fee	–	Leased fee	–	Leased fee	–
Financing terms	Conventional	Conventional	–	Conventional	–	Conventional	–	Conventional	–	Conventional	–
Conditions of sale	Arm's-length sale	Arm's-length sale	–	Arm's-length sale	–	Arm's-length sale	–	Arm's-length sale	–	Arm's-length sale	–
Expenditures immediately after purchase	–	None	–	None	–	None	–	$50,000 in deferred maintenance	+ 1.87	None	–
Adjusted unit price	–	$77.93		$71.38		$76.09		$82.77		$73.08	
Date of sale	–	9 months ago	+ 6.00%	4 months ago	+ 2.67%	5 months ago	+ 3.33%	2 months ago	+ 1.33%	6 months ago	+ 4.00%
Adjusted unit price	**–**	**$82.61**		**$73.29**		**$78.62**		**$83.87**		**$76.00**	
Construction quality and condition	Average	Average		Average		Average		Average		Average	
Ratio of parking spaces to rental area	Adequate	Similar		Similar		Similar		Inferior		Similar	
Average rent per sq. ft. of rentable area	$12.60	$12.80		$11.80		$12.60		$13.00		$12.30	
Location	Average	Superior		Inferior		Superior		Superior		Inferior	
Expense ratio	Market norm	Similar		Inferior		Similar		Similar		Similar	
Overall comparability	–	Superior		Inferior		Superior		Superior		Inferior	

located on an interior site accessed from a collector street. Parking is adequate.

- Sale C was sold five months ago for $2,450,000. The building contains 35,000 square feet of gross building area and 32,200 square feet of rentable area (92% of GBA). Its unit price is $76.09 per square foot of rentable area. The improvements were constructed five years ago and are in average condition. Rent averages $12.60 per square foot of rentable area. All tenant services are provided by the landlord. The building has an occupancy rate of 90%, and all rents, lease terms, and expense categories are considered to be at market terms. The property's location is at the intersection of a collector road and a major arterial highway. The property has a parking ratio similar to that of the subject.
- Sale D was sold two months ago for $2,160,000. The building is six years old and in average condition. It contains 30,000 square feet of gross building area and 26,700 square feet of rentable area (89% of GBA). The unit price is $80.90 per square foot of rentable area. The rent averages $13.00 per square foot of rentable area, and the lease terms and building expenses are at market levels. The occupancy rate is 95%. The site is located at the intersection of two major arterial highways and has a lower ratio of parking spaces to rentable area than the subject property.
- Sale E was sold six months ago for $2,470,000. The building was constructed four years ago and is in average condition. It contains 38,000 square feet of gross building area and 33,800 square feet of rentable area (89% of GBA). Its unit price is $73.08 per square foot of rentable area. The location is an interior site accessed by a collector street. The occupancy rate for the building is 90%. Rents average $12.30 per square foot of rentable area. Full tenant services are provided by the landlord. Rents, lease terms, and property expenses are at market terms. The property has adequate parking, and the parking ratio is similar to that of the subject property.

The appraiser first analyzes the market data and determines that all of the office building sales involved the transfer of a leased fee interest. Thus, no adjustments for differences in property rights conveyed are necessary. (The below-market rent of Sale B will be considered later as part of the economic characteristics of the comparable properties.) All sales were transacted with conventional market financing, so no adjustments for this element of comparison are required either. Because all of the transactions were conducted at arm's length, no adjustments for conditions of sale are necessary.

The buyer of the property in Sale D invested an additional $50,000 in repairs immediately after the sale for deferred maintenance on the building's HVAC system. The appraiser confirmed with both the buyer and the seller in the transaction that both parties considered the $50,000 cost of those repairs in their negotiations. As a result, the appraiser adjusted the reported unit price by \$1.87 (\$50,000/26,700 rentable square feet). The other sales required no adjustments for expenditures made immediately after purchase.

According to the appraiser's market analysis, prices in the local office property market had been stable for several years as the market absorbed excess supply. Two years ago, sale prices began to rise as demand for office space increased. Market research revealed that the sale prices of similar properties rose 5% over the first year and that rate jumped up to an 8% increase over the course of the current year. Although the comparable sales used were generally recent transactions, all occurring within nine months of the date of valuation, this time period saw active market growth. Individual adjustments for differences in market conditions were based on the 8% annual rate of increase in the current year, e.g., 6.00% for Sale A (8% × 9/12), 2.67% for Sale B (8% × 4/12), and so on.

The appraiser examined the physical elements of comparison to determine if market evidence supported additional quantitative adjustments. Additional information on the sale of comparable properties revealed general value trends but did not support quantitative adjustments for these elements.

A relative comparison analysis of the physical elements of comparison is described below.

- Sale A has an adjusted unit price of \$82.61 per square foot of rentable area. Its location at the intersection of a major arterial highway and a collector road is superior to the location of the subject property. The building occupancy rate for Sale A is slightly lower than the subject's and lower than the rate considered typical for stabilized occupancy in the market. In short, Sale A has more superior than inferior attributes and these attributes are considered more significant. This sale indicates a unit value for the subject property of less than \$82.61 per square foot of rentable area.
- Sale B has an adjusted unit price of \$73.29 per square foot of rentable area. Effective contract rent is lower than market rent. The location of this property on a collector street is inferior to the subject property's location on a major arterial highway. The occupancy rate for the comparable property is below the market rate for stabilized occupancy, and the expense ratio for the property is slightly higher than typical, resulting in a lower net income. In all, more of the attributes of Sale B are inferior than superior and these inferior factors are also considered more significant. In this particular case, the difference in the rentable area ratios may be considered to have the least impact on value. Therefore, the analysis of Sale B indicates that the subject should have a unit value greater than \$73.29 per square foot of rentable area.
- Sale C has an adjusted unit price of \$78.62 per square foot of rentable area. The location of the property is similar to that of the subject. Sale C is superior to the subject, and the value for the subject should be less than \$78.62 per square foot of rentable area.

- Sale D has an adjusted unit price of $83.87 per square foot of rentable area. Because it is situated at the intersection of two major arterial highways, the property has a significantly superior location compared to that of the subject. The availability of parking is more limited. Sale D has a higher occupancy rate than the stabilized occupancy rate that characterizes the market for this type of property. The superior location and higher occupancy outweigh the limited parking. Overall, this property is superior to the subject and an appropriate value for the subject would be less than $83.87 per square foot of rentable area.
- Sale E has an adjusted unit price of $76.00 per square foot of rentable area. The location of the property on a collector street is inferior to that of the subject. The property is similar to the subject in all other elements of comparison. Since Sale E has an inferior location, the price of the subject should be greater than $76.00 per square foot of rentable area.

The value indications derived from the comparable sales are reconciled into a value bracket by arranging the five sales in an array relative to the subject (Table 20.2). The value bracket for the subject property is between $76.00 and $78.62 per square foot of rentable area. Sale C is the property most similar to the subject and therefore may be given the greatest weight.

Table 20.2 Bracketing the Subject Property's Value

Sale	Inferior	Superior
D		$83.87
A		$82.61
C		$78.62
E	$76.00	
B	$73.29	

Reconciliation

Based on the indicated range of value and the weight placed on Sale C, the market evidence supports a value estimate of $78.00 per square foot of rentable area, which is in the upper mid-range of the value bracket. The market value of the subject property would then be calculated as follows:

$$\$78.00 \times 31{,}800 = \$2{,}480{,}400$$

Industrial Building Example

The property being appraised is a 15-year-old warehouse containing 25,000 square feet of gross building area and 2,500 square feet of finished office area. The ceiling height is 18 feet. The quality of construction is good and the building's condition is average.

The five comparable sales described below were used in the analysis. All of the properties are warehouses located in the subject property's market area and the building-to-land ratios for the subject and all the comparables are similar.

- Sale A was sold one year ago for $622,000. The seller provided advantageous financing that resulted in the buyer paying $63,000 more than if the buyer had paid cash (i.e., a purchase-money mortgage). The property is a 28,000-sq.-ft. warehouse with an 18-ft. ceiling height and 2,750 square feet of finished office area. It was 14 years old at the time of the sale. The quality of construction is good, but at the time of sale the warehouse exhibited excessive deferred maintenance. When the appraiser verified the details of the transaction with the parties in the sale, the buyer reported budgeting for costs of $35,000 to upgrade the property.
- Sale B was sold six months ago for $530,000 in a cash payment to the seller. This 27,000-sq.-ft. warehouse has 18-ft. ceilings and 2,200 square feet of finished office area. It was 13 years old. The quality of construction and condition are average.
- Sale C is a current sale transacted for $495,000. The buyer assumed an existing loan at below-market rates. This favorable financing resulted in the buyer paying $9,000 more than if the buyer had obtained financing at market terms. This 22,000-sq.-ft. warehouse has 17-ft. ceilings and 3,000 square feet of finished office area. The property is 13 years old. The quality of construction is good and its condition is average. This warehouse is subject to a long-term lease at a below-market rate.
- Sale D was sold three months ago for $554,000. This 25,000-sq.-ft. warehouse has a 19-ft. ceiling height and 2,500 square feet of finished office area. It is 16 years old. The quality of construction is good and the condition is excellent.
- Sale E is a current sale for $626,000 paid in cash to the seller. This 26,000-sq.-ft. warehouse has 18-ft. ceilings and 2,100 square feet of finished office area. The building is 16 years old. The quality of construction is good and its condition is average. The property is subject to a long-term lease that is above market levels.

Quantitative Adjustments

The quantitative adjustment procedure is summarized in Table 20.3 and described below.

Property Rights Conveyed

Sales C and E were sold subject to long-term leases, so both require an adjustment for property rights conveyed. At the time of sale, the lease on the property in Sale C had seven years remaining at a rate that was $0.25 below the market rate. Discounting the annual lost income of $5,500 at a market-derived rate of 9.5% (higher than the rate used for the deficit rent because of higher risk) indicates an upward adjustment of $27,681 to the sale price of Sale C. The property sold in Sale E, on the other hand, was leased at a rate $0.45 above the market rate with

Table 20.3 Quantitative Adjustments

	Subject Property	Sale A		Sale B		Sale C		Sale D		Sale E	
Price	–		$622,000		$530,000		$495,000		$554,000		$626,000
Area in square feet	25,000	28,000		27,000		22,000		25,000		26,000	
Ceiling height	18 ft.	18 ft.		18 ft.		17 ft.		19 ft.		18 ft.	
Age	15 years	14 years		13 years		13 years		16 years		16 years	
Construction quality	Good	Good		Average		Good		Good		Good	
Office area	2,500	2,750		2,200		3,000		2,500		2,100	
Elements of comparison											
Property rights conveyed	Fee simple	Fee simple	–	Fee simple	–	Leased fee	+ $27,681	Fee simple	–	Leased fee	– $75,087
Adjusted sale price			$622,000		$530,000		$522,681		$554,000		$550,913
Financing terms	Cash	Purchase-money mortgage	– $63,000	Cash	–	Loan assumption	– $9,000	Cash	–	Cash	–
Adjusted sale price			$559,000		$530,000		$513,681		$554,000		$550,913
Conditions of sale	Arm's length	Arm's length	–	Arm's length	–	Arm's length	–	Arm's length	–	Arm's length	–
Expenditures made immediately after purchase	None	Excessive deferred maintenance	+ $35,000	None	–	None	–	None	–	None	–
Adjusted sale price			$594,000		$530,000		$513,681		$554,000		$550,913
Market conditions	Current	One year	× 1.04	6 mos.	× 1.02	Current		3 mos.	× 1.01	Current	–
Adjusted sale price			$617,760		$540,600		$513,681		$559,540		$550,913
Condition of improvements	Average	Average (after repairs)	–	Average	–	Average	–	Average	–	Average	–
Adjusted sale price			$617,760		$540,600		$513,681		$559,540		$550,913
Adjusted price per sq. ft.			$22.06		$20.02		$23.35		$22.38		$21.19

10 years remaining on the lease term. The present value of the $11,700 annual difference between contract and market rent is $73,462. This amount is subtracted from the price of Sale E to adjust that transaction for the favorable leasing terms in place at the time of the sale.

Financing Terms

Sales A and C require adjustment for financing terms. The seller of Sale A provided advantageous financing that resulted in the buyer paying $63,000 more than the buyer would have paid in a cash transaction. Therefore, a downward adjustment of $63,000 is made to Sale A. The buyer of Sale C assumed an existing, below-market loan. The buyer paid a $9,000 premium above the price that would have been paid under market terms, so a downward adjustment of $9,000 is made to Sale C.

Conditions of Sale

Because all the comparable sales were arm's-length transactions, none requires an adjustment for conditions of sale.

Expenditures Made Immediately After Purchase

Sale A suffered from excessive deferred maintenance. At the time of sale, the buyer anticipated spending $35,000 to upgrade the building to average condition.

Market Conditions

The sales occurred over a 12-month period. Market analysis shows that properties in this market have been appreciating at 4% annually. Sales A, B, and D require upward adjustments for change in market conditions.

Condition of Improvements

The subject property is in average condition. Recall that Sale A was adjusted upward by $35,000 for expenditures made immediately after purchase to bring it in line with the subject property's condition. Another adjustment would not be made for the property's condition at the time of sale because, after correcting for deferred maintenance, the property was considered to be in average condition.

Adjusted Unit Prices

After applying all known quantitative adjustments, the comparable sales indicate a value range from $20.02 to $23.35 per square foot.

Qualitative Analysis

After quantitative adjustments are made, the sales may be analyzed for qualitative differences that will help in the reconciliation process. Table 20.4 shows a value trend for the ratio of office area to total building area within the comparable properties. The properties with a higher percentage of office space had a higher average unit price than the properties with a smaller percentage of office space.

After relative comparison analysis, the value bracket has tightened to $21.19 to $23.35 per square foot with Sales A and D ($22.06 and $22.38

Table 20.4 Relative Comparison: Ratio of Office Area to Total Building Area

	8%	10%	14%
Sale A		$22.06	
Sale B	$20.02		
Sale C			$23.35
Sale D		$22.38	
Sale E	$21.19		
Subject property		10%	
Relative comparison	Inferior	Similar	Superior

per square foot, respectively) most similar to the subject property. If the bracket of values were broader—for example, if the adjusted unit prices of Sales A and D ranged from $19.00 to $24.00—the appraiser could analyze the comparables sales further to determine if the subject is more similar to the sales in the upper or lower ends of the bracket.

Other elements of comparison may affect the adjusted unit prices of comparable sales to some degree. The appraiser could prepare data arrays for each of the other physical characteristics that may have an effect on unit price (Tables 20.5, 20.6, and 20.7), but if the market evidence does not show discernible trends for these elements of comparison individually or as a group, then no additional analysis would be necessary.

The range of adjusted unit prices for inferior or superior sales may overlap the range set by sales of different overall comparability (Table 20.8). For example, suppose Sale D had an adjusted unit price of $20.75 per square foot, which is less than the unit price of Sale E, an "inferior" property. In that situation the appraiser should address the causes for the overlap and refine the value bracket. Comparing the ranges of inferior, similar, and superior properties can help the appraiser identify statistical outliers—i.e., observations that are extreme and often evidence of an error. An outlier may have an inordinate effect on a statistical model if the reason for its departure from the typical range cannot be explained.

Reconciliation

The value indications of the comparable sales with the highest overall comparability to the subject property—Sales A and D—are in a tight range, from $22.06 to $22.38. The comparable sales that are inferior (Sales B and E) or superior (Sale C) overall also bracket the two sales with similar overall comparability and further support a value indication of $22.25 per square foot. The market value of the subject property would then be calculated as follows:

$$\$22.25 \times 25{,}000 = \$556{,}250$$

Table 20.5 Relative Comparison: Construction Quality

	Poor	Average	Good	Excellent
Sale A			$22.06	
Sale B		$20.02		
Sale C			$23.35	
Sale D			$22.38	
Sale E			$21.19	
Subject property			Good	
Relative comparison	Inferior	Inferior	Similar	Superior

Table 20.6 Relative Comparison: Age of Improvements

	13–14	15	16
Sale A	$22.06		
Sale B	$20.02		
Sale C	$23.35		
Sale D			$22.38
Sale E			$21.19
Subject property		15	
Relative comparison	Inferior	Similar	Superior

Table 20.7 Relative Comparison: Ceiling Height

	17 feet	18 feet	19 feet
Sale A		$22.06	
Sale B		$20.02	
Sale C	$23.35		
Sale D			$22.38
Sale E		$21.19	
Subject property		18 feet	
Relative comparison	Inferior	Similar	Superior

Table 20.8 Overall Comparability

	Sale A	Sale B	Sale C	Sale D	Sale E
Percentage of office space	Similar	Inferior	Superior	Similar	Inferior
Construction quality	Similar	Inferior	Similar	Similar	Similar
Age of improvements	Superior	Superior	Superior	Inferior	Inferior
Ceiling height	Similar	Similar	Inferior	Superior	Similar
Overall comparability	**Similar**	**Inferior**	**Superior**	**Similar**	**Inferior**
Adjusted unit price	$22.06	$20.02	$23.35	$22.38	$21.19

The Income Capitalization Approach

Income-producing real estate is typically purchased as an investment, and from an investor's point of view earning power is the critical element affecting property value. One basic investment premise holds that the higher the earnings, the higher the value, provided the amount of risk remains constant. An investor who purchases income-producing real estate is essentially trading present dollars for the expectation of receiving future dollars. The income capitalization approach to value consists of methods, techniques, and mathematical procedures that an appraiser uses to analyze a property's capacity to generate benefits (i.e., usually the monetary benefits of income and reversion) and convert these benefits into an indication of present value.

> In the income capitalization approach, an appraiser analyzes a property's capacity to generate future benefits and capitalizes the income into an indication of present value. The principle of anticipation is fundamental to the approach. Techniques and procedures from this approach are also used to analyze comparable sales data in the sales comparison approach and to measure obsolescence in the cost approach.

The analysis of cost and sales data is often an integral part of the income capitalization approach, and capitalization techniques are frequently employed in the cost and sales comparison approaches as well. Capitalization techniques are commonly used to analyze and adjust sales data in the sales comparison approach. In the cost approach, obsolescence is often measured by capitalizing an estimated income loss. The income capitalization approach is described here as part of the systematic valuation process, but the various methods, techniques, and procedures used in the approach are analytical tools with broad applicability in the analysis and valuation of income-producing properties.

This chapter provides a broad overview of the income capitalization approach and discusses the principles and rationale on which it is based. Chapters 22 through 25 continue this discussion with detailed explanations of the specific methods, techniques, and procedures used to project and capitalize future benefits.

Relation to Appraisal Principles

Anticipation and Change

Anticipation is fundamental to the income capitalization approach. All income capitalization methods, techniques, and procedures forecast anticipated future benefits and estimate their present value. This may involve forecasting the anticipated future income from a property or estimating a capitalization rate that implicitly reflects the anticipated pattern of change in income over time.

The approach must also reflect how change affects the value of income-producing properties. To provide sound value indications, the appraiser must carefully address and forecast investors' expectations of changes in income levels, the expenses required to ensure income, and probable increases or decreases in property value. The defined income of a real estate investment may differ according to the type of investor. The ongoing securitization and globalization of real estate investments has brought new participants into the market. The income streams that investors in real estate investment trusts (REITs) and pension funds consider are different from the net incomes on which more traditional investors have focused.[1] Furthermore, foreign investors may have distinctly different yield expectations and anticipated holding periods.

The capitalization process must reflect the possibility that actual future income, expenses, and property value may differ from those originally anticipated by an investor on the date of appraisal. The more uncertainty there is concerning the future levels of these variables, the riskier the investment. Investors expect to earn a higher rate of return on riskier investments. This should be reflected in the discount and capitalization rates obtained from market research.

Supply and Demand

The principles of supply and demand and the related concept of competition are particularly useful in forecasting future benefits and estimating rates of return in the income capitalization approach. Both income and rates of return are determined in the market.

If the demand for a particular type of space exceeds the existing supply, owners may be able to increase rents. Vacancy rates may fall

1. For a discussion of how pension fund managers and other institutional investors analyze income and cash flow to property, see the discussion of the securitization of real estate markets in Chapter 10.

and developers may find new construction profitable. Property values may increase until supply satisfies demand. On the other hand, if the demand for space is less than the existing supply, rents may decline and vacancy rates may increase. Therefore, to estimate rates of return and forecast future benefits, appraisers consider the demand (both present and anticipated) for the particular type of property and how the demand relates to supply.

Applicability and Limitations

Any property that has the potential to generate income can be valued using the income capitalization approach. When more than one approach to value is used to develop an opinion of value for an income-producing property, the value indication produced by the income capitalization approach might be given greater weight than that of the other approaches in the final reconciliation of value indications.

Interests To Be Valued

Income-producing real estate is usually leased, which creates legal estates of the lessor's interest (i.e., the leased fee) and the lessee's interest (i.e., the leasehold). Any interest can be valued, even if no entity holds that interest as of the date of value. The interest to be valued depends on the intended use and intended user of the appraisal. Federal or state law often requires appraisers to value leased properties as fee simple estates, not leased fee estates, for eminent domain and ad valorem taxation. When the fee simple interest is valued, the presumption is that the property is available to be leased at market rates.

When an appraisal assignment involves the valuation of the fee simple interest in a leased property, the valuation of the entire bundle of rights may or may not require the valuation of the separate parts. The value of a leasehold estate may be positive, zero, or negative, depending on the relationship between market rent and contract rent, as explained in Chapter 7. The difference between the market rent and contract rent may be capitalized at an appropriate rate or discounted to present value to produce an indication of the leasehold value, if any, without consideration of the value of the leased fee estate.

Although the market values of leased fee and leasehold positions are often said to be "allocated" between the two (or more) interests, each interest must be valued on its own merit. The results can then be compared with the valuation of the fee simple interest. This comparison is particularly important when contract benefits or detriments are substantial.

Appraisers should not necessarily conclude that the values of leasehold and leased fee interests are additive and will always equal the value of fee simple estimate. It is possible that in some cases both the leaseholder and the leased fee owner are at a disadvantage because of the terms of the lease. In other cases, there may be an apparent advantage of one party over the other when compared with other leases. For example, tenants who signed leases when rent rates were high may be at a disadvantage and pay more than the current market rent if the economy is now poor and market rates have fallen.

Like all contracts, a real estate lease depends on the actual performance of all parties to the contract. A weak tenant with the best of intentions may still be a high risk to the lessor. The same is true of a financially capable tenant who is litigious and willing to ignore lease terms, break a lease, and defy lawsuits. If the tenant defaults or does not renew a lease, the value of the leased fee may be seriously affected.

Because a leasehold or a leased fee interest is based on contract rights, appraisers differentiate between lease provisions that are generally representative of the market and other elements of a contract that are not typical of the market. An understanding of the risks associated with the parties to the lease and the lease arrangement is also required. A lease never increases the market value of real property rights to the fee simple estate. Any potential value increment in excess of a fee simple estate is attributable to the particular lease contract. Detrimental aspects of a lease may result in a situation in which either or both of the parties to the lease, and their corresponding value positions, may be diminished.

Valuation techniques involving the income generated by the property intend to simulate investor behavior. For example, investors in small residential income properties might typically purchase on the basis of gross income multipliers (*GIM*s) or effective gross income multipliers (*EGIM*s). Thus, the appraiser could develop an opinion of the value of a subject property using the appropriate multiplier. Similarly, investors in large office buildings with numerous tenants might project future cash flows by analyzing each lease and considering the impact of lease renewals and the anticipated sale of the property at the end of a projection period. The appraiser may simulate this process by conducting a discounted cash flow analysis for the subject property.

Income capitalization techniques include direct capitalization and yield capitalization. In direct capitalization, income is expected to remain relatively level. Changes in future property value are implicit in the rates exhibited by actual market transactions

Yield capitalization anticipates changes in property income and value over a holding period. Changes in the property's income stream or future value are reflected by specific inputs.

Definitions

The income capitalization approach employs more specialized terminology than any of the other approaches to value, and the meanings of the various terms sometimes overlap. Table 21.1 shows the relationships between different rates used in the approach and the real property interests that can be valued. Table 21.2 lists synonymous terms and symbols commonly used in income capitalization.

Table 21.1 Rates, Ratios, and Relationships

Property Interest	Net Income or Cash Flow	Forecast Reversion	Capitalization Rate	Yield Rate
Total property (V_O)	Net operating income (*NOI* or I_O)	Proceeds of resale (*PR* or V_N), property reversion	Overall capitalization rate (R_O)	Risk rate, discount rate (Y_O)
Debt, mortgage loan (V_M)	Debt service (I_M), monthly—DS, annual—ADS	Balance, balloon, book value (*b*)	Mortgage capitalization rate (R_M)	Yield rate to mortgage (Y_M), interest rate
Equity (V_E)	Equity income (I_E)	Equity reversion (*ER*)	Equity capitalization rate (R_E)	Equity yield rate (Y_E)
Land, site (V_L)	*NOI* to land (NOI_L or I_L)	Land reversion (*LR*)	Land capitalization rate (R_L)	Land yield rate (Y_L)
Building, improvements (V_B)	*NOI* to building (NOI_B or I_B)	Building reversion (*BR*)	Building capitalization rate (R_B)	Building yield rate (Y_B)
Leased fee (V_{LF})	*NOI* to lessor (NOI_{LF} or I_{LF})	Property reversion (*PR* or V_N) or proceeds of resale	Leased fee capitalization rate (R_{LF})	Leased fee yield rate (Y_{LF})
Leasehold (V_{LH})	*NOI* to lessee (NOI_{LH} or I_{LH})	None or proceeds of resale of leasehold estate	Leasehold capitalization rate (R_{LH})	Leasehold yield rate (Y_{LH})

Table 21.2 Terms and Synonyms Used in the Income Capitalization Approach

Category	Preferred Term	Synonym/Symbol
Lease	Flat rental lease	Level payment lease
	Variable rental lease	Index lease
	Step-up or step-down lease	Graduated rental lease
	Revaluation lease	
	Lease with an annual increase	
	Percentage lease	
Rent	Contract rent	
	Market rent	Economic rent
	Scheduled rent	
	Pro forma rent	
	Effective rent	
	Excess rent	
	Deficit rent	
	Percentage rent	
	Overage rent	
Future benefits	Potential gross income	*PGI*
	Effective gross income	*EGI*
	Net operating income	*NOI* or I_O*
	Equity income	Income to equity, I_E
	Reversion	Reversionary benefits, resale value, property reversion, V_N
Operating expenses	Fixed expense	
	Variable expense	
	Replacement allowance	Replacement reserve, capital items
Rates of return	Overall capitalization rate	R_O
	Equity capitalization rate	Cash flow rate, cash-on-cash return, pretax capitalization rate, equity dividend rate, R_E
	Terminal capitalization rate	Residual capitalization rate, exit capitalization rate, R_N
	Land capitalization rate	R_L
	Building capitalization rate	R_B
	Discount rate	Risk rate
	Safe rate	Riskless rate, relatively riskless rate
	Internal rate of return	*IRR*
	Overall yield rate	Property yield rate, Y_O
	Equity yield rate	Y_E
	Mortgage capitalization rate	Mortgage constant, annual loan constant, R_M
Income multipliers	Potential gross income multiplier	*PGIM*
	Effective gross income multiplier	*EGIM*
	Net income multiplier	*NIM*
Vacancy	Vacancy and collection loss	
Stabilization	Stabilized occupancy	
	Stabilized income	

* The traditional abbreviation *NOI* is commonly used in accounting, finance, economics, and other professional disciplines. The symbol I_O is used in Appraisal Institute educational materials to maintain a consistent set of variables and subscripts throughout income capitalization calculations. The terms can be used interchangeably.

Market Value and Investment Value

An important distinction is made between market value and investment value. Investment value is the value of a certain property to a particular investor given that investor's investment criteria. Investment value may coincide with market value, which was defined in Chapter 6, if the client's investment criteria are typical of successful buyers in the market. In this case, the two opinions of value may be the same number, but the two types of value and their concepts are not interchangeable.

To develop an opinion of market value with the income capitalization approach, the appraiser must be certain that all the data and forecasts used are market-oriented and reflect the motivations of a typical investor who would be willing to purchase the property as of the effective date of the appraisal. A particular investor may be willing to pay a price different from market value, if necessary, to acquire a property that satisfies other investment objectives unique to that investor.

Leases

The income to various interests transferred by the landlord to the tenant is generally derived through the conveyance and operation of a lease. A lease is a written[2] document in which the rights to use and occupy land or structures are transferred by the owner to another for a specified period of time in return for a specified rent. An appraiser begins the income capitalization approach by analyzing existing and proposed leases that apply to the subject property. These leases provide information on the base rent, any other income, and the division of expenses between the landlord and the tenant.

Although a lease can be drawn to fit any situation, most leases[3] fall into one of several broad classifications:

- flat rental leases
- variable rental leases
- step-up or step-down leases
- revaluation leases
- annual increase leases
- percentage leases

Leases may be negotiated on a gross rental basis (with the lessor paying most or all operating expenses of the real estate), on a net rental basis (with the tenant paying all expenses), or on a modified gross rental basis (in which expenses are divided up between the lessor and the lessee.) Leases can also be categorized by their terms of occupancy:

- month-to-month
- short-term (of five years or less)
- long-term (of more than five years)

lease
A contract in which the rights to use and occupy land or structures are transferred by the owner to another for a specified period of time in return for a specified rent.

2. Most states require a written lease only when the term is greater than one year.
3. Other lease types are defined in accounting practice, e.g., capital or financing leases and operating or service leases. These leases often involve equipment.

Leases and Expenses

The terms *gross lease*, *modified gross lease*, and *net lease* do not always mean the same thing in different markets. The terms reflect the expenses that are included in each type of rent, and their meanings vary from market to market. In general, the following distinctions can be made:

- Gross lease—tenant pays rent and landlord pays expenses.
- Modified gross lease—tenant and landlord share expenses.
- Net lease—landlord passes on all expenses to tenant.

Sometimes real estate professionals will refer to a *triple net lease*, in which the tenant pays utilities, taxes, insurance, and maintenance and the landlord pays for structural repairs only.

To analyze income and expenses based on market observation, the appraiser must understand how these terms are used in the market and clearly communicate that information to the intended user in the appraisal report. Furthermore, the appraiser must consistently account for the same expenses in the analysis of the income generated by a certain type of lease. For example, assume the available market data for five comparable office properties supports an estimate of market rent in the range of $27.50 to $31.00 per square foot per year, all quoted on a "net" rental basis. The rents for four of the properties range from $27.50 to $29.00 per square foot, and the tenants in those buildings pay for all expenses. The owner of the fifth comparable property, for which "net" rents are quoted at $31.00 per square foot, actually pays for insurance—i.e., that owner defines "net" rent differently than the other property owners. Consequently, the rent specified in the "net" lease of the fifth property, which would be equivalent to a "modified" lease in the other buildings, is noticeably higher.

An extreme form of net lease is commonly referred to as a *bondable lease* (or sometimes as an *absolute net* or a *triple net lease*). In effect, the tenant is responsible for all expenses for the entire duration of the lease term, and is even obligated to continue to pay rent after a casualty or condemnation. The shifting of risk from landlord to tenant creates a lease with the obligations equivalent to a bond. Bondable leases are most often used in credit tenant leases.

Flat Rental Lease

A flat rental lease specifies a level of rent that continues throughout the duration of the lease. In a stable market, this type of lease may be typical and acceptable. Flat rental leases may also be prevalent in net rent situations where changes in expenses are the responsibility of the tenant (or tenants). In a changing market, however, lessors would prefer long-term leases that are more responsive to rising market conditions whereas in that situation lessees would prefer a flat rental lease. Similarly, lessors would prefer flat leases when rents are falling. When flat rental leases are used in inflationary periods, they tend to be short-term such as apartment leases. Some valuation assignments for the federal government require the appraiser to express the estimate of market rent on a "leveled" basis. This requires forecasting any change in market rent over a projection period and converting the total income generated by that lease over the projection period into an annual level equivalent.

flat rental lease
A lease with a specified level of rent that continues throughout the lease term.

Variable Rental Lease

Variable rental leases are quite common, particularly when an owner anticipates periodic changes in market rent. This type of lease may specify a periodic percentage change or the change may be tied into a

index lease

A lease, usually for a long term, that provides for periodic rent adjustments based on the change in an economic index.

step-up (step-down) lease

A lease that provides for a certain rent for an initial period, followed by an increase (or decrease) in rent over stated periods.

revaluation lease

A lease that provides for periodic rent adjustments to contract rent based on the prevailing market conditions.

specific index such as a nationally published consumer price index. (Often those leases are called *index leases*.) Sometimes the lease may specify that the rent change will be tied to the higher or lower of the two–the periodic percentage or the index. This is particularly prevalent in gross and modified gross leases where an owner needs periodic income adjustments to offset increases in expenses.

Step-up or Step-down Rental Lease

Step-up or step-down leases (also known as *graduated rental leases*) provide for specified changes in the amount of rent at one or more points during the lease term. A step-up lease, which allows for smaller rent payments in the early years, can be advantageous to a tenant establishing a business in a new location. This type of lease can also be used to recognize tenant expenditures on a property that are effectively amortized during the early years of the lease. Long-term ground leases may include provisions for increasing the rent to reflect the expectation of future increases in property value and protect the purchasing power of the landlord's investment. Because property value is usually expected to increase, tenants are expected to pay commensurately higher rents.

Step-down leases are less common than step-up leases. They are generally used to reflect unusual circumstances associated with a particular property such as the likelihood of reduced tenant appeal in the future or capital recapture of interior improvements during the early years of a long-term lease.

Lease With an Annual Increase

One of the most common types of leases simply increases the rent annually by a dollar amount specified in the lease.

Revaluation Lease

Revaluation leases provide for periodic rent adjustments based on revaluation of the rental rate under the prevailing market conditions. The most common method of recalculating contract rent is to apply a stated percentage to the market value of the property at the time of revaluation, which may or may not result in contract rent equal to market rent. Although revaluation leases tend to be long-term, some are short-term with renewal option rents based on revaluation of market rent when the option is exercised. When the parties to a lease cannot agree on the value or rent, revaluation through appraisal or arbitration may be stipulated in the lease.

Percentage Lease

In percentage leases some or all of the gross income is based on a specified percentage of the volume of business, productivity, or use achieved by the tenant. Percentage leases may be short- or long-term and are most frequently used for retail properties. A straight percentage lease may have no minimum rent, but most specify a guaranteed minimum rent and an overage rent, which is defined in the next section. Percentage leases are commonly used for retail space.

percentage lease
A lease in which the rent or some portion of the rent represents a specified percentage of the volume of business, productivity, or use achieved by the tenant.

Rent

The income to investment properties consists primarily of rent. Different types of rent affect the quality of property income. Several categories are used by appraisers to analyze rental income:

- market rent
- contract rent
- effective rent
- excess rent
- deficit rent
- percentage rent
- overage rent

Market Rent

Market rent is the rental income a property would command in the open market. It is indicated by the current rents that are either paid or asked for comparable space with the same division of expenses as of the date of the appraisal. Market rent is sometimes referred to as *economic rent*. Market rents vary with economic conditions, so estimating market rent is not always simple.

Rent for vacant or owner-occupied space is usually estimated at market rent levels and distinguished from contract rent in the income analysis. In fee simple valuations, all rentable space is estimated at market rent levels. Any rent attributed to specific leases is disregarded in the income analysis. In a leased fee analysis, current contract rents defined by any existing leases are used for leased space, and income for vacant space is estimated at market rent. In developing market rent and expense estimates, the appraiser should make sure that property management is competent.

Market data provides evidence of a range of market rents. For example, if the market for industrial space shows a rent range of $4.00 to $5.00 per square foot of gross building area per year on a gross rental basis and the subject property is leased for $3.00 per square foot of gross building area, the appraiser could conclude that the actual rent is below market levels. However, if the actual rents were $3.90, $4.50, or $5.05 per square foot of gross building area, it would be reasonable to

market rent
The most probable rent that a property should bring in a competitive and open market reflecting all conditions and restrictions of the lease agreement, including permitted uses, use restrictions, expense obligations, term, concessions, renewal and purchase options, and tenant improvements (TIs).

contract rent

The actual rental income specified in a lease.

effective rent

The rental rate net of financial concessions such as periods of free rent during the lease term and above- or below-market tenant improvements (TIs).

conclude that those rents are consistent with market rents. If market rents are on a gross rental basis and the subject is leased on a net rental basis, it may be difficult to compare market and contract rent unless adjustments are made to account for differences in the responsibility for expenses. Moreover, the rents charged for the subject and comparable space cannot be compared without considering the size and other physical characteristics of the demised spaces in the properties.

Contract Rent

Contract rent is the actual rental income specified in a lease. It is the rent agreed on by the landlord and the tenant and may be higher than, less than, or equal to market rent. Also, it is important to compare rents of properties with a similar division of expenses, similar lease terms, and a similar level of finished space.

Effective Rent

In markets where concessions take the form of free rent, above-market tenant improvements, or atypical allowances, the true effective rent must be quantified. Effective rent is an analytical tool used to compare leases with different provisions and develop an estimate of market rent. *Effective rent* may be defined as the total base rent, or minimum rent stipulated in a lease, over the specified lease term minus rent concessions–e.g., free rent, excessive tenant improvements, moving allowances, lease buyouts, cash allowances, and other leasing incentives.

Effective rent may be calculated in several different ways. It may be estimated based on rental income from existing leases at contract rates or rental income from leases at market rates. In calculating effective rent, an appraiser must allow for rent concessions in effect at the time of the appraisal, any discounts, or other benefits that may have prompted a prospective tenant to enter into a lease.

The timing of the rent concessions may make analysis of effective rent a moot point. For example, consider a 10,000-sq.-ft. industrial property with a five-year lease at $4,000 per month, four months of rent concessions (the first two months of each of the first two years), and a date of value at the beginning of the third year of the lease. The concessions granted in the first two years of the lease are not an issue in the analysis of the income generated in the third year, and the actual and effective rent would be the same on the date of value.

Effective rent can be calculated as the average, annual rent net of rent concessions or as an annual rent that produces the same present value as the actual annual rents net of rent concessions. While these two methods are considered interchangeable, they do not produce the same results. The first method is a mathematical average, whereas the second is a discounting procedure in which the rent concessions are accounted for in the years that they actually occur.

As a simple example of effective rent calculations, consider a lease on a 10,000-sq.-ft. industrial building in which the rent is specified as $4,000 per month (or $48,000 per year) for a five-year term with level income throughout the lease term. When the lease was negotiated, the tenant received free rent for the first month of each year as a concession. The contract rent is $4.80 per square foot. However, the effective rent is only $4.40 per square foot:

$4,000 per month × 11 months =	$44,000
$44,000/10,000 square feet =	$4.40 per square foot

There are different ways to treat tenant improvement costs. The appraisal problem will dictate whether it is appropriate to deduct all tenant improvements or only deduct the additional actual tenant improvement costs over a market standard.

Excess Rent and Deficit Rent

Excess rent is the amount by which contract rent exceeds market rent at the time of the appraisal. Excess rent is created by a lease that is favorable to the lessor and may reflect superior management or a lease that was negotiated in a stronger rental market. Excess rent may be expected to continue for the remainder of the lease (if the relationship of contract rent and market rent is expected to remain the same for the duration of the lease). However, due to the higher risk associated with the receipt of excess rent, it may be calculated separately and capitalized or discounted at a higher rate. Because excess rent is the result of the lease contract rather than the income potential of the underlying real property on the valuation date, the incremental value created by a lease premium can result in a leased fee value that exceeds the fee simple value. Such a situation is known as a *negative leasehold.*

Tenants occupying smaller spaces who pay excess rent may not be able to succeed because of the rent disadvantage. Higher risk may also be attributable to the excess rent paid by a large, financially capable company with the power to contest the lease.

Deficit rent is the amount by which market rent exceeds contract rent at the time of the appraisal. It is created by a lease favorable to the tenant and may reflect uninformed or unusually motivated parties, inferior management, or a lease executed in a weaker rental market. When leased fee value is less than fee simple value, real estate taxes may be based on the higher fee simple value. A leased fee value that is less than the fee simple value results in a positive leasehold interest for the tenant. When there is a positive

excess rent

The amount by which contract rent exceeds market rent at the time of the appraisal; created by a lease favorable to the landlord (lessor) and may reflect unusual management, unknowledgeable or unusually motivated parties, a lease execution in an earlier, stronger rental market, or an agreement of the parties. Due to the higher risk inherent in the receipt of excess rent, it may be calculated separately and capitalized or discounted at a higher rate in the income capitalization approach.

deficit rent

The amount by which market rent exceeds contract rent at the time of the appraisal; created by a lease favorable to the tenant, resulting in a positive leasehold, and may reflect uninformed or unusually motivated parties, special relationships, inferior management, a lease executed in a weaker rental market, or concessions agreed to by the parties.

leasehold interest for a financially strong tenant, there is often reduced risk for the leased fee owner. This may reduce the capitalization rate or discount rate that is appropriate for the leased fee position.[4]

Percentage Rent

Percentage rent is rental income received in accordance with the terms of a percentage clause in a lease. Percentage rent is typically derived from retail tenants and is based on a certain percentage of their sales revenue. It is usually paid at the end of each year and may be more difficult to collect than other forms of rent paid on a more frequent basis. Depending on the tenant, percentage rent may involve more risk than other forms of rent and may be capitalized or discounted separately and at a different rate. Note that the risk is in the variability of the income, more than in the likelihood that rent collection will be difficult.

The emergence of new competition in the area or the departure of an anchor tenant from a shopping center may reduce or eliminate anticipated percentage rent. Also, as is true for excess rent, the conditions that create percentage rent may not extend for the duration of the lease. Furthermore, calculation of a store's sales revenue can be affected by transactions involving a "virtual" or Internet component.

Overage Rent

Overage rent is percentage rent paid over and above the guaranteed minimum rent or base rent. The level of sales at which a percentage clause is activated is specified in a lease and called a *breakpoint*. The natural breakpoint is the level of sales at which the percentage rent exactly equals the base rent.

The breakpoint in a percentage lease does not necessarily have to be the natural breakpoint. For example, if the annual base rent was set in the lease at \$400,000 and the percentage of retail sales specified in the lease was 20%, then the natural breakpoint would be a sales volume of \$2,000,000–i.e., \$400,000/0.20 = \$2,000,000. The breakpoint specified in the lease could be set at a sales volume of \$2,250,000. In this case, the tenant would pay the base rent of \$400,000 until sales reached \$2,250,000 and the percentage clause would be activated so that the percentage rent jumps to \$450,000 (\$2,250,000 × 0.20 = \$450,000). The breakpoint could also be set lower than the natural breakpoint–say, at a sales volume of \$1,750,000–but the actual rent paid is usually the higher of either the base rent or percentage rent. That is, the tenant would likely pay the base rent of \$400,000 until sales reached the natural breakpoint

percentage rent
Rental income received in accordance with the terms of a percentage lease; typically derived from retail store and restaurant tenants and based on a certain percentage of their gross sales.

overage rent
The percentage rent paid over and above the guaranteed minimum rent or base rent; calculated as a percentage of sales in excess of a specified breakpoint sales volume.

base rent
The minimum rent stipulated in a lease.

4. See Richard L. Parli and Jeffrey D. Fisher, "Risk and Reasonableness for Nonmarket Occupancy," *The Appraisal Journal* (April 2003): 136-144, and "Risk and Reasonableness for Nonmarket Occupancy—A Second Look During a Recession," *The Appraisal Journal* (Winter 2010): 94-103.

of $2,000,000, at which point the percentage rent would start to rise above the level of the base rent.

Overage rent should not be confused with excess rent. Overage rent may be market rent, part market and part excess rent, or excess rent only.

Future Benefits

The benefits of owning specific rights in income-producing real estate include the right to receive all cash flows accruing to the real property over the holding or projection period (i.e., the term of ownership) plus any proceeds from disposition of the property at the termination of the investment.[5] While actual disposition might not occur, it is presumed in order to quantify the reversion.

Various measures of future benefits are considered in the income capitalization approach. Commonly used measures include

- potential gross income
- effective gross income
- net operating income
- equity income
- reversionary benefits

Potential Gross Income

Potential gross income (*PGI*) is the total potential income attributable to the real property at full occupancy before vacancy and operating expenses are deducted. It may refer to the level of rental income prevailing as of the effective date of the appraisal or expected during the first full month or year of operation, or to the periodic income anticipated during the projection period.

Effective Gross Income

Effective gross income (*EGI*) is the anticipated rental income and other income from the real property adjusted for vacancy and collection losses. This adjustment covers losses expected to be incurred due to unoccupied space, turnover, and nonpayment of rent by tenants.

Net Operating Income

Net operating income (*NOI* or I_O) is the actual or anticipated net income remaining after all operating expenses are deducted from effective gross income. Net operating income is customarily expressed as an annual amount. In certain income capitalization applications, a single year's net operating income may represent a steady stream of fixed income that is expected to continue for a number of years. In other applications, the income may

potential gross income (*PGI*)
The total income attributable to real property at full occupancy before vacancy and operating expenses are deducted.

effective gross income (*EGI*)
The anticipated income from all operations of the real property after an allowance is made for vacancy and collection losses and an addition is made for any other income.

5. The *holding period* is a market-oriented measure of how long investors typically retain ownership of real property. The *projection period* is used in investment analysis to forecast the term of ownership given the reasonable expectations of certain market events.

net operating income (NOI or I_O)
The actual or anticipated net income that remains after all operating expenses are deducted from effective gross income but before mortgage debt service and book depreciation are deducted.
Note: This definition mirrors the convention used in corporate finance and business valuation for EBITDA (earnings before interest, taxes, depreciation, and amortization).

equity income (I_E)
The portion of net operating income that remains after total mortgage debt service is paid but before ordinary income tax on operations is deducted.

represent the starting level of income that is expected to change in a regular or irregular pattern over the years. Still other applications may require that net operating income be estimated for each year of the analysis.

Equity Income

Equity income (I_E) is the portion of net operating income that remains after debt service is paid. Like net operating income, a single year's equity income may represent a steady stream of fixed income, the starting level of a changing income stream, or the equity income for a particular year of the analysis. Equity income is sometimes called *equity cash flow*, *equity dividend*, or *cash throw-off*.

Reversion

Reversion is a lump-sum benefit an investor receives, or expects to receive, upon termination of an investment or at an intermediate analysis period during the term of an investment (especially for appraisals). The reversionary benefit may be calculated before or after the mortgage balance is deducted. For example, the reversionary benefits for fee simple and leased fee estates are the net proceeds expected to result from resale of the property at the end of the investment projection period. For a mortgagee or lender, reversion consists of the balance of the mortgage when it is paid off or forecast to be paid off. Table 21.3 shows several

Table 21.3 Summary of Incomes and Reversions Associated with Various Real Property Interests in Income-Producing Property

Fee Simple	
Income	Net operating income based on market rents (NOI or I_O)
Reversion	Net proceeds of disposition (V_N)
Mortgagee (Lender's Position)	
Income	Mortgage debt service (I_M)
Reversion	Balance if paid prior to maturity or balloon payment if paid at maturity; none if loan amortizes fully (V_{M_N})
Equity	
Income	Equity income (I_E)
Reversion	Net equity proceeds of disposition (V_{E_N})
Leased Fee	
Income	Net operating income based on contract rents
Reversion	Property reversion or net proceeds of disposition of leased fee estate
Leasehold	
Income	Rental advantage when contract rent is below market rent; rental disadvantage when contract rent is above market rent
Reversion	None if held to end of lease or net proceeds of sale of leasehold estate

possible investment positions in an income-producing property and identifies the income streams and reversions associated with each interest.

Reversionary benefits are usually estimated as anticipated dollar amounts or as relative changes in value over the presumed projection period. A dollar estimate of the reversion might be based on a lessee's option to purchase the property at the end of the lease. Alternatively, the value of the reversion at the end of the projection period might be estimated by applying a capitalization rate to the income that a buyer expects to receive at the time of resale (or expected resale). Reversionary benefits may or may not require separate measurement, depending on the purpose of the analysis and the method of capitalization used. The reversionary benefits derived from an investment may be particularly uncertain in depressed markets, but a reversion amount is still a consideration.

reversion
A lump-sum benefit that an investor receives or expects to receive upon the termination of an investment; also called *reversionary benefit*.

Operating Expenses

In the income capitalization approach, a comprehensive analysis of the annual expenses of property operation is essential whether the value indication is derived from estimated net operating income or equity income. Operating expenses are the periodic expenditures necessary to maintain the real property and continue the production of revenue.

An operating statement that conforms to this definition of *operating expenses* is used for appraisal purposes. This reconstructed operating statement may differ from statements prepared for an owner or by an accountant because the latter often include mortgage interest or non-cash expenses such as depreciation. Operating statements are prepared on either a cash or accrual basis, and the appraiser must know the accounting basis used in the operating statements for the property being appraised. Operating statements provide valuable factual data and can be used to identify trends in operating expenses.

Operating expenses comprise three categories:

- fixed expenses
- variable expenses
- replacement allowance

These classifications have been used for a long time, but there are other valid classification systems that an appraiser can employ and different property types may require different classification.

Fixed Expenses

Fixed expenses are operating expenses that generally do not vary with occupancy and have to be paid whether the property is occupied or vacant. Real estate taxes

reconstructed operating statement
A statement prepared by an appraiser or other analyst to reflect the potential future performance of a property, considering the historical income and expenses of an investment property. In preparing reconstructed operating statements, appraisers may consult accountants' financial statements, comparable properties, auditors' statements, or historical data provided by the ownership entity.

and building insurance costs are typically considered fixed expenses. Although these expenses rarely remain constant, they generally do not fluctuate widely from year to year, do not vary in response to changing occupancy levels, and are not subject to management control. Therefore, an appraiser can usually identify a trend and accurately estimate these expense items.

Variable Expenses

Variable expenses are operating expenses for utilities, maintenance, janitorial, and other services that generally vary with the level of occupancy or the extent of services provided, though most variable expenses have some minimal fixed component regardless of occupancy. Specific expense items of this type may vary greatly from year to year, but similar types of property often reflect a reasonably consistent pattern of variable expenses in relation to gross income. Because fewer services are provided to the tenants of freestanding retail and industrial properties, these properties usually have a much lower ratio of expenses to gross income than apartment and office buildings.

Replacement Allowance

A replacement allowance provides for the periodic replacement of building components that wear out more rapidly than the building itself and must be replaced periodically during the building's useful life (i.e., capital items). Market participants may view replacement allowances differently from market to market–e.g., accounting for a replacement allowance as a line item or implicitly in the capitalization or discount rate. Appraisers must deal with replacement allowances in a manner that is consistent with the method used in the relevant market for comparable properties.

Rates of Return

A prudent investor ultimately seeks a total return greater than or equal to the amount invested. Therefore, the investor's expected return consists of two components:

- full recovery of the amount invested, i.e., the return of capital
- a reward for the assumption of risk, i.e., a return on invested capital

Because the returns from real estate may take a variety of forms, many rates, or measures of return, are used in capitalization. All measures of return can be categorized as either income rates, such as an overall capitalization rate (R_O) or equity capitalization rate (R_E), or discount rates, such as an effective interest rate (the rate of return on debt capital), yield rate (the rate used to convert future payments into present value, Y_O), or internal rate of return (*IRR*).

The term *discount rate* describes any rate used to convert future cash flows over time into a present

> An investor's total expected return includes the return of capital (recapture of capital) and a return on capital (compensation for use of capital until recapture). Rates of return may be income rates (ratios of annual income to value that are used to convert income into value) or yield rates (rates of return on capital).

value. Because investors expect their total return to exceed the amount invested, the present value of a prospective benefit is less than the total income over the ownership term—thus the "discount."[6] A yield rate is the rate of return on capital. It considers all expected property benefits, including a reversion.

Under certain conditions, the yield rate (Y_O) for a property may be numerically equivalent to the corresponding income rate (R_O). Nevertheless, the rates and their related concepts are not the same, nor are they interchangeable. An income rate is the ratio of one year's income to value.[7] A discount rate is applied to a series of individual incomes to obtain the present value.

In the income capitalization approach, both income rates and yield rates can be derived for, and applied to, any component of real property rights or the underlying physical real estate. For example, an appraiser may analyze total property income in terms of income to the land and income to the building or in terms of income to the mortgage and equity interests in the property. Similarly, an appraiser may seek the total investment yield or analyze the separate yields to the land and the building or to the mortgage and the equity interests. Finally, an appraiser may want to know the value of the unencumbered fee simple, the leased fee, or the leasehold interest. (Practical examples of these applications and the relevant symbols, formulas, and procedures are presented in Chapter 26.)

Return on and Return of Capital

The notion that an investor anticipates a complete recovery of invested capital—plus a payment for the use of capital—prevails in the real estate market just as it does in other markets. The term *return of capital* refers to the recovery of invested capital. The term *return on capital* refers to the additional amount received as compensation for use of the investor's capital until it is recaptured. Investors are concerned with both types of return. The rate of return on capital is analogous to the yield rate or the interest rate earned or expected. A typical example is the mortgage loan calculation in which the return of and the return on capital are considered in the level mortgage payment over time.

In real estate investments, capital may be recaptured in many ways.[8] Investment capital may be recaptured through annual income, or it may be recaptured all or in part through disposition of the property at the termination of the investment. It may also be recaptured through

return of capital
The recovery of invested capital through income or reversion or both.

return on capital
The additional amount received as compensation (profit or reward) for use of an investor's capital until it is recaptured. The rate of return on capital is the yield rate or the interest rate earned or expected.

6. For a thorough discussion of discounting, see Charles B. Akerson and David C. Lennhoff, editor, *Capitalization Theory and Techniques: Study Guide*, 3rd ed. (Chicago: Appraisal Institute, 2009).
7. The rate is usually calculated with the income for the first year, although the income for the previous year may be used. In rare cases, the incomes for several years might be averaged to obtain a representative income figure.
8. The term *recapture* was coined at a time when investors assumed that property values could only decline due to depreciation from physical or functional causes. Today appraisers use the term when some income provision must be made to compensate for the loss of invested capital.

a combination of both. If the property value does not change between the time the initial investment is made and the time the property is sold, the investor can recapture all the initial capital invested at property resale at the end of the holding period. Thus, when initial value is equivalent to resale value, the annual income can all be attributed to the return on capital. If the income has remained level (or constant), the indicated income rate (i.e., the overall capitalization rate) will equal the return on capital.

In yield capitalization the distinction between the return on and the return of capital is more explicit. The yield rate estimated for cash flows determines a specified return on capital. Direct capitalization, on the other hand, uses income rates such as overall capitalization rates, which must implicitly allow for both the return on and return of capital. When the capitalization rate is applied to the subject property's income, the indicated value must represent a price that would allow the investor to earn a market rate of return on the capital invested along with the recapture of the capital. Thus, the capitalization rate estimated and applied to value property must reflect or consider a market level of return of and return on the initial investment in one calculation.

Income Rates

An income rate expresses the relationship between one year's income and the corresponding capital value of a property.

An overall capitalization rate (R_O) is an income rate for a total property that reflects the relationship between a single year's net operating income and the total property price or value. It is used to convert net operating income into an indication of overall property value. An overall capitalization rate is not a rate of return on capital or a full measure of investment performance. It may be more than, less than, or equal to the expected yield on the capital invested, depending on projected income and value changes.

> **income rate**
> A rate that reflects the ratio of one year's income to the value of the property; examples include the overall capitalization rate (R_O), the equity capitalization rate (R_E), and the mortgage capitalization rate (R_M).

An equity capitalization rate (R_E) is an income rate that reflects the relationship between a single year's equity income expectancy and the equity investment. When used to capitalize the subject property's cash flow after debt service into equity value, the equity capitalization rate is often referred to in the real estate market as the *cash flow rate*, *cash-on-cash rate*, *cash-on-cash return*, or *equity dividend rate*. Like the overall capitalization rate, the equity capitalization rate is not a rate of return on capital. It may be more than, less than, or equal to the expected equity yield rate, depending on projected changes in income, value, and amortization of the loan.

Discount Rates

Various kinds of discount rates are used to discount cash flows applicable to a specific position or interest in defined real estate. Discount rates may or may not be developed in the same way as internal rates of return and may not necessarily consider all expected property benefits.

A yield rate is a rate of return on capital. It is usually expressed as a compound annual percentage rate. The yield rate considers all expected property benefits (both positive and negative over time), including the proceeds from disposition at the termination of the investment, if any. The term *interest rate* usually refers to the yield rate for debt capital, not equity capital.

An internal rate of return (*IRR*) is the yield rate that is earned for a given capital investment over the period of ownership. The internal rate of return for an investment is the yield rate that equates the present value of the future benefits of the investment to the amount of capital invested. The internal rate of return applies to all expected benefits, including the net proceeds from disposition at the investment's termination. It can be used to measure the return on any capital investment, before or after income taxes.

An overall yield rate (Y_O), or property yield rate, is a rate of return on and of the total capital invested. It considers all changes in income over the investment projection period as well as the reversion at the end of the projection period. It does not, however, consider the effect of debt financing. Rather, it is calculated as if the property were purchased with no debt capital and thus is sometimes called an *unleveraged rate* or an *unlevered rate*. The overall yield rate can be viewed as the combined yield on both the debt and equity capital. It is calculated in the same way the internal rate of return is calculated.

An equity yield rate (Y_E) is a rate of return on equity capital. It may be distinguished from a rate of return on debt capital, which is usually referred to as an *effective mortgage interest rate* or *mortgage yield rate* (Y_M). The equity yield rate is the equity investor's internal rate of return. It is affected by the amount of financial leverage employed in securing mortgage debt and thus is known as a *leveraged rate* or *levered rate*.

yield rate (Y)
A rate of return on capital, usually expressed as a compound annual percentage rate. A yield rate considers all expected property benefits, including the proceeds from sale at the termination of the investment.

overall yield rate (Y_O)
The rate of return on the total capital invested, including both debt and equity. Also called the *property yield rate*. When applied to cash flows, it is called a *discount rate*.

Estimating Rates

Whether an income rate or a yield rate is applied, the conversion of income into property value should reflect the annual rate of return the market indicates is necessary to attract investment capital. This rate is influenced by many factors:

- the degree of perceived risk
- market expectations regarding future inflation
- the prospective rates of return for alternative investments (i.e., opportunity costs)
- the rates of return earned by comparable properties in the past
- the availability of debt financing
- the prevailing tax law

The rate of return on investment combines a safe rate with a premium to compensate the investor for risk, the illiquidity of invested capital, and management involvement. The rate of return on capital may incorporate inflationary expectations and should reflect the competition for capital among alternative investments of comparable risk.

time value of money
The concept underlying compound interest that holds that $1 (or another unit of currency) received today is worth more than $1 (or another unit of currency) received in the future due to opportunity cost, inflation, and the certainty of payment.

Because the rates of return used in the income capitalization approach represent prospective rates, not historical rates, the market's perception of risk and changes in purchasing power are particularly important. Generally, higher overall capitalization rates are associated with less desirable properties, and lower overall capitalization rates are associated with more desirable properties.

The suitability of a particular rate of return cannot be proven with market evidence, but the rate estimated should be consistent with the data available. Estimating rates requires appraisal judgment and knowledge of prevailing market attitudes and economic indicators.

Typically, investors expect to receive a return on capital that represents the time value of money with an appropriate adjustment for perceived risk. The minimum rate of return for invested capital is sometimes referred to as the *safe*, *riskless*, or *relatively riskless rate*–e.g., the prevailing rate on insured savings accounts or guaranteed government securities.[9] Theoretically, the difference between the total rate of return on capital and the safe rate may be considered a premium to compensate the investor for risk, the illiquidity of invested capital, and other investment considerations.

A discount rate reflects the relationship between income and the value that a market will attribute to that income. The financial and economic concepts implicit in a discount rate are complex and have been the subject of significant analysis for more than a century. Although four key components can be identified within a discount rate–the safe rate plus considerations of illiquidity, management, and various risks–a discount rate that is constructed by adding allowances for these components can be misleading and inaccurate. The band-of-investment concept can be helpful in understanding these components, especially in differentiating marginal risk considerations, but these band-of-investment methods should not be represented as developing a market discount rate.

Risk

The anticipation of receiving future benefits creates value, but the possibility of not receiving or losing future benefits reduces value and creates risk. Higher rewards are required in return for accepting higher risk. To a real estate investor, risk is the chance of incurring a financial loss and the uncertainty of realizing projected future benefits. Most investors try to avoid excessive risk. They prefer certainty to uncertainty and expect a reward for taking a risk. Appraisers must recognize investors'

9. For example, federal statutes prescribe certain US securities rates as a means of compensating for the time value of money on an essentially risk-free basis while accounting for inflation. See 40 USC §1961 and the amendment contained in Public Law No. 106-554, effective December 21, 2000.

attitudes in analyzing market evidence, projecting future benefits, and applying capitalization procedures. The appraiser must be satisfied that the income rate or yield rate used in capitalization is consistent with market evidence and reflects the level of risk associated with receiving the anticipated benefits.

Inflation and Value

Appraisers should be aware of the difference between inflation and appreciation in real value. Inflation is an increase in the volume of money and credit, a rise in the general level of prices, and the erosion of purchasing power. Appreciation in real value results from an excess of demand over supply, which increases property values beyond the level of inflation.

The amount of inflation expected affects the forecast of future benefits and the estimation of an appropriate income or yield rate. If inflation is anticipated, the desired nominal rate of return on invested capital will likely increase to compensate for lost purchasing power. The required nominal rate, then, will increase to offset the expected inflation. Most investors try to protect the real rate of return over time.

A distinction must be made between expected inflation and unexpected inflation. Expected inflation refers to changes in price levels that are expected at the time the investment is made or when the property is being appraised. However, actual inflation may differ from what was anticipated at the time the investment was made. Depending on how the investment responds to the actual change in price levels, its value may fluctuate over time at a different rate than originally anticipated. If the return on the investment does not increase with unexpected inflation, the investor's real rate of return will be less than originally projected.

The converse of inflation–deflation–is a decrease in the general price level of commodities. In a deflationary period, the purchasing power of money rises because general price levels are falling. Historically, deflation has not been a significant problem in the United States since the beginning of World War II. The -0.4% change in the annual average of the consumer price index in 2009 was only the third year of negative change in that indicator since the 1930s and the first negative change since 1955. Theoretically, deflation should affect the return on an investment in the opposite manner of inflation. That is, because of expected deflation, the nominal rate of return on an investment in real property would likely decrease to account for the greater purchasing power of the cash. In a deflationary period with asset prices falling, the value of cash in hand may be perceived as greater than the potential appreciation of property, which could decrease investment and lending.

Procedure

The income capitalization approach supports two basic methods: direct capitalization, which uses the relationship of one year's income to conclude a value, and yield capitalization, which considers a series of cash flows over time together with any reversion value or resale proceeds.

The two methods of income capitalization are direct capitalization, in which a single year's income is divided by an income rate or multiplied by an income factor to reach an indication of value, and yield capitalization, in which future benefits are converted into a value indication by discounting them at an appropriate yield rate (DCF analysis) or applying an overall capitalization rate that reflects the investment's income pattern, value change, and yield rate.

Initially, both methods require a comprehensive study of historical income and expenses for the subject property. This study is combined with an analysis of typical income and expense levels for comparable properties. A reconstructed operating statement is developed for the subject property. This statement must reflect the purpose of the appraisal, especially with respect to the property interest being appraised. Leased fee value will reflect current leases and the associated expense structure, while fee simple value starts with an income based on market rent.

Yield capitalization will require a consideration of probable income and expenses over the designated projection period, often from five to 10 years. When this method is used, the appraiser must forecast income and expenses over time together with the eventual reversion or resale value of the property. Direct capitalization, on the other hand, requires a one-year cash flow estimate (usually 12 months from the date of value) and application of an overall rate to estimate value. This method often relies on sales of properties with income characteristics and future expectations similar to the subject's, although alternate methods for developing the appropriate rate are available.

Although there are various income capitalization techniques available to the appraiser, certain steps are essential in applying the income capitalization approach. Before applying most capitalization techniques, an appraiser works down from potential gross income to net operating income. To do this, the appraiser will

1. Research the income and expense data for the subject property and comparables.
2. Estimate the potential gross income of the property by adding the rental income and any other potential income.
3. Estimate the vacancy and collection loss.
4. Subtract vacancy and collection loss from total potential gross income to arrive at the effective gross income of the subject property.
5. Estimate the total operating expenses for the subject by adding fixed expenses, variable expenses, and a replacement allowance (where applicable).
6. Subtract the estimate of total operating expenses from the estimate of effective gross income to arrive at net operating income. (Deductions for capital items may also be necessary at various points in time through the projection period to calculate the cash flow used in discounted cash flow analysis.)
7. Apply one of the direct or yield capitalization techniques to this data to generate an estimate of value via the income capitalization approach.

Some capitalization techniques involve the use of a potential gross income multiplier or effective gross income multiplier. In those cases, the appraiser does not work down to net operating income but stops at effective gross income.

Direct Capitalization, Yield Capitalization, and Discounting

Direct capitalization makes use of a single year's income and a market-derived factor or overall capitalization rate. Initially, the process appears rather simple. The practitioner need only estimate the income and the factor or overall capitalization rate. In contrast, yield capitalization requires the practitioner to make explicit forecasts of income, expenses, and changes in vacancy levels and expenses over the projection period. The net sale price of the property at the end of the projection period must also be estimated. The concluded yield rate is then applied to convert anticipated economic benefits into present value.

Practitioners who use direct capitalization must recognize that, while an overall capitalization rate is only applied to one characteristic of the property (i.e., to a single year's net operating income), the overall capitalization rate is valid only if it accounts for all the other characteristics of the property. For example, suppose that annual increases of 3% are forecast in the net rent of a comparable sale property and an overall capitalization rate of 10% for the comparable property is extracted from the market data. Furthermore, suppose that annual increases of 2% are forecast in the net rent of the subject property. Applying the overall capitalization rate of 10% extracted from the sale property to the income stream of the subject property would be a misapplication of the approach and would overstate the subject property's value.

In yield capitalization, the practitioner must draw specific conclusions about changes in net income, cash flow, and property value over the projection period. These conclusions are set forth in forecasts of future income and property reversion. The reader of the appraisal report can review the forecasts and examine each component of the future income and property value.

Also, specific investment goals for the return on and of invested capital can be considered in yield capitalization. The property's projected income and reversion are discounted to a present value by applying the investor's anticipated yield rate in the present value procedure. Yield rates can be derived (from comparable sales, interviews, etc.) with formulas and factors obtained from financial tables or calculated and applied with financial calculators or personal computers. Various software programs can also be used to discount cash flows.

Both direct capitalization and yield capitalization are market-derived techniques, and when applied correctly they should result in similar value indications for a subject property. In applying the income capitalization approach, the appraiser does not need to be limited to a single capitalization method. With adequate information and proper use, direct and yield capitalization methods should produce similar results. If differences arise, the appraiser should check that the various techniques are being applied correctly and consistently and that the analysis reflects the actions of market participants. The results derived from the application of different capitalization techniques should be reconciled within the income capitalization approach and may be considered again in final reconciliation.

Income and Expense Analysis

To apply any capitalization procedure, a reliable estimate of income expectancy must be developed. Although some capitalization procedures are based on the actual level of income at the time of the appraisal, all must eventually include a projection of future income. Among other things, an appraiser should consider the future outlook both in estimating income and expenses and in selecting the appropriate capitalization methodology to use. Failure to consider future income would contradict the principle of anticipation, which holds that value is the present worth of future benefits.

Historical income and current income are significant, but the ultimate concern is the future. The earning history of a property is important only insofar as it is accepted by buyers as an indication of the future. Current income is a good starting point, but the direction and expected pattern of income change are critical to the capitalization process.

Many types of first-year income can be converted into value estimates for different property interests using direct capitalization. Some examples are

- net operating income (*NOI* or I_O)
- equity income (I_E)

In yield capitalization, various cash flows and appropriate reversion values can be used to estimate the value of different property interests:

- Annual I_O and property reversion over a projection period for a leased fee (V_{LF}) or fee simple interest value (V_O)
- I_E and equity reversion over a projection period for an equity value (V_E)
- property cash flow considering tenant improvements (TIs) and leasing commissions, and property reversion over the projection period for a leased fee or fee simple interest value

When using either direct or yield capitalization, reliable projections of income are important. Significant value differences can result when the same overall capitalization rate or potential gross income multiplier is used to convert different income estimates into value. If, for example, a potential gross income multiplier of 6.0 is applied to potential gross income estimates of $50,000 and $55,000, values of $300,000 and $330,000 result. A $5,000 difference in potential gross income produces a $30,000 difference in value. Similarly, when an overall capitalization rate of 10.0% is applied to net operating income estimates of $35,000 and $40,000, values of $350,000 and $400,000 result. In this example, a $5,000 difference in net operating income results in a $50,000 value difference. Income forecasting is a sensitive and crucial part of income capitalization because income projections have a significant effect on value.

An appraiser may estimate income for a single year or series of years depending on the data available and the capitalization method employed. The analysis can be based on

- the actual level of income at the time of the appraisal
- a forecast of income for the first year of the investment
- a forecast of income over a specified projection period
- a stabilized, average annual income over a specific projection period

If an opinion of market value is sought, the income forecast should reflect the expectations of market participants. In an assignment to develop an opinion of investment value, the appraiser may base the income forecasts on the specific ownership or management requirements of the investor.

If a partial interest such as an equity interest in a fee simple or leased fee estate is being valued, the equity income may be used as the basis of the analysis. In this case, annual mortgage debt service is deducted from net operating income to calculate the equity income. Sometimes debt service is based on an existing mortgage and the amount is specified. In other cases, debt service must be estimated based on the typical mortgage terms indicated by current market activity and the property type being appraised.

Table 22.1 lists the key elements to investigate in developing income and expense estimates for various property types. The specific line items involved in the generation of income and the allocation of expenses may vary for different property types.

Table 22.1 Characteristic Income and Expenses of Principal Property Types

Industrial Buildings	
Lease and income	Medium- to long-term net or modified gross lease; contract rent.
Expenses	Tenants pay most operating expenses and sometimes prorated property taxes, insurance, and exterior maintenance; landlord pays management expenses; tenant improvement allowance sometimes provided by landlord; leasing commissions paid by landlord to agent or broker.
Retail Properties	
Major (anchor) tenants	
Lease and income	Long-term net lease; base and percentage (overage) rent.
Expenses	Tenants pay utilities, interior maintenance, and common area maintenance (such expense recoveries are prorated); tenants may share in advertising and management expenses; tenant improvement allowance provided by landlord; leasing commissions paid by landlord to agent or broker; tenant improvements and leasing commissions are typically treated as below-the-line items (i.e., not deducted before derivation of net operating income).
Smaller (local) tenants	
Lease and income	Short- to medium-term net lease; base and percentage (overage) rent.
Expenses	Tenants pay utilities, interior maintenance, and common area maintenance (these expense recoveries are prorated); tenants may share in advertising and management expenses; tenant improvement allowance provided by landlord; leasing commissions paid by landlord to agent or broker; tenant improvements and leasing commissions are typically treated as below-the-line items.
Multifamily Residential Properties	
Lease and income	Lease for one year or less; modified gross lease; contract rent.
Expenses	Tenants often pay own utility expenses; landlord pays property taxes, insurance, management, and maintenance; replacement allowance may be treated as an above-the-line item; no tenant improvement allowance.
Office Buildings	
Lease and income	Medium- to long-term lease; base rent may be adjusted upward on an escalation basis according to an index.
Expenses	Under a gross lease, landlord pays all operating expenses; under a net lease, tenants pay all expenses; leases may contain provisions to pass through any increase in certain expenses over a specified base amount and customarily on a per-square-foot basis. Tenant improvement allowance provided by landlord; leasing commissions paid by landlord to agent or broker. Both are treated as below-the-line expenses.

Note: The treatment of expenses described here is typical in many, but not all, markets.

Estimating and Adjusting Market Rent

An investigation of market rent levels starts with the subject property. By examining financial statements and leases and interviewing selected tenants during property inspection, an appraiser can verify the subject property's current rent schedule. Further verification may be necessary if the owner's or manager's information is in doubt or if it is required based on the scope of work. The sum of current rents may be compared with previous totals using operating statements for the past several years. Statements of rents, including the rent paid under percentage leases or escalation clauses, should be examined for all building tenants. After analyzing the existing rent schedule for the subject property, the appraiser reduces all rents to a unit basis for comparison. All differences in rents within the property are described and explained. Then rental data for comparable space in the market is assembled so that equivalent market rents can be estimated and reduced to a unit of comparison.

When a market rent estimate for the subject property is required, the appraiser gathers, compares, and adjusts comparable rental data. The parties to each lease should be identified to ensure that the party held responsible for rent payments is actually a party to the lease or, by endorsement, the guarantor. It is also important to ascertain that the lease represents a freely negotiated, arm's-length transaction. A lease that does not meet these criteria, such as a lease to an owner-tenant or a sale-leaseback, often does not provide a reliable indication of market rent. Since sale-leasebacks are actually financing vehicles, they should not be used in estimating market rent.

The rents of comparable properties can provide a basis for estimating market rent for a subject property once they have been reduced to the same unit basis applied to the subject property. Comparable rents may be adjusted just as the transaction prices of comparable properties are adjusted in the sales comparison approach. Recent leases for the subject property may be a good indication of market rent, but lease renewals or extensions negotiated with existing tenants should be used with caution. Existing tenants may be willing to pay higher rents to avoid relocating. Alternatively, a landlord may offer existing tenants lower rent to avoid vacancies and the expense of obtaining new tenants.

The elements of comparison considered in rental analysis are

real property rights being leased and conditions of rental	Rentals that do not reflect arm's-length negotiations most likely will have to be eliminated as comparables.
market conditions	Economic conditions change, so leases negotiated in the past may not reflect current prevailing rents.
location	Time-distance linkages and unit-specific locations in project.
physical characteristics	Size, height, interior finish, functional layout, site amenities, etc.
division of expenses stipulated in the lease and other lease terms	Were concessions made? Who pays operating expenses? What are the provisions regarding changing the rent during the term of the lease?
use of the property	Market rents might have to be adjusted for the intended use or level of build-out of the subject property when it differs from that of the comparable.
non-realty components	If a leasing or management company is involved, the income of a hotel that is part of a national chain may be higher than that of a hotel not in a chain. The higher income stems from the value associated with the name of the hotel franchise, not from any difference in the income potential of the real property.

The amount of data needed to support a market rent estimate for a subject property depends on the complexity of the appraisal problem, the availability of directly comparable rentals, and the extent to which the pattern of adjusted rent indications derived from the comparables differs from the income pattern of the subject property. When sufficient, closely comparable rental data is not available, the appraiser should

Interests

To a certain extent, the interest being appraised determines how rents are analyzed and estimated. The valuation of fee simple interests in income-producing real estate is based on the market rent the property is capable of generating. Therefore, to value proposed projects without actual leases, properties with unleased space, and owner-occupied properties, market rent estimates are used in the income capitalization approach.

To value the leased fee estate, the appraiser considers contract rent for leased space, which may or may not be at market levels, and market rent for vacant and owner-occupied space. When discounted cash flow analysis is used, future market rent forecasts are required to estimate income after existing leases expire. It should be emphasized that the discounting of contract rents usually does not result in an opinion of the market value of the fee simple interest. It results in an opinion of the market value of the leased fee interest.

To value a leased fee interest in a recently completed, income-producing property that has not achieved stabilized occupancy, an appropriate vacancy and collection loss must be forecast over an appropriate absorption or lease-up period. Appraisals of proposed properties for lending purposes often require value estimates at different stages in the property's development:

- as is
- when completed
- at stabilization

The value as is of a proposed development is typically the current value of the vacant land. The other two values are prospective values as of the completion of construction (value considering lease-up of space at that time) and when the property actually achieves stabilized occupancy.

include other data, preferably data that can be adjusted. If an appraiser uses proper judgment in making adjustments, a reasonably clear pattern of market rents should emerge.

Income and Expense Data

To derive pertinent income and expense data, an appraiser investigates comparable sales and rentals of competitive income-producing properties of the same type in the same market. For investment properties, current and recent incomes are reviewed, and vacancy and collection losses and typical operating expenses are studied. Interviews with owners, tenants, and brokers in the area can provide lease and expense data.

Appraisers try to obtain all income and expense data from the income-producing properties used as comparables. This data is tabulated in a reconstructed operating statement and filed by property type. (A suggested format for reconstructed operating statements is illustrated later in this chapter.)

Like expense data, rental information is difficult to obtain. Therefore, appraisers should take every opportunity to add rents to their rental databases. Appraisers should keep their own records because long-term leases are rarely in public records. A separate county index may cite the parties to recorded leases and the volume and page where leases are recorded. Sometimes this information is listed with deeds and mortgages, but it is usually coded for easy identification. In certain cities, abstracts of recorded leases are printed by private publishing services. In the vast majority of cases, however, leases are not publicly recorded. Classified ads may also provide rental information and can be found using various online sources. Many appraisers periodically check advertised rentals and recorded rental information by property type or area. It is convenient to file rental data under the same property use classifications used for sales data. Because sources of rental data vary, appraisers should take care to ensure the accuracy of this information.

Income and expense comparables should be filed chronologically and by property type so they can be retrieved easily and used to estimate the expenses for a similar type of property. Income and expense figures should be converted to appropriate units of comparison for analysis. For example, income may be reported in terms of rent per apartment unit, per room, per hospital bed, or per square foot. Expenses for insurance, taxes, painting, decorating, and other required maintenance can be expressed in the same units of comparison used for income, or they can be expressed as a percentage of the effective gross income. The unit of comparison selected must be used consistently throughout the analysis of the subject property and in the rental database information.

Rental property data may show vacancy rates as a percentage of potential gross income and operating expenses as a percentage of effective gross income. This data is essential in valuing income-producing property.

Lease Data

If written leases exist and the income estimate is based on the continuation of lease income, the appraiser examines lease abstracts for provisions that could affect the quantity, quality, and durability of property income. The appraiser may either read the leases or rely on the client or another authorized party to disclose all pertinent lease provisions through lease summaries or briefs. In any case, the source of information and level of verification should be described in the scope of work section of the appraisal report. The appraiser also analyzes the leases of competitive properties to estimate market rent and other forms of income applicable to the market for competitive space.

Typical lease data includes

- date of the lease
- reference information, if the lease is recorded
- legal description or other identification of the leased premises
- name of lessor–i.e., owner or landlord
- name of lessee–i.e., tenant
- lease term
- occupancy date
- commencement date for rent payment
- rent amount, including any percentage clause, graduation, and payment terms
- rent concessions, including any discounts or benefits
- landlord's covenants–i.e., items such as taxes, insurance, and maintenance for which the owner or landlord is responsible

- tenant's covenants–i.e., items such as taxes, insurance, maintenance, utilities, and cleaning expenses for which the tenant is responsible
- right of assignment or right to sublet–i.e., whether the leasehold, or tenant's interest, may be assigned or sublet, under what conditions, and whether assignment relieves the initial tenant of future liability
- option (or options) to renew, including the date of required notice, term of renewal, rent, and other renewal provisions
- option to purchase
- expense caps and expense stops, escalation rent, and expense recoveries
- options to purchase and any accompanying conditions
- escape clauses, termination clauses, cancellation clauses, kick-out clauses, and most-favored-tenant clauses
- continued occupancy contingency
- security deposits, including advance rent, bond, or expenditures by the tenant for items such as leasehold improvements
- casualty loss–i.e., whether the lease continues after a fire or other disaster and on what basis
- lessee's improvements, including whether they can be removed when the lease expires and to whom they belong
- noncompete and exclusive use clauses
- condemnation, including the respective rights of the lessor and the lessee if all or any part of the property is appropriated by a public agency
- revaluation clauses
- special provisions

Special attention should be paid to lease data on rent, rent concessions, the division of expenses, renewal options, escalation clauses, purchase options, escape clauses, and tenant improvements.

A sample form for analyzing a typical office lease is shown in Figure 22.1.

Rent

The amount of rent to be paid by the tenant is basic lease data. An appraiser considers rent from all sources, which may include base or minimum rent, contract rent, percentage rent, and escalation rent. The sources of rental income should be clearly identified.

Rent Concessions

When real estate markets are oversupplied, landlords may give tenants concessions such as free rent for a specified period of time or extra tenant improvements. In shopping center leases, retail store tenants are sometimes given rent credit for interior store improvements. Rent concessions often result from imbalanced market conditions and the relative negotiating strengths of the landlord and the tenant. Concessions are also used as a marketing tool, for example, when the owner speci-

Figure 22.1 Office Space Rental Worksheet

Building ______________________________

Suite No./Identifier ______________________ Floor ____________

Lessor ______________________________

Lessee ______________________ Guarantor ____________

Rentable area ____________ Usable area ____________ Rentable/usable area ratio ______

Lease date ____________ Commencement ____________ Expiration ____________

Base rent ____________ CPI escalation ❑ Yes ❑ No

Graduations ______________________________

____

Tenant improvements (by owner) ______________________________

Tenant improvements (by tenant) ______________________________

Special provisions ______________________________

____

Who pays	**Lessor**	**Lessee**	**Stop**	**Stop Amount per Sq. Ft.**	**Cap**	**Cap Amount per Sq. Ft.**
Fixed expenses						
Real estate taxes	❑	❑	❑	________	❑	________
Property insurance (fire, storm, vandalism)	❑	❑	❑	________	❑	________
Variable expenses						
Tenant space utilities	❑	❑	❑	________	❑	________
Common area utilities	❑	❑	❑	________	❑	________
Tenant space HVAC	❑	❑	❑	________	❑	________
Common area HVAC	❑	❑	❑	________	❑	________
Tenant space cleaning (janitorial service)	❑	❑	❑	________	❑	________
Common area cleaning	❑	❑	❑	________	❑	________
Repairs and maintenance						
Exterior	❑	❑	❑	________	❑	________
Interior	❑	❑	❑	________	❑	________
Management	❑	❑	❑	________	❑	________
Other expenses (if any)	❑	❑	❑	________	❑	________
____________	❑	❑	❑	________	❑	________

Renewal options

How many ______________________ Years each ____________

New rent ______________________________

New escalation (and base year) ______________________________

New tenant improvements ______________________________

Comments ______________________________

____

____

fies a rent that is above market levels with the rent concession bringing the rent down to the market rate in the lease negotiations. Concessions are provided by landlords when demand is weak and there is increased competition among landlords to attract new tenants. It is not unusual for free rent concessions to be given outside of the lease term so that the concessions do not appear on the written lease contract. In these situations appraisers must still consider the lease concessions when calculating the effective rent being paid. Concessions together with tenant installation allowances influence market rent estimates.

Division of Expenses between the Lessor and Lessee

Most leases outline the obligations of the lessor and the lessee to specify who must pay for taxes, insurance, utilities, heat, janitorial service (if any), repairs, unit owner's or common area (CAM) expenses, and other expenses required to maintain and operate the leased property. The appraiser should identify the division of expenses in each lease analyzed and compare the rents and estimated rental value of the subject space to those of comparable space. Any required adjustments in the division of expenses in comparable properties should reflect the same lease terms and division of expenses as the subject property.

Renewal Options

Renewal options that allow a tenant to extend the lease term for one or more prescribed periods of time are frequently included in leases. A typical renewal option requires that the tenant provide advance notice of the intention to renew. The lease also must identify the length of the renewal period and the rent or method of determining the rent to be paid. The extension period rent may be set at the original rent or at a level determined when the lease was negotiated. Or it may be calculated with a procedure or formula specified in the lease. Renewal options are binding on the landlord but allow the tenant to make a decision based on the circumstances at the time of renewal. Thus, renewal options tend to favor the tenant.

If the terms of the renewal option are favorable to the tenant, this fact should be noted in the appraisal report, and the appraiser may be justified in concluding that the tenant would exercise the option to renew. If the terms of the renewal option are not favorable to the tenant, this fact should still be pointed out, and the appraiser may conclude that the tenant would not exercise the option to renew. This is particularly important in discounted cash flow analysis, where it might have a significant impact on the appraiser's selection of a projection period as well as projections of outlays for downtime between leases, tenant improvements, and leasing commissions.

Expense Stop and Expense Cap Clauses

Leases often include clauses that limit the expenses that either the landlord or the tenant will pay. With an expense stop, the landlord meets defined operating expenses to a specified level above which increases in

expense stop
A clause in a lease that limits the landlord's expense obligation because the lessee assumes any expenses above an established level.

expense cap
A clause in a lease that limits a tenant's share of operating expenses.

operating expenses become the responsibility of the tenant or lessee. This allows the landlord to pass through any increases above the specified level over time and protects the landlord against unforeseen increases in expenses. Often the level of expenses incurred during the first year of the lease is specified as the level of the stop, although a stated amount per square foot is sometimes used. With an expense cap, operating expenses are borne by the tenant to a specified level above which the landlord picks up the expenses. The cap defines the tenant's maximum obligations and limits the tenant's exposure to the risk of increasing expenses.

Expense stop clauses are often added to traditional gross or flat rental leases. In multitenant office buildings, increased expenses are usually prorated among the tenants in proportion to the area they occupy or on some other equitable basis. The prorated shares are then added to the tenants' rents. The expenses allocated to vacant space are normally paid by the owner.

Sometimes a single stop provision is used to cover all the expenses to be passed through to the tenants. Alternatively, an expense stop might be specified for individual expense items. For example, tax stop clauses provide that any increases in taxes over a specified level be passed on to the tenant.

escalation clause
A clause in an agreement that provides for the adjustment of a price or rent based on some event or index, e.g., a provision to increase rent if operating expenses increase; also called *expense recovery clause* or *stop clause*.

Escalation Clauses and Expense Recovery Clauses

An escalation clause helps a landlord offset increases in operating expenses, which are passed on to tenants on a pro rata basis through an adjustment to rent. Some escalation clauses can be drawn so broadly that the lease is almost applied on a net rental basis.

An expense recovery clause stipulates that some or all operating expenses paid by the landlord are recoverable from the tenant. In different parts of the country, expense recoveries are known as *reimbursables*, *billables*, or *pass-throughs*. Some of these items (e.g., common area maintenance charges) may be considered under operating expenses, while others may be considered under replacement allowances. Expense recoveries are usually treated as separate revenue items, and recoverable expenses are usually deducted as expenses in income and expense statements. The analysis should consider whether the recoverable items have historically been recovered and the probability of recovery in the future.

Purchase Options

Certain leases include a clause granting the lessee an option to purchase the leased property or to match any offer to purchase. The relationship of contract to market rent and other factors will influence the likelihood of a tenant exercising such an option. In some cases, this option must be exercised on the lease termination date or at some point or points during the lease term. In other cases, this option may be available at any time. The option price may be fixed or it may change periodically based on an empirical formula, depreciated book value, or revaluation of the property. A purchase option may only give the lessee the right to purchase the property or make an offer if an offer to purchase is made by a third party. This provision is referred to as a *right of first refusal.* A purchase option can restrict marketability and the price a third-party buyer will pay for the property. The option price, if stated, may represent a limit on the market value of the leased fee estate.

Escape, Kick-Out, Cotenancy, and Buyout Clauses

Landlords and tenants may have reasons for terminating a lease prior to the end of a lease term, and a lease agreement often includes language that protects both parties in case of a default or other form of termination. For example, an escape clause may permit a tenant to cancel a lease under circumstances that would not ordinarily be considered justification for lease cancellation. A condemnation or casualty clause might allow the tenant to cancel the lease if a condemnation or casualty loss hinders operations. A casualty clause may stipulate that the landlord be allowed a reasonable amount of time to make necessary repairs and provide for appropriate abatement of rent in the interim. A landlord might include a demolition clause in a lease to preserve the prospects for sale or redevelopment of the site. This type of escape clause can affect rent levels and market value.

escape clause
A provision that allows a tenant or landlord to cancel a lease. Sometimes called a *kick-out clause* when it allows the landlord to cancel a lease.

A kick-out clause written into a lease allows a landlord to cancel a lease upon the occurrence of a specific event, e.g., if sales have not achieved a predetermined level after a certain period of time. Kick-out clauses may create risk and warrant adjustments to discount rates or capitalization rates used in direct capitalization.

Cotenancy clauses in retail leases permit tenants to terminate a lease if the landlord has not replaced an anchor tenant or other specified tenant or tenant types within a predetermined period. For a tenant, the purpose of a cotenancy clause is typically to ensure a certain level of traffic within a shopping center through the continuous operation of other tenants. Cotenancy clauses may have a significant effect on property performance if they are exercised.

In the event of bankruptcy of either the landlord or tenant, the US Bankruptcy Code (last revised in 2006) is generally agreed to supersede any lease provisions relating to the bankruptcy of one of the parties. The bankruptcy of a tenant can have a significant effect on the value of commercial properties because of the length of typical leases. However, section 365 of the Bankruptcy Code caps the damages a landlord can claim from the rejection of a long-term lease contract by a party in Chapter 11 bankruptcy proceedings, although the courts have interpreted the language differently.

Buyout clauses provide for a payment by either a landlord or a tenant to the other to induce the cancellation of a lease. The amount of the payment may be set by the lease or be negotiated at the time of the cancellation.

Termination clauses in leases permit the tenant to terminate the lease within a specified period after giving notice.

Most-favored-tenant clauses are sometimes found in leases to major tenants. The terms of these leases require the landlord to reduce the lease rate per square foot for this tenant to equal the lower lease rates subsequently executed for another tenant.

continued occupancy clause
For an in-line shopping center tenant, a lease provision that conditions the continued occupancy of that tenant upon the occupancy of another, usually an anchor tenant.

Continued Occupancy Clauses

Multitenant properties may be subject to leases that condition the continued occupancy of one tenant on the occupancy of another tenant. An anchor tenant's decision to vacate during the lease term can precipitate the departure of other tenants as well. In appraising shopping centers, the probability of an anchor tenant leaving at or before expiration of the current lease must be carefully analyzed. This is true whether or not the satellite (i.e., non-anchor) stores have leases conditioning their occupancy on the continued occupancy of the anchor tenant. Small stores are often unable to continue operation if the anchor leaves the center.

Tenant Improvements

Extensive tenant improvements can influence contract rent or they may be built into the asking rent as a tenant improvement allowance. Consideration of tenant improvements (TIs) is usually addressed in discounted cash flow analysis because the costs accrued can be incorporated into the analysis at the appropriate points of the projection period. Stabilized net operating income should recognize the tenant improvements that are appropriate for properties in the market.

tenant improvement allowance
A dollar amount (usually expressed as an amount per square foot) provided to the tenant by the landlord for the construction of tenant improvements, which may or may not equal the cost of remodeling.

tenant improvements (TIs)
1. Fixed improvements to the land or structures installed for use by a lessee.
2. The original installation of finished tenant space in a construction project; subject to periodic change for succeeding tenants.

When capital expenditures that are not accounted for in the asking rent are made by the lessor, reimbursement may be accomplished through marginally higher rent that amortizes the lessor's expenditures over all or part of the lease period. If capital expenditures are made by the tenant, the lessor may reduce the tenant's rent for all or part of the lease term as compensation for such tenant expenditures. In many retail environments, the rents vary directly with the level of build-out provided to the tenant. When using these leases as comparable data, the level of build-out supplied with the rent is an important element of comparison.

Tenant improvements are driven by the market–i.e., they are only done if the market dictates it. Also, tenant improvements do not apply to all property types. The standard maintenance and upkeep of an apartment unit before renting the unit to a new tenant is not usually considered a tenant improvement, unless the cleaning and refurbishment exceed the typical levels needed to maintain the property's competitiveness in the market. If the tenant improvements directly affect net operating income and are recorded above the *NOI* line item in a reconstructed operating statement, they are considered above-the-line expenses. More often, they are treated as below-the-line expenses.

A developer or owner may be responsible for a certain level of build-out or tenant improvements, and that will be reflected in the rent as defined in a tenant workletter. Improvements in excess of that level are the responsibility of tenants and are not reflected in the rent, or they may be provided by the landlord and amortized over the lease term. The level of build-out may be different for new space and for retrofitting an existing space, and the level of tenant improvements may be different for a renewal tenant and a new tenant.

above-the-line expense
An expense that is recorded "above" the net operating income line in a reconstructed operating statement typically developed for valuation purposes and therefore is considered part of the total operating expenses for the property.

below-the-line expense
An expense that is recorded "below" the net operating income line in a reconstructed operating statement and therefore is not considered part of the total stabilized operating expenses for the property. Tenant improvements and leasing concessions are the most common line items recorded below the net operating income line for analytical purposes.

exclusive use clause
A provision that limits the landlord from leasing to any other tenants in the property or in a defined area who are conducting a similar business, most often in shopping center leases. Also called an *exclusivity clause*.

Noncompete, Dark Store, and Exclusive Use Clauses

Leases may contain a provision that prohibits tenants from operating a business in a nearby, competing shopping center. For example, a tenant who sells sporting goods may agree not to open another, competing sporting goods facility near the shopping center. This is known as *radius restriction*.

In some jurisdictions, a lease may include a clause that states that the tenant must continue to occupy the site throughout the term of the lease and is barred from opening a competitive store within a certain period after the expiration date of the lease. A dark store clause protects a landlord, whose property could be put in a poor releasing position if a tenant moves out and opens another store within the same trade area. A dark store clause may be especially important in a percentage lease involving an anchor or other major tenant.[1]

An exclusive use clause may be written into a lease to control the retail mix of the shopping center. Such a clause may also be sought by a tenant who wants to achieve some degree of monopoly status (e.g., a fast food retailer that wants to have the only restaurant of its type in the shopping center).

1. A dark store clause may sometimes be referred to as a *go dark clause*, which is also sometimes used to describe the kickout clause discussed previously.

Developing Reconstructed Operating Statements

Assessing the earning power of a property means reaching a conclusion regarding its net operating income expectancy. The appraiser estimates income and expenses after researching and analyzing the following:

- the income and expense history of the subject property
- income and expense histories of competitive properties
- recently signed leases, proposed leases, rejected lease proposals, and asking rents for the subject and competitive properties
- actual vacancy levels for the subject and competitive properties
- management expenses for the subject and competitive properties
- operating expense data and operating expenses at the subject and competitive properties
- forecast changes in taxes, energy costs, and other operating expenses

Appraisers often present this information in tabular form to assist the reader of the report. Income and expenses are generally reported in annual or monthly dollar amounts and analyzed in terms of nominal dollar amounts per unit of rentable area or another unit of comparison. To show how historical and forecast data on operating expenses is commonly arrayed, Table 22.2 summarizes the operating expense history of a downtown office building with 60,000 square feet of rentable space. Table 22.3 summarizes the operating expenses of five comparable properties in the same market area and allows for easy comparison of the subject property and the comparables. It is obvious that the total operating expenses of the subject, at $15.82 per square foot for the year being studied, are significantly higher than those of the comparables, which range from $13.73 to $15.07 per square foot. For most of the operating expenses listed, the per-unit expenses for the subject fall within the ranges set by the comparable properties, but the expenses for electricity, at $4.14 per square foot, and cleaning, at $2.28 per square foot, are higher than for any of the comparables. In the income and expense analysis, the appraiser will have to investigate the reasons for the higher costs of electricity and cleaning for the subject property.

> Income estimates are developed by analyzing information on the subject and competitive properties, i.e., individual income and expense histories, recent transactional data (signed leases, rents asked and offered), vacancy levels, and management expenses. Published operating data, tax assessment policies, projected utility rates, and market expectations should also be investigated.

After thoroughly analyzing property and lease data for the subject and comparable properties, the appraiser develops a net operating income estimate for the subject property. If the appraiser is focusing on the benefits accruing to the equity investment, the equity income is also estimated.

Table 22.2 Subject Property Operating Expense History

	Three Years Ago Actual		Two Years Ago Actual		One Year Ago Actual		Current Year Budget	
	Dollars	Per Square Foot	Dollars	Per Square Foot	Dollars	Per Square Foot	Dollars	Per Square Foot
Fixed expenses								
Real estate taxes	$232,812	$3.88	$272,378	$4.54	$314,433	$5.24	$323,400	$5.39
Insurance	7,134	0.12	7,050	0.12	19,875	0.33	20,100	0.34
Variable expenses								
Electricity	$200,390	$3.34	$216,632	$3.61	$211,789	$3.53	$248,350	$4.14
Steam heat	79,211	1.32	71,390	1.19	72,675	1.21	85,250	1.42
Cleaning	117,102	1.95	109,775	1.83	128,987	2.15	136,750	2.28
Payroll	8,432	0.14	10,208	0.17	11,386	0.19	12,600	0.21
Repairs and maintenance	17,388	0.29	30,688	0.51	38,875	0.65	52,825	0.88
Water and sewer	3,010	0.05	3,030	0.05	2,412	0.04	4,800	0.08
Administrative, legal, and accounting	1,180	0.02	1,778	0.03	10,856	0.18	10,850	0.18
Management fees	47,570	0.79	49,300	0.82	50,100	0.84	53,500	0.89
Miscellaneous	3,031	0.05	88	0.001	610	0.01	600	0.01
Total operating expenses	$717,260	$11.95	$772,317	$12.87	$861,998	$14.37	$949,025	$15.82

Note: Figures have been rounded.

Table 22.3 Analysis of Operating Expenses of Comparable Properties

		Comparable Properties				
		A	B	C	D	E
	Subject Property Pro Forma	130 Main Street	110 Second Avenue	717 Fourth Avenue	133 Third Avenue	One Commerce Plaza
Operating year	Current	1 year ago	1 year ago	1 year ago	1 year ago	1 year ago
Year built	7 years ago	7 years ago	18 years ago	25 years ago	22 years ago	8 years ago
Rentable area in square feet	60,000	75,000	49,411	56,411	52,000	66,000
Operating Expenses*						
Fixed expenses						
Real estate taxes	$5.39	$5.51	$5.48	$5.01	$5.47	$5.35
Insurance	0.34	0.18	0.27	0.30	0.51	0.27
Variable expenses						
Electricity	$4.14	$4.03	$3.47	$3.31	$3.25	$3.45
Steam heat	1.42	1.25	1.60	1.35	1.75	1.55
Cleaning	2.28	1.61	1.38	1.27	1.28	1.30
Payroll	0.21	0.25	0.32	0.78	0.73	0.21
Repairs and maintenance	0.88	0.45	0.63	0.98	0.99	0.38
Water and sewer	0.08	0.08	0.08	0.08	0.09	0.10
Administrative, legal, and accounting	0.18	0.19	0.19	0.26	0.08	0.11
Management fees	0.89	0.80	0.80	0.80	0.90	1.00
Miscellaneous	0.01	0.02	0.01	0.02	0.02	0.01
Total operating expenses	$15.82	$14.37	$14.23	$14.16	$15.07	$13.73

* Per square foot

Potential Gross Income

Appraisers usually analyze potential gross income on an annual basis. Potential gross income comprises

- rent for all space in the property—e.g., contract rent for current leases, market rent for vacant or owner-occupied space, percentage and overage rent for retail properties
- rent from escalation clauses
- reimbursement income
- all other forms of income to the real property—e.g., income from services supplied to the tenants, such as secretarial service, switchboard service, antenna connections, storage, and garage space, and income from coin-operated equipment and parking fees

Because service-derived income may or may not be attributable to the real property, an appraiser might find it inappropriate to include this income in the property's potential gross income. The appraiser may treat such income as business income or as personal property income, depending on its source. If a form of income is subject to vacancy and collection loss, it should be incorporated into potential gross income, and the appropriate vacancy and collection charge should be made to reflect effective gross income.

Vacancy and Collection Loss

Vacancy and collection loss is an allowance for reductions in potential gross income attributable to vacancies, tenant turnover, and nonpayment of rent or other income. This line item considers two components:

- physical vacancy as a loss in income
- collection loss due to default by tenants

The rents collected each year are typically less than annual potential gross income, so an allowance for vacancy and collection loss is usually included in the appraisal of income-producing property. The allowance is usually estimated as a percentage of potential gross income, which varies depending on the type and characteristics of the physical property, the quality of its tenants, the type and level of income streams, current and projected market supply and demand conditions, and national, regional, and local economic conditions.

An appraiser should survey the local market to support the vacancy estimate. Published surveys of similar properties under similar conditions may be helpful but should be used with caution as they are not necessarily indicative of current, local market conditions. The conclusion in the income capitalization approach may differ from the current vacancy level indicated by primary or secondary data because the estimate reflects typical investor expectations for the subject property only over the projection period. Other

> **vacancy and collection loss**
> A deduction from potential gross income (*PGI*) made to reflect income reductions due to vacancies, tenant turnover, and nonpayment of rent; also called *vacancy and credit loss* or *vacancy and contingency loss*.

methods of measuring vacancy and collection loss include comparing potential gross income at market rates against the subject property's actual collected income.

Effective Gross Income

Effective gross income is calculated as the potential gross income minus the vacancy and collection loss allowance.

Operating Expenses

Operating expenses may be recorded in categories selected by the property owner. The records also may follow a standard system of accounting established by an association of owners or by accounting firms that serve a particular segment of the real estate market. Generally, operating expenses are divided into three categories:

operating expenses
The periodic expenditures necessary to maintain the real property and continue production of the effective gross income, assuming prudent and competent management.

- fixed expenses
- variable expenses
- replacement allowance

However operating expenses are organized, an appraiser analyzes and reconstructs expense statements to develop an estimate of the typical operating expense forecast for the property on an annual cash basis.

Fixed Expenses

Most reconstructed operating statements contain line items for real estate taxes and insurance costs. Tax data can be found in public records, and the assessor's office may provide information about projected changes in assessments or rates and their probable effect on future taxes. If a property is assessed unfairly, the real estate tax expense may need to be adjusted in the reconstructed operating statement. If the subject property has an unusually low assessment compared to similar properties or appears to deviate from the general pattern of taxation in the jurisdiction, the most probable amount and trend of future taxes must be considered. Any past changes in the assessment of the subject property should be studied. If the assessment is low, the assessor may be required by law to raise it. If the figure is high, however, a reduction may not be easy to get. In projecting real estate taxes, an appraiser tries to anticipate tax assessments based on past tax trends, present taxes, the municipality's future expenditures, and the perceptions of market participants. Because the concept of market value presumes a sale, the real estate tax projection should consider the impact of the presumed sale on the anticipated assessed value and taxes.

fixed expenses
Operating expenses such as taxes and insurance that generally do not vary with occupancy and that prudent management will pay for whether the property is occupied or vacant.

For proposed properties or properties that are not currently assessed, appraisers can develop operating statement projections without including real estate taxes. The resulting estimate is net operating income before real estate taxes, and a provision for real estate taxes is included in the capitalization rate used to convert this net income into property value. For example, suppose that real estate taxes are typically 2% of market value and net operating income after real estate taxes would normally be capitalized at 11% to derive an opinion of market value for the subject property. In this case, the estimated net operating income before real estate taxes could be capitalized at 13% (11% + 2%) to derive a property value indication. (This is known as a *loaded capitalization rate*.) Alternatively, the appraiser may choose to estimate real estate taxes for a proposed project based on building costs or the taxes paid by recently constructed, competitive properties. Appraisers should exercise care to determine applicable procedures in the jurisdiction in which the property is located. Any unusual, unpaid special assessments or other mandatory, one-time expenses should be addressed as a lump-sum adjustment at the end of the analysis, if that is what market participants would do.

An owner's operating expense statement may show the insurance premiums paid on a cash basis. If the premiums are not paid annually, they must be adjusted to a hypothetical annual cash expense before they are included in the reconstructed operating statement. Fire, extended coverage, and owner's liability insurance are typical insurance items. Elevators, boilers, plate glass, or other items may also be insured, depending on the property type. The appraiser must determine the amount of insurance and, if it is inadequate or superadequate, adjust the annual cost to indicate appropriate coverage for the property. As with all projected expenses, the insurance expense estimate must reflect dynamic changes in the market such as the increase in insurance costs following an event like a catastrophic hurricane.

Insurance on business inventory, business liability, and other business property is the occupant's responsibility and therefore should not be charged to the operation of the real estate. When questions concerning coinsurance or terms of coverage arise, an appraiser might need to obtain professional insurance counsel.

Variable Expenses

Operating statements for large properties frequently list many types of variable expenses such as the following:

- management
- utilities–e.g., electricity, gas, water, and sewer
- heat
- air-conditioning
- general payroll
- cleaning
- maintenance and repair of structure
- decorating

- grounds and parking area maintenance
- miscellaneous–e.g., administrative, security, supplies, rubbish removal, and exterminating
- leasing commissions

variable expenses
Operating expenses that generally vary with the level of occupancy or the extent of services provided.

Management services may be contracted or provided by the property owner. The management expense may have two components: a professional property management fee and other expenses related to the operations of the asset. The property management fee is usually expressed as a percentage of effective gross income, which conforms to the local pattern of such charges for typical management.[2] For some property types there may be additional management expenses such as on-site supervision and the cost of maintaining and operating on-site facilities such as offices or managers' apartments. These additional management expenses, in conjunction with other management expenses such as the cost of telephone service, clerical help, legal or accounting services, printing and postage, and advertising and promotion, may be accounted for elsewhere in the expense statement. Management expenses may be included among recoverable operating expenses in certain markets for some property types.

In some markets standard retail leases contain a provision for levying administrative charges as a percentage of common area maintenance charges. These charges are typically treated as a mark-up to tenant reimbursements and may replace or be added to the management fee.

Utility expenses for an existing property are usually projected based on an analysis of past charges and current trends. The subject property's utility requirements can be compared with known utility expenses per unit of measure–e.g., per square foot, per room, per apartment unit–for similar properties to estimate probable future utility expenses. Hours of tenant operation may prove to be significant in the analysis. For example, the number of nights per week that a shopping center is open and the hours of after-dark operation will directly affect electricity consumption and may also affect expenses for maintenance and garbage removal. In analyzing utility expenses, appraisers recognize local circumstances and the current and expected future cost of all applicable utilities. Utilities may be paid entirely by the property owner or entirely by the tenant, or they may be shared. These expenses may be recouped as part of common area reimbursements or through a different utility reimbursement plan, e.g., a ratio utility billing system (RUBS) in a multifamily property.

Although the cost of electricity for leased space is frequently a tenant expense, and therefore not included in the operating expense

2. Actual property management should be distinguished from asset management. Large, investment-grade properties are often held as part of a portfolio that includes both securities and real estate. The managers of these portfolios make critical decisions concerning when to acquire and sell a real estate asset, how to finance or when to refinance, and when to reposition a property in the market. Though their roles are distinct, the functions of a property manager and an asset manager may sometimes be intertwined. Asset management fees should not be included among the items enumerated as operating expenses for real property.

statement, the owner may be responsible for lighting public areas and for the power needed to run elevators and other common building equipment. Some regional shopping centers purchase electricity on a wholesale basis and resell it to the tenants on a retail basis, keeping the difference as profit. If this is the case, the appraiser should consider whether the profit component represents income to the business or income to the real property.

When used for heating and air-conditioning, gas can be a major expense item that is either paid by the tenant or paid by the property owner and reflected in the rent.

The cost of water is a major consideration for industrial plants that use processes that depend on water and for multifamily projects in which the cost of sewer service is usually tied to the amount of water used. It is also an important consideration for laundries, restaurants, taverns, hotels, and similar operations. The leases for these properties may stipulate that the tenant pay this expense. If the owner typically pays for water, this charge should be included in the expense statement.

In municipalities with sewerage systems, a separate charge for use of the system may be paid by the tenant or the owner of the real estate. This total expense may be substantial, particularly for hotels, motels, recreational facilities, apartments, and office buildings.

The cost of heat is generally a tenant expense in single-tenant properties, industrial and retail properties, and apartment and office projects with individual heating units. It is a major expense item shown in operating statements for centrally heated apartment and office properties. The fuel consumed may be coal, oil, gas, electricity, or public steam. Heating supplies, maintenance, and workers' wages are included in this expense category under certain accounting methods.

Public steam suppliers and gas companies maintain records of fuel consumption and corresponding degree days from year to year. (One degree day is equal to the number of degrees, during a 24-hour day, that the mean temperature falls below 65° Fahrenheit, which is the base temperature in the United States.) An appraiser can use these records and fuel cost data to compare the property's heating expense for the most recent years with a typical year. Probable changes in the cost of the fuel used should be reflected in the appraiser's projection.

Air-conditioning expenses may be charged under the individual categories of electricity, gas, water, payroll, and repairs, or heating and air-conditioning may be combined under the category of heating, ventilation, and air-conditioning (HVAC). The cost of air-conditioning varies with local climatic conditions and the type of system installed. A projection of this expense may be based on typical unit charges for the community or the property type. Most office buildings and many apartment buildings have central HVAC systems, and operating expenses are included in their annual statements. Most retail properties and some apartment buildings have individual heating and air-conditioning units that are operated by the tenants. The maintenance and repair of these units, particularly in apartments, may continue to be the property owner's obligation.

General payroll expenses include payments to all employees whose services are essential to property operation and management but whose salaries are not included in other specific expense categories. In some areas the cost of custodial or janitorial service is based on union wage schedules. In others the charge is negotiated based on local custom and practice. If a custodian or manager occupies an apartment as partial payment for his or her services, the apartment's rental value may be included as income and an identical amount deducted as an expense. In certain properties additional expenses are incurred to pay the salaries of security personnel, porters, and elevator operators. Unemployment and social security taxes for employees may be included under general payroll expenses or listed in a separate expense category.

In office buildings the cost of cleaning or janitorial services is a major expense and usually includes two elements: cleaning costs and cleaning supplies. It is usually estimated in terms of cost per square foot of rentable area, whether the work is done by payroll personnel or by an outside cleaning firm. This expense is equivalent to maid service or housekeeping in hotels and furnished apartments. In hotels and motels, cleaning expenses are attributed to the rooms department and may be estimated as a percentage of the department's gross income. The percentage established reflects the property's previous experience and industry standards. Cleaning may be an owner or tenant expense, depending on the property type and lease provisions.

Maintenance and repair expenses are incurred during the year to maintain the structure and its major components and to keep them in good working order. These expenses may cover roof repair, window caulking, tuckpointing, exterior painting, and the repair of heating, lighting, and plumbing equipment. Typically, under net leases, maintenance costs are paid by the tenants and repair costs by the owners. There may be a contract for elevator maintenance and repair, and often owners are still responsible for maintenance of the roof, HVAC system, and general structure. However, the coverage of these contracts varies, and the appraiser must determine any additional operating expenses not covered by the maintenance contract. A contract covering air-conditioning equipment, for example, would probably be included in the air-conditioning expense category.

Alterations, including major replacements, modernization, and renovation, may be considered capital expenditures and therefore are not included as a periodic expense under repair and maintenance. If the lessor makes alterations in the rented space, the expense may or may not be amortized by additional rent. In some cases the tenant may pay for alterations.

The total expense for property maintenance and repair is affected by the extent to which building component and equipment replacements are covered in the replacement allowance as well as the age, condition, and functional utility of the property. If an extensive replacement allowance is included in the reconstructed operating statement, annual maintenance and repair expenses may be reduced. Similarly, if an owner cures items of deferred maintenance, the annual maintenance and repair expenses may be reduced.

For some properties, historical expense records may include typical repairs and even capital expenses in an overall category called "repairs and maintenance." If this is the case, the reconstructed operating statement will need to show an adjustment to the historical data, especially where separate replacement allowances are included. The goal of the analysis is to consider all appropriate expenses over time as well as a replacement allowance to ensure the ongoing repair of major building components. Also, there may be some crossover in the tenant improvement category and the replacement allowance or repair category. The same method should be applied to any comparable sales information to ensure consistency when the various rates and ratios are extracted and then applied to the subject property.

Decorating expenses may include the cost of interior painting, wallpapering, or wall cleaning in tenant or public areas. Decorating expenditures may vary with local practice and the supply and demand for space.

The cost of maintaining grounds and parking areas can vary widely depending on the type of property and its total site area. The cost of snow removal may be substantial in northern states, particularly for properties with outdoor parking in addition to sidewalks and driveways. Hard-surfaced public parking areas with drains, lights, and marked car spaces are subject to intensive wear and can be expensive to maintain. These expenses may be entirely or partly reimbursed through an increment added to the rents of tenants served by the facility. In this case

Leasing Commissions

Leasing commissions are fees paid to an agent for leasing tenant space. In direct capitalization, leasing commissions are either treated as a normalized annual expense or included below the line in the reconstructed operating statement, depending on local market convention. In discounted cash flow analysis, leasing commissions are typically included in the time period they are expected to occur. Leasing commissions may or may not be reflected in the operating statements provided by the owner. Initial leasing commissions, which may be extensive in a new development, are usually treated as part of the capital expenditure for developing the project. These initial leasing commissions are not included as ongoing periodic expenses.

A blended rate can be developed to reflect leasing commission costs for both existing leases and new leases. For example, if the tenant renewal ratio for a property is 70%, the leasing commission for existing tenants is 2.5%, and the leasing commission for new tenants is 30% @ 6%, a blended rate can be developed as follows:

$$\begin{aligned} 0.70 \times 0.025 &= \quad 0.0175 \\ 0.30 \times 0.060 &= +\underline{0.0180} \\ \text{Blended rate} &= \quad 0.0355 \text{ (3.55\%)} \end{aligned}$$

This blended rate is then applied to existing tenant leases as they expire.

both the added income and the added expenses are included in the appraiser's reconstructed operating statement. Landscaping and lawn maintenance are also covered by this expense category.

Certain types of buildings in some areas may require security provisions, the cost of which will vary according to the number of employees needed to control entry and exit and to circulate through the property. Maintenance and energy expenses may also be incurred if security provisions include electric alarm systems, closed circuit television, or flood lighting.

The cost of cleaning materials, office supplies, and miscellaneous items not covered elsewhere may be included under supplies. Garbage and pest control services are usually contracted and their cost is included in the expense statement.

Expenses for miscellaneous items vary with property type. If this expense category represents a significant percentage of effective gross income, however, it may be wise to explain individual expense items or reallocate them to specific categories.

Replacement Allowance

A replacement allowance, sometimes referred to as *reserves for replacement*, provides for the periodic replacement of building components that wear out more rapidly than the building itself and must be replaced during the building's economic life. Depending on local practice, the replacement allowance may be reflected explicitly as an expense or implicitly in the capitalization or discount rate.

replacement allowance
An allowance that provides for the periodic replacement of building components that wear out more rapidly than the building itself and must be replaced during the building's economic life; sometimes referred to as *reserves* or *reserves for replacement*.

If shown specifically, the annual replacement allowance for each component of a property is usually estimated as the anticipated cost of its replacement prorated over its total useful life, provided this does not exceed the total useful life of the structure. Some appraisers use simple averaging (with or without calculating a sinking fund payment), while others prefer to show the actual cost and timing of these replacements. New elevators or other components that are expected to have useful lives that equal or exceed the remaining useful life of the structure do not require an allowance for replacement, unless making replacements or installing new equipment increases the remaining useful life of the structure beyond that of the long-lived items. Examples of building components that may require a replacement allowance include

- roof covering
- carpeting
- kitchen, bath, and laundry equipment
- HVAC compressors, elevators, and boilers
- specific structural items and equipment that have limited economic life expectancies

- sidewalks
- driveways
- parking areas
- exterior painting and weatherproofing for windows

The scope of items to be covered in a replacement allowance is a matter of appraisal judgment based on market evidence. However, the magnitude and coverage of the replacement allowance is based on the annual repair and maintenance expenses of the property for the specific components considered in the allowance. Historical operating statements prepared on a cash basis may include periodic replacement expenses under repair and maintenance. If comprehensive provisions for replacements are made in the reconstructed operating statement, these charges may be duplicated unless the annual maintenance expense estimate is reduced.

In certain real estate markets, space is rented to a new tenant only after substantial interior improvements are made. If this work is performed at the landlord's expense and is required to achieve the estimated rent, the expense of these improvements may be included in the reconstructed operating statement as part of the replacement allowance in a separate "tenant improvements" or "capital expenditure" category, depending on local practice.

A total expense estimate that provides for all items of repair, maintenance, and replacement may exceed the actual expenditures shown in the owner's operating statements for recent years. This is particularly common when the building being appraised is relatively new and the owner has not incurred many capital or repair expenses. In preparing a reconstructed operating statement for a typical year, an appraiser recognizes that replacements must be made eventually and that replacement costs affect operating expenses. These costs can be reflected in increased annual maintenance costs or, on an accrual basis, in an annual replacement allowance.

The appraiser must know whether or not a replacement allowance is included in any operating statement used to derive a market capitalization rate for use in the income capitalization approach. It is essential that the income statements of comparable properties be consistent. Otherwise, adjustments will be required. A capitalization rate derived from a comparable sale property is valid only if it is applied to the subject property on an equivalent basis. Consequently, a rate derived from a sale with an expense estimate that does not provide for a replacement allowance should not be applied to an income estimate for a subject property that includes such an allowance without an adjustment that reflects the difference. Investor survey rates may or may not include deductions for replacement allowances, and the appraiser must exercise caution in applying capitalization and discount rates from surveys.

Total Operating Expenses

Total operating expenses are the sum of fixed and variable expenses and the replacement allowance in the reconstructed expense estimate.

Exclusions from Reconstructed Operating Statements

The operating statements prepared for real estate owners typically list all expenditures made during a specific year. An owner's statement may include nonrecurring items that should not be included in an expense estimate intended to reflect typical annual expenses. Such a statement may also include items of business expense or costs associated with the specific circumstances of ownership.

A reconstructed operating statement represents an opinion of the probable future net operating income of an investment.* Certain items included in operating statements prepared for property owners should be omitted in reconstructed operating statements prepared for appraisal purposes. These items include book depreciation, depletion allowances or other special tax considerations, income tax, special corporation costs, additions to capital, and loan payments.

Book Depreciation

The book depreciation for the improvements on a parcel of real estate is based on historical cost or another previously established figure that has no relation to current market value. Moreover, book depreciation is based on a formula designed for tax purposes. The capitalization method and procedure selected provide for the recapture of invested capital, so including depreciation in the operating expense statement is redundant.

Depletion Allowances or Other Special Tax Considerations

A depletion allowance is an accounting process that allows for lower taxation of the revenue generated by extracting natural resources from a property because there is less oil, coal, natural gas, or other minerals left in the ground. The concept of depletion is similar to the depreciation of assets, and including the depletion allowance in the operating expenses would be redundant for the same reasons given for book depreciation.

Income Tax

The amount of income tax varies with the type of property ownership—i.e., the property may be held by a corporation, a partnership, a public utility, or an individual. The expected or average income tax of the owner is not an operating expense of the property. It is an expense of ownership.

Special Corporation Costs

The expenses attributable to corporate operations also pertain to the type of ownership. Corporate expenses are not part of a reconstructed operating statement developed for appraisal purposes.

Additions to Capital

Expenditures for capital improvements usually do not recur annually and therefore should not be included in an estimate reflecting the typical annual expenses of operation. Capital improvements may enhance value by increasing the annual net operating income or economic life of the property, but the capital expenditure is not a periodic operating expense.

The exclusion of capital expenditures is specific to reconstructed operating statements, which are used to calculate net operating income. An average annual expectation may be included in the replacement reserve. When cash flows are estimated for a discounted cash flow analysis, capital expenditures may be deducted from the net operating income in the year the expenditure is expected to occur and not averaged on an annual basis. This is particularly important when the property's future net operating income is based on the assumption that the capital expenditure will be made. In this case, failure to account for the capital expenditure could result in an overstatement of value. Similarly, value may be understated if capital improvements are presumed to have been "written off" without appropriately considering their contribution to value or their additions to the total capital invested.

Loan Payments

Operating statements prepared by owners often reflect loan payments in the form of periodic debt service and may include a loan payoff. These payments are not included in the reconstructed operating statement because net operating income is defined to exclude mortgage debt service.

* Some practitioners use the term *pro forma* synonymously with *reconstructed operating statement*. Technically, a pro forma is a financial statement—e.g., a balance sheet or income statement used by a business developed "according to form." In appraisal practice, a reconstructed operating statement is developed to conform to the appraiser's definition of *net operating income*, which generally differs from the definition of *income* used by accountants. Thus, a reconstructed operating statement drawn up by an appraiser will usually differ from a typical pro forma income statement prepared by an accountant.

Net Operating Income

After total operating expenses are deducted from effective gross income, the remainder is the net operating income.

Additional Calculations

After the appraiser calculates net operating income, further calculations may be needed to determine

- mortgage debt service
- equity income
- expense and income ratios

Mortgage Debt Service

Mortgage debt service is the annual sum of all mortgage payments. Mortgage debt service is deducted from net operating income to derive equity income, which is used in certain capitalization procedures. The definition of *market value* is based on financing terms compatible with those found in the market. Thus, in estimating market value, the mortgage debt service to be deducted from the net operating income must be based on market terms. In some cases the appraiser may be asked to develop an opinion of the value of the equity investor's position based on existing or specified financing. In this case the debt service would reflect the specific terms in the existing or specified mortgage (or mortgages).

Operating expense ratios and net income ratios are used to identify income and expense statements that are not typical or to confirm those that are typical.

operating expense ratio (*OER*)
The ratio of total operating expenses to effective gross income (*TOE*/*EGI*); the complement of the net income ratio, i.e., $OER = 1 - NIR$.

net income ratio (*NIR*)
The ratio of net operating income to effective gross income (*NOI*/*EGI*); the complement of the operating expense ratio, i.e., $NIR = 1 - OER$.

Equity Income

Equity income is the income that remains after all mortgage debt service is deducted from net operating income ($I_O - I_M$).

Expense and Income Ratios

The ratio of total operating expenses to effective gross income is the operating expense ratio (*OER*). The complement of this ratio is the net income ratio (*NIR*), which is the ratio of net operating income to effective gross income. These ratios tend to fall within certain ranges for specific categories of property. Experienced appraisers recognize appropriate ratios, so they can identify statements that deviate from typical patterns and require further analysis. They understand that risk varies inversely with the net income ratio because, for properties with low *NOI* ratios, small changes in effective gross income will have an inordinately large effect on net income.

Nationwide studies of apartment and office building properties conducted by the Institute of Real Estate Management (IREM) and the Building Owners and Managers Association International (BOMA) can often be used as general guides in assessing the reasonableness of operating expense ratios. Similar studies are also available for hotels, industrial properties, and self-storage properties. Sometimes local IREM or BOMA chapters or real estate appraisal organizations and their chapters conduct and publish studies of operating expenses that can be used as market indicators. Published studies are useful, but the appraiser must still develop operating expense ratios from comparable properties in the subject property's market or verify that published ratios are applicable to this market. Appraisers must also consider the applicability of the survey data to the physical characteristics of the subject property. For example, an appraiser should probably not use an IREM survey of buildings with an average building size of 400 units in the analysis of a 30-unit apartment building.

23 Direct Capitalization

Direct capitalization is a method used in the income capitalization approach to convert a single year's income expectancy into a value indication. This conversion is accomplished in one step, by dividing the net operating income estimate by an appropriate income rate.

Direct capitalization is widely used when properties are already operating on a stabilized basis. Direct capitalization can also be used when there is a sufficient supply of comparable sales with similar risk levels, incomes, expenses, physical and locational characteristics, and future expectations from which to extract capitalization rates or when there are alternate methods for deriving capitalization rates. The direct capitalization methodology may be less useful for properties going through an initial lease-up period and for properties with income or expenses that are expected to change in an irregular pattern over time. Investors often have minimum first-year capitalization rate requirements. In these cases, comparables with similar future expectations may not be available and one of the yield capitalization techniques may be more appropriate.

direct capitalization
A method used to convert an estimate of a single year's income expectancy into an indication of value in one direct step, either by dividing the net income estimate by an appropriate capitalization rate or by multiplying the income estimate by an appropriate factor. Direct capitalization employs capitalization rates and multipliers extracted or developed from market data. Only one year's income is used. Yield and value change are implied, but not explicitly identified.

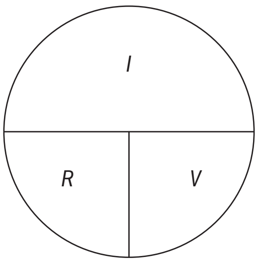
The advantages of direct capitalization are (1) it is simple to use and easy to explain, (2) it often expresses

The basic formulas for direct capitalization are

$$I = R \times V \qquad R = \frac{I}{V} \qquad V = \frac{I}{V}$$

$$V = I \times F \qquad I = \frac{V}{F} \qquad F = \frac{V}{I}$$

where I is income, R is capitalization rate, V is value, and F is factor.



market thinking, and (3) it provides strong market evidence of value when adequate sales are available.

Direct capitalization is applied using one of two basic methods:

- applying an overall capitalization rate to relate value to the entire property income (i.e., net operating income)
- using residual techniques that consider components of a property's income and then applying market-derived capitalization rates to each income component analyzed

Direct capitalization is distinct from yield capitalization (which is discussed in Chapters 24 and 25) in that it does not directly consider individual cash flows beyond one year. Yield capitalization explicitly calculates the year-by-year effects of potentially changing income patterns, changes in the original investment's value, and other considerations. In contrast, direct capitalization processes a single year's income into an indication of value. Either direct capitalization or yield capitalization can be used to produce a supportable indication of value when based on relevant market information derived from comparable properties. These comparable properties should have similar income-expense ratios, land value-to-building value ratios, risk characteristics, and future expectations of income and value changes over a typical projection period. When this data is available, the choice of capitalization method does not affect the indication of value.

Derivation of Overall Capitalization Rates

Any interest in real estate that is capable of generating income can be valued using direct capitalization. The direct capitalization formula is

$$\text{Value} = \frac{\text{Net Operating Income}}{\text{Overall Capitalization Rate}}$$

Overall capitalization rates can be estimated with various techniques. The techniques used depend on the quantity and quality of data available. When supported by appropriate market data, accepted techniques include

- derivation from comparable sales
- band of investment–mortgage and equity components
- band of investment–land and building components
- the debt coverage analysis
- analysis of yield capitalization rates
- surveys

Derivation of R_O from Comparable Sales

Deriving capitalization rates from comparable sales is the preferred technique when sufficient information about sales of similar, competitive properties is available. Data on each property's sale price, income, expenses, financing terms, and market conditions at the time of sale is needed. In addition, the appraiser must make certain that the net operating income of each comparable property is calculated and estimated in the same way that the net operating income of the subject property is estimated.

overall capitalization rate (R_O)
An income rate for a total real property interest that reflects the relationship between a single year's net operating income expectancy and the total property price or value.

$$R_O = \frac{I_O}{V_O}$$

Often the operating data available for comparable sale properties is from the year that ended just prior to the date of sale, so appraisers may have to explain (or adjust for) a time difference. Both income and expense data (in the 12 months after the date of valuation) and the structure of expenses in terms of replacement allowances and other components should be similar to those of the subject property. Moreover, neither non-market financing terms nor different market conditions should have affected the prices of the comparable properties. If the objective of the appraisal is to value the fee simple interest, income streams for the comparable properties analyzed must be at or around the level of market rent, or adjustments will be necessary. If the value of the leased fee interest is being sought, the comparable properties must be leased in the same manner as the subject property, or again adjustments will be required. Expectations for changes in the income and value of the comparable properties must also match those of the subject property, or an adjustment to the rate will be necessary.

The overall level of risk associated with each comparable should be similar to that of the subject property. Risk can be analyzed by investigating the credit rating of the property's tenants, market conditions for the particular property, the stability of the property's income stream, the level of investment in the property by the tenant, the property's net income ratio, and the property's upside or downside potential.

When these requirements are met, the appraiser can estimate an overall rate by dividing each property's net operating income by its sale price. Table 23.1 illustrates this procedure using data from four comparable sales of small residential income properties. If all four transactions are equally reliable and comparable, the appraiser might conclude that an overall rate of 0.0941 to 0.0984 should be applied to the subject property. The final rate concluded depends on the appraiser's judgment as to the degree of similarity between each sale and the subject property.

Table 23.1 Derivation of Overall Capitalization Rates from Comparable Sales

	Sale A	Sale B	Sale C	Sale D
Net operating income	$35,100	$40,000	$30,500	$48,400
Price	$368,500	$425,000	$310,000	$500,000
Indicated R_O	0.0953	0.0941	0.0984	0.0968

For example, if Sales A and D are the most comparable, the concluded rate might be approximately 0.0960, or 9.6%.

If there are differences between a comparable property and the subject property that could affect the overall capitalization rate concluded, the appraiser must account for these differences. In that case the appraiser must decide whether the rate concluded for the subject property should be higher or lower than the rate indicated by a specific sale or group of sales. Appraisal judgment is also needed to determine whether the rate selected for the subject should fall within the range established by the sales or be set above or below the range. If there are wide differences between a comparable property and the subject property that could affect the overall capitalization rate, the appraiser must explain the market behavior or property characteristics that account for these differences.

When rates derived from comparable sales are used, the overall capitalization rate is applied to the subject property in a manner consistent with its derivation. In other words, if the market-derived capitalization rates are based on the properties' net operating income expectancies for the first year–i.e., the 12 months after the date of sale–the capitalization rate for the subject property should be applied to its anticipated net operating income for the first year of operation.

The net income to be capitalized may be estimated before or after an annual allowance for specific replacement categories, e.g., the allowance for furniture, fixtures, and equipment for hotel properties and the replacement allowance for office properties.[1] Again, it is imperative that the appraiser analyze comparable sales and derive their capitalization rates in the same manner used to analyze the subject property and capitalize its income.

The following examples illustrate the importance of deriving and applying rates consistently. In the first example, the replacement allowance for the subject property is estimated to be $2,500. The overall rate indicated by comparable sales, in which a replacement allowance is not deducted as an operating expense, was 0.0850. In the second example, the replacement allowance is deducted as an operating expense, and the indicated overall rate becomes 0.0825. In the first calculation, the allowance is not included as an expense item for the subject property, so the net operating income there is $2,500 higher than in the second calculation. The valuation conclusions produced by the two calculations are identical because the rates were derived and applied consistently.

Allowance for Replacements Not Included in Operating Expenses	
Net Operating Income	$85,000
Overall Rate	0.0850
Capitalization: $85,000/0.0850	$1,000,000
Allowance for Replacements Included in Operating Expenses	
Net Operating Income	$82,500
Overall Rate	0.0825
Capitalization: $82,500/0.0825	$1,000,000

1. In some markets, practitioners no longer deduct a replacement allowance as an above-the-line item in direct capitalization. Whenever this expense item is implicit in the capitalization rate, it should not be deducted in estimating the net operating income for a subject property.

Whether net operating income is estimated with or without an allowance for replacements, the overall capitalization rate is calculated by dividing the net operating income of a comparable property by its sale price. An overall capitalization rate provides compelling evidence of value when a series of conditions are met:

1. Data must be drawn from properties that are physically similar to the property being appraised and from similar (preferably competing) markets. When a comparable property has significant differences, it may be afforded less weight or may be discarded entirely.
2. Sale properties used as sources for calculating overall capitalization rates should have current (date of sale) and future market expectations, including income and expense patterns and likely value trends, that are comparable to those affecting the subject property.
3. Income and expenses must be estimated on the same basis for the subject property and all comparable properties. For example, if reserves for replacement are included in the net operating income for each comparable, reserves for replacement should be reflected in the net operating income for the subject property also.
4. The comparable property's price must reflect market terms, or an adjustment for cash equivalency must be made.
5. If adjustments are considered necessary for differences between a comparable and the subject property, they should be made separately from the process of calculating the overall capitalization rate and should be based on market evidence.

Derivation of R_O by Band of Investment—Mortgage and Equity

Because most properties are purchased with debt and equity capital, the overall capitalization rate must satisfy the market return requirements of both investment positions. Lenders must anticipate receiving a competitive interest rate commensurate with the perceived risk of the investment or they will not make funds available. Lenders generally require that the loan principal be repaid through periodic amortization payments. Similarly, equity investors must anticipate receiving a competitive equity return (i.e., equity capitalization rate) commensurate with the perceived risk, or they will invest their funds elsewhere.

The mortgage capitalization rate (R_M) is the ratio of the annual debt service to the principal amount of the mortgage loan. The rate established at the inception of a mortgage is commonly called the *mortgage constant*. The annual mortgage constant for a new loan is calculated by multiplying each period's payment by the number of payments per year and then dividing this amount by the amount of the loan. A current mortgage capitalization rate may also be calculated on the basis of the outstanding mortgage amount once debt service payments have been made. It should be noted

> **band of investment**
> A technique in which the capitalization rates attributable to components of a capital investment (debt and equity) are weighted and combined to derive a weighted-average rate attributable to the total investment.

mortgage capitalization rate (R_M)
The capitalization rate for debt; the ratio of the annual debt service to the principal amount of the mortgage loan. The mortgage capitalization rate (R_M) is equivalent to the periodic (monthly, quarterly, annual) mortgage constant times the number of payments per year on a given loan on the day the loan is initiated.

$$R_M = \frac{\text{Annual Debt Service}}{\text{Mortgage Principal}}$$

equity capitalization rate (R_E)
An income rate that reflects the relationship between one year's equity cash flow and the equity investment; also called the *cash-on-cash rate*, *cash flow rate*, or *equity dividend rate*.

$$R_E = \frac{\text{Pre-tax Cash Flow}}{\text{Equity Invested}}$$

equity ratio (E)
The ratio between the down payment paid on a property and its total price; the fraction of the investment that is unencumbered by debt.

loan-to-value ratio (M)
The ratio between a mortgage loan and the value of the property pledged as security, usually expressed as a percentage; also called *loan ratio*.

that the mortgage capitalization rate (R_M) differs from the mortgage interest rate (Y_M). The mortgage interest rate, or yield rate to the mortgage, is the internal rate of return that equates the present value of the mortgage payments with the principal balance of the loan–i.e., the rate used to calculate the mortgage payment.

The mortgage capitalization rate is a function of the interest rate, the frequency of amortization (e.g., annual, monthly), and the amortization term of the loan. It is the sum of the interest rate and the sinking fund factor. When the loan terms are known, the mortgage capitalization rate can be calculated, using a financial calculator or any of a variety of computer software programs, by simply dividing annual debt service by the remaining mortgage balance, if known.

The equity investor also seeks a systematic cash return. The rate used to capitalize equity income is called the *equity capitalization rate* (R_E). It is the ratio of the annual return to the equity position to the amount of equity investment. The equity capitalization rate may be more or less than the expected equity yield rate (Y_E). For appraisal purposes, a property's equity capitalization rate is the anticipated cash flow to the equity investor for the first year of the projection period divided by the initial equity investment.

The overall capitalization rate must satisfy both the mortgage capitalization rate requirement of the lender and the equity return requirement of the equity investor. For mortgage-equity analysis, it can be viewed as a composite rate, weighted in proportion to the total property investment represented by debt and equity.[2] The overall capitalization rate is a weighted average of the mortgage capitalization rate (R_M) and equity capitalization rate (R_E). The loan-to-value ratio (M) represents the loan or debt portion of the property investment. The equity ratio (E, which is sometimes shown as $1 - M$) represents the equity portion of the property investment. The sum of E and M is 1, i.e., 100%.

When sufficient market data is available, the overall rate can be calculated directly. If only the mortgage and equity capitalization rates are known, however, an overall rate may be derived with the band-of-investment, or weighted-average, technique. The following formulas are used to calculate the overall capitalization rate:

Mortgage Component	$M \times R_M =$	________
Equity Component	$+ E \times R_E =$	+ ________
	$R_O =$	________

2. The band of investment is similar to the weighted average cost of capital (WACC) used in finance.

To illustrate how the overall capitalization rate is calculated with the band-of-investment technique, suppose that the following characteristics describe the subject property.

Available Loan	75% ratio, 7.0% interest, 25-year amortization period (monthly payment), 8.5% mortgage capitalization rate (R_M)
Equity Capitalization Rate	6.5% (derived from comparable sales)

The overall rate is calculated as follows:

R_O	=	$M \times R_M$	=	0.75×0.085	=	0.0638
	=	$+ E \times R_E$	=	$+ 0.25 \times 0.065$	= +	0.0163
					=	0.0801

Although this technique can be used to derive overall capitalization rates, the technique is only applicable when sufficient market data is available to estimate equity capitalization rates. A capitalization rate used to develop an opinion of market value should be justified and supported by market data, but sometimes this data is not available. When the available market data is scarce or not reliable, mortgage-equity techniques may be used to develop or test capitalization rates. Appraisers may develop information through interviews with market participants and from their own records. These indirect analyses are not substitutes for data from market sales of comparable properties, but they can lead to valuable insights and understandings. The mortgage yield rate (Y_M) should not be used in place of the mortgage capitalization rate (R_M), nor should an equity yield rate (Y_E) be substituted for an equity capitalization rate (R_E).

Derivation of R_O by Band of Investment—Land and Building

A band of investment formula can also be applied to the physical components of property–i.e., the land and the buildings. Essentially this methodology is the same as the mortgage-equity technique, except that the elements are the physical property components. Just as weighted rates are developed for mortgage and equity components in mortgage-equity analysis, weighted rates for the land and buildings can be developed if accurate rates for these components can be estimated independently and the proportion of total property value represented by each component can be identified. The formula is

$$R_O = (L \times R_L) + (B \times R_B)$$

where

L = land value as a percentage of total property value
R_L = land capitalization rate
B = building value as a percentage of total property value
R_B = building capitalization rate

As an example, assume the land represents 45% of the value of a property and the building represents the other 55%. The land capitalization rate derived from comparable sales data is 8.0%, and the building capitalization rate is 11.0%. The indicated overall rate is calculated as follows:

building capitalization rate (R_B)
The rate used in certain residual techniques or in a band of investment to convert building income into an indication of building value. The ratio of building income to building value.

land capitalization rate (R_L)
The rate used to convert land income into an indication of land value; the ratio of land income to land value.

debt coverage ratio (*DCR*)
The ratio of net operating income to annual debt service ($DCR = I_O / I_M$), which measures the relative ability of a property to meet its debt service out of net operating income; also called *debt service coverage ratio* (*DSCR*).

debt service (I_M)
The periodic payment, expressed on an annual basis, that covers the interest on, and for an amortizing loan the retirement of, the outstanding principal of a mortgage loan; also called *mortgage debt service*.

$$
\begin{array}{llrlrlr}
R_O & = & L \times R_L & = & 0.45 \times 0.08 & = & 0.0360 \\
 & = & \underline{+ B \times R_B} & = & \underline{+ 0.55 \times 0.11} & = & \underline{+ 0.0605} \\
 & & & = & & & 0.0965
\end{array}
$$

Land and building capitalization rates may be extracted by applying residual analysis to improved properties. (Land and building residual techniques are illustrated later in this chapter.)

Debt Coverage Formula

In addition to the traditional terms of lending–i.e., the interest rate, loan-to-value ratio, amortization term, maturity, and payment period–real estate lenders sometimes use another judgment criteria: the debt coverage ratio (*DCR*).[3] This is the ratio of net operating income to annual debt service (I_M), or the payment that covers interest on and retirement of the outstanding principal of the mortgage loan:

$$DCR = \frac{I_O}{I_M}$$

When lenders underwrite loans on income-producing property, they try to provide a cushion so that the borrower will likely be able to meet the debt service obligations on the loan even if property income declines. Lenders establish a debt coverage ratio as a matter of policy, which must be greater than 1.0 to cover debt service. More risky loans require a higher debt coverage ratio. For example, if a ratio of 1.20 is typical, a more risky loan may require a ratio of 1.50.

The debt coverage ratio can be multiplied by the mortgage capitalization rate and the loan-to-value ratio to arrive at an estimated overall rate for a property that is at stabilized occupancy. Lenders sometimes refer to overall capitalization rates developed using this method as *in-house capitalization rates*. The formula is

$$R_O = DCR \times R_M \times M$$

For a property with net operating income of \$50,000 and annual debt service of \$43,264, the debt coverage ratio is calculated as

$$
\begin{aligned}
DCR &= \frac{\$50{,}000}{\$43{,}264} \\
&= 1.1557
\end{aligned}
$$

3. James H. Boykin and Martin E. Hoesli, "An Argument for the Debt Coverage Method in Developing Capitalization Rates," *The Appraisal Journal* (October 1990): 558-566.

If R_M equals 0.085 and M is 0.75, R_O is estimated as

$$R_O = 1.1557 \times 0.085 \times 0.75$$
$$= 0.0737$$

Debt coverage ratio analysis is sometimes used as a check or test of reasonableness for a capitalization rate derived using another method.

Surveys

Various national real estate and research firms survey institutional investors periodically and publish the discount and capitalization requirements of those investors. The results of these surveys can give appraisers an overall picture of current return requirements (in contrast to historical performance data). Many appraisers survey investors and other market observers in their local markets to augment secondary survey data.

In the development of a capitalization rate, surveys are generally used as support rather than as primary evidence of a capitalization rate. Survey data obtained directly from subscription services often contains more comprehensive information about investment criteria and trends than information published in the trade press.[4] In judging the reliability of capitalization rate survey data, the appraiser may consider the following:

- the number and composition of survey participants
- the geographical location of each sector of the real estate market covered by the survey
- the category or product, grade or quality, and locational attributes of each sector of the real estate market surveyed
- how the measures of financial performance such as overall capitalization rates are derived
- whether reserves for replacement are included for R_O survey data
- the fact that surveys almost always represent leased fee capitalization rates

Appraisers who use rates published in national surveys should understand that the participants in the surveys may not represent typical real estate investors. Often these surveys reflect the opinions of institutional investors such as insurance companies, pension funds, and other big money equity investors. These investors will not have the same investment criteria as typical investors in small commercial and residential properties.

Residual Techniques

Residual techniques are based on the same basic premises that apply to direct capitalization rates. However, while an overall rate processes the entire net operating income into a value indication, the residual techniques

4. Tony Sevelka, "Where the Overall Cap Rate Meets the Discount Rate," *The Appraisal Journal* (Spring 2004): 135-146.

separate net operating income into various components. These include the income attributable to physical components (land and building residuals), financial components (mortgage and equity residuals), and legal components (leased fee and leasehold interests). Although these components can be appraised by applying yield capitalization techniques, in direct capitalization only the first year's net operating income for each component is included in the analysis. The application of residual techniques is only justified if the inferences on which the techniques are based are reasonable.

Regardless of which known and unknown (residual) components of the property are being analyzed, the appraiser starts with the value of the known items and the net operating income, as shown in Table 23.2. To apply a residual technique, an appraiser performs the following steps:

1. Apply an appropriate capitalization rate to the value of the known component to derive the annual income needed to support the investment in that component.
2. Deduct the annual income needed to support the investment in the known component from the net operating income to derive the residual income available to support the investment in the unknown component.
3. Capitalize the residual income at a capitalization rate appropriate to the investment in the residual component to develop the present value of this component.
4. Add the values of the known component and the residual component to derive a value indication for the total property.

Residual techniques allow an appraiser to capitalize the income allocated to an investment component of unknown value after other investment components of known value have been satisfied. They can be applied to the land and building components of property, to the mortgage and equity components, or to the leased fee and leasehold components but only when specific property information is available. The usefulness of the techniques in the income capitalization approach is extremely limited, but these techniques can be applicable in highest and best use analysis.

Prior to the publication of *The Ellwood Tables* in 1959, the physical residual techniques (land and building) were the dominant methods for valuing real estate. L. W. Ellwood's contribution to the income capitalization approach changed the practice of real estate appraisal in several ways:

- Prior to *The Ellwood Tables*, appraisers generally considered all market value transactions to reflect cash transfers between the buyer and the seller with no provision for financing. Ellwood recognized that most market transactions involved cash to the seller but were financed in part with some form of debt or other financial consideration on

residual techniques
Procedures used to capitalize the income allocated to an investment component of unknown value after all investment components of known values have been satisfied; may be applied to a property's physical components (land and building), financial interests (mortgage and equity), or legal components (leased fee and leasehold interests).

Table 23.2 Known and Unknown Variables in Residual Calculations

Residual Technique	Known	Unknown
Land residual	Net operating income (*NOI* or I_O) Building value (V_B) Building capitalization rate (R_B) Land capitalization rate (R_L)	Land or site value (V_L)
Building residual	Net operating income (*NOI* or I_O) Land or site value (V_L) Land capitalization rate (R_L) Building capitalization rate (R_B)	Building value (V_B)
Mortgage residual	Net operating income (*NOI* or I_O) Amount of equity (V_E) Equity capitalization rate (R_E) Mortgage capitalization rate (R_M)	Mortgage amount (V_M)
Equity residual	Net operating income (*NOI* or I_O) Mortgage amount (V_M) Mortgage capitalization rate (R_M) Equity capitalization rate (R_E)	Amount of equity (V_E)

the part of the buyer. His view was that each component–mortgage and equity–could be analyzed separately in the context of a given property.

- Ellwood promoted the simple understanding that choosing an alternate method–direct capitalization or yield capitalization–did not produce a different result. As long as market rates appropriate to the method were applied, the same result would be produced.
- Ellwood emphasized that the concept of the present worth of anticipated future benefits provides that if it is possible to construct a cash flow statement for any given time horizon, it is possible to use some form of discounting in the capitalization process. This realization permitted appraisers and investors to consider the anticipated benefits of a given property more precisely and to avoid using direct capitalization to analyze a single year's income, which might be less precise. Ellwood stated that "two years are better than just one" and even a five-year analysis is feasible for most income-producing properties.
- Until *The Ellwood Tables*, most appraisers focused on land and building components. Ellwood added the consideration of mortgage and equity components to provide another dimension to the analysis, not as a substitute.
- Ellwood did not limit his thinking to market value alone. Instead he provided an analytical framework in which specific anticipations or market expectations could be tested and the results applied to either opinions of market value or other aspects of property financial analysis.
- Although Ellwood is most often credited with adding new considerations to real property appraisal analysis, he also clarified, refocused, and brought new understanding to the fundamental appraisal methods

and techniques that had been applied for many years. In this way, he helped overcome errors and abuses in traditional appraisal practices and made the analysis more precise while adding new techniques.

The development of computerized discounted cash flow analyses in professional appraisal practice has largely supplanted the use of residual techniques, except when the data needed to apply more sophisticated techniques is not available. Today residual techniques are used primarily in specialized situations–e.g., in highest and best use analysis as a test of financial feasibility. Nevertheless, residual analysis techniques remain a fundamental component of appraisal theory, and well-rounded appraisers should be familiar with them.

Building Residual Technique

An appraiser who applies the building residual technique must be able to estimate land value independently. The technique is especially applicable when data on land values and land rents is available to establish land capitalization rates. The appraiser applies the land capitalization rate to the known land value to obtain the amount of annual net income needed to support the land value. Then this amount is deducted from the net operating income to derive the residual income available to support the investment in the building (or buildings). The appraiser capitalizes this residual income at the building capitalization rate to derive an indication of the present value of the building (or buildings). Finally, the land value and the building value are added to derive an indication of total property value.

For example, consider a small warehouse with an estimated land value of $200,000. Analysis of several sales of comparable sites reveals a land capitalization rate of 6.5% and a building capitalization rate of 10%. The net operating income of the subject property is estimated to be $67,500. Using the building residual technique, the value of the subject property is calculated as follows:

Estimated Land Value		$200,000
Net Operating Income	$67,500	
Less Income Attributable to Land		
Land Value × R_L ($200,000 × 0.065)	– $13,000	
Residual Income to Building	$54,500	
Building Value (capitalized: $54,500 ÷ 0.10)		+ $545,000
Indicated Property Value		$745,000

This technique is simple, but its applicability and usefulness are extremely limited. Depending on the particular market, the building residual technique may or may not reflect the way purchaser-investors regard investment real estate. However, if the required data is available, the building residual technique can be used to value properties with improvements that have suffered substantial depreciation. In fact, current reproduction or replacement cost minus the present value of the improvements provides an estimate of total depreciation. In addition, the building residual technique directly measures the contribution of the improvements to total property value, so it can help an appraiser determine when demolition or major renovation of property improvements is economically feasible or, if appropriate, help establish the tax basis for depreciation of the improvements.

building residual technique
A capitalization technique in which the net operating income attributable to improvements is isolated and capitalized by the building capitalization rate (R_B) to indicate the improvements' contribution to total property value. When the improvements' value is added to land value, a total property value opinion is produced.

land residual technique
A method of estimating land value in which the net operating income attributable to the land is capitalized to produce an indication of the land's contribution to the total property.

Land Residual Technique

The land residual technique calls for a separate estimation of the value of the building (or buildings). In land residual applications, an appraiser will often consider a new highest and best use assuming a building that does not exist. In this application, building value is usually estimated as the current cost to construct a new building that represents the highest and best use of the site.

The building capitalization rate is applied to the building value to obtain the amount of annual net income needed to support the value of the building. This amount is then deducted from net operating income to indicate the residual income available to support the investment in the land. The residual income is capitalized at the land capitalization rate to derive an indication of the value of the land. Finally, the building value is added to the land value to derive an indication of total property value.

Using the same data used in the building residual example but assuming that building value rather than land value is known, the problem is calculated from the opposite viewpoint. The land and building capitalization rates derived from the market are applied to the subject property as follows:

Estimated Building Value		\$545,000
Net Operating Income	\$67,500	
Less Income Attributable to the Building		
Building Value × R_B (\$545,000 × 0.10)	− \$54,500	
Residual Income to Land	\$13,000	
Land Value (capitalized: \$13,000 ÷ 0.065)		+ \$200,000
Indicated Property Value		\$745,000

The land residual technique allows an appraiser to estimate land values when recent data on land sales is not available. In practice, the technique is used often to test the highest and best use of the land or site for proposed construction. It can also be used to provide a value indication for new structures that do not suffer from depreciation. The land residual technique is less applicable when the cost to produce a new building is inconsistent with the amount of value such a building would contribute to property value.

Land and building residual techniques should be used with extreme care because small changes in the assumptions made can often have a significant influence on value indications.

Equity Residual Technique

To apply the equity residual technique, an appraiser deducts annual debt service from net operating income to obtain the residual income to the equity interest. The annual debt service is calculated based on mortgage loan terms typically available in the market.

To derive an equity capitalization rate from the market, the appraiser may apply the following process:

Net Operating Income	\$60,000
Less Mortgage Debt Service	
\$375,000 loan, 7.0% interest, 25-year term	
\$375,000 × 0.08481* =	− \$31,804
Residual Income to Equity	\$28,196
Equity Investment (known)	\$212,000
Equity Capitalization Rate	
\$28,196 / \$212,000	13.3%

* Annual constant (R_M) for monthly loan payment from precomputed tables. A financial calculator or computer can also be used to calculate the annual constant.

For a similar property with comparable characteristics, the 13.3% equity capitalization rate can be divided into the equity income to develop an indication of equity value. When equity value is added to the mortgage amount, an indication of property value is produced. The results derived in applying the equity residual technique can also be used in the band-of-investment method.

Mortgage Residual Technique

When the mortgage residual technique is applied, the amount of available equity is the known component and the mortgage amount or value is unknown. The income needed to satisfy the equity component at the equity capitalization rate is deducted from the net operating income to obtain the residual income to the mortgage component. The residual mortgage income is then capitalized into value at the mortgage capitalization rate. The preceding example of equity residual capitalization can be approached from the opposite side of the equation to illustrate mortgage residual technique calculations:

Available Equity		\$212,000
Net Operating Income	\$60,000	
Less Equity Requirement		
Equity × R_E (\$212,000 × 0.133)	− \$28,196	
Residual Income to Mortgage	\$31,804	
Mortgage Value		
(capitalized: \$31,804 ÷ 0.08481)		+ \$375,000
Indicated Property Value		\$587,000

The mortgage residual technique works as a mathematical process, but it does not follow the customary logic of market participants. Its most common use is in determining the amount of mortgage available and the associated value requirement. For example, an investor with a certain amount of equity and a given set of mortgage terms could apply the mortgage residual technique to determine how much to pay for a property. However, the technique is based on the premise that the amount of money the equity investor is willing to invest in the property has already been determined and that the investor requires a specified equity capitalization rate from the property. This implies that the loan amount depends on the residual cash flow available for mortgage debt service and the mortgage capitalization rate. Lenders generally will not make a loan unless net operating income exceeds the mortgage debt service by a specified amount. Also, once the loan is made, the lender has the legal right to receive the agreed-upon debt service, but any residual cash flow goes to the equity investor. Even with below-market loans, the equity investor receives the income remaining after payment of the contract interest. Thus, the mortgage residual technique does not necessarily reflect market behavior and would not normally be appropriate for estimating the value of a property subject to a specific mortgage.

Leased Fee and Leasehold Residuals

Theoretically, the leased fee and leasehold components of value can be derived using residual techniques, although the assumption that the sum of the values of the leasehold and the leased fee equals the value of the fee simple estate has not historically been supported by market data. As a result, leased fee and leasehold residuals are of dubious usefulness. The remaining term of a lease, the creditworthiness of the tenants, the influence of atypical lease clauses and stipulations, and other factors can affect the value of the sum of the parts, causing the sum to be less than or greater than the value of the fee simple estate.

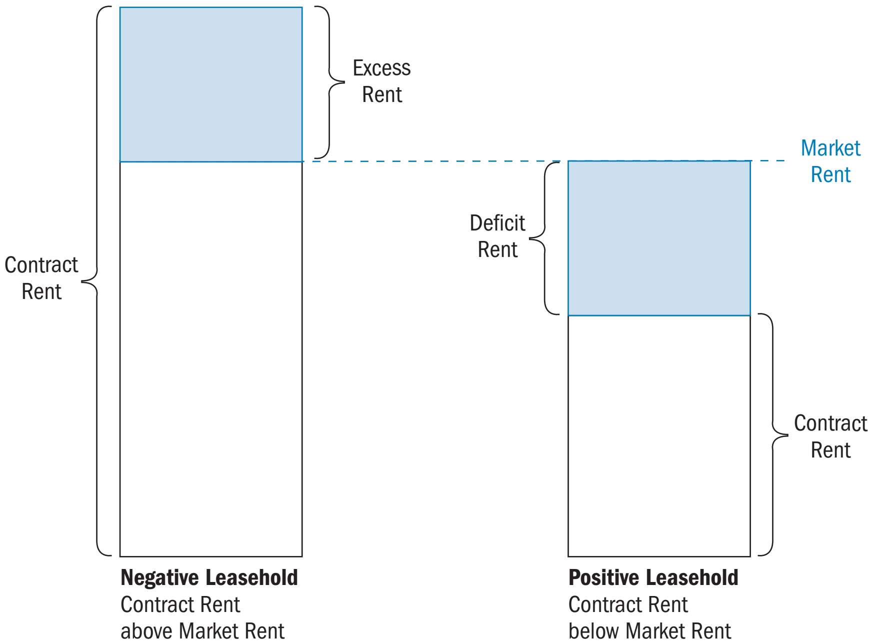
The value of the leased fee estate represents the owner's interest in the property. The benefits that accrue to an owner of a leased fee estate generally consist of income throughout the lease term and the reversion at the end of the lease.

The market value of a leasehold interest depends on how contract rent compares to market rent, as shown in Figure 23.1. A leasehold interest may acquire value if the lease allows for subletting and the term is long enough so that market participants will pay something for the advantageous lease.

When analyzing a leasehold interest, it is essential that the appraiser analyze all of the economic benefits or disadvantages created by the lease. An appraiser should ask the following questions:

- What is the term of the lease?
- What is the likelihood that the tenant will be able to meet all of the rental payments on time?
- Are the various clauses and stipulations in the lease typical of the market, or do they create special advantages or disadvantages for either party?
- Is either the leased fee interest or the leasehold interest transferable, or does the lease prohibit transfers?

Figure 23.1 Positive and Negative Leasehold Interests



- Is the lease written in a manner that will accommodate reasonable change over time, or will it eventually become cumbersome to the parties?

A residual calculation of leasehold or leased fee value is most often appropriate in the case of a below-market lease. In that situation, the value indication derived in the cost approach serves as an indication of the value of the fee simple estate, and subtracting the capitalized rent loss allows the value indication to be allocated between leased fee and leasehold components. Alternatively, the sales comparison approach can be used to estimate the value of the leased fee estate if the comparable sales have similar below-market rates and are therefore already value indications for leased fee estates. Similarly, leased fee capitalization rates can be extracted from comparable sales with similar below-market rents.

Using direct capitalization techniques, a below-market contract rent can be capitalized at a leased fee capitalization rate derived from comparable sales with similar below-market lease characteristics. Then the market rent can be capitalized using a rate derived from comparable sales with market-rate (or near-market) leases, and the value indication can be adjusted for the below-market lease.

Leasehold capitalization rates are difficult to derive and can be sensitive to lease characteristics. As a result, leasehold estates are usually valued using discounted cash flow analysis instead of direct capitalization.

An appraiser cannot simply assume that each of the interests created by the lease has market value. Many leases create no separate value for the tenant. For example, when the tenant cannot or will not pay the rent, the market value of the leased fee estate may be reduced to an amount less than the market value of a comparable property that is unleased or a comparable property leased to a more reliable tenant at below-market terms.

Gross Income Multipliers and Gross Rent Multipliers

Gross income multipliers (*GIM*s) are used to compare the income-producing characteristics of properties, most often small residential income properties. Potential or effective gross income can be converted into an opinion of value by applying the relevant gross income multiplier. This method of capitalization is mathematically related to direct capitalization because rates are the reciprocals of multipliers or factors. Therefore, it is appropriate to discuss the derivation and use of multipliers under direct capitalization.

To derive a gross income multiplier from market data, sales of properties that were rented at the time of sale or were anticipated to be rented within a short time must be available. The ratio of the sale price of a property to its known gross income at the time of sale or its projected income over the first year of ownership is the gross income multiplier. Gross income multipliers are typically calculated on an annual basis.

Appraisers who attempt to derive and apply gross income multipliers for valuation purposes must be careful for several reasons. First, the properties analyzed must be comparable to the subject property and to one another in terms of physical, locational, and investment characteristics. Properties with similar or even identical multipliers can have very different operating expense ratios and, therefore, may not be comparable for valuation purposes.

Second, the term *gross income multiplier* is used because some of the gross income from a property or type of property may come from sources other than rent. A gross rent multiplier applies to rental income only and can be calculated on a monthly or annual basis, consistent with market practices.

Third, the appraiser must use similar income data to derive the multiplier for each transaction. For example, gross income multipliers extracted from full-service rentals would not be applied to a subject property leased on a net basis. The sale price can be divided by either the potential or effective gross income, but the data and measure must be used consistently throughout the analysis to produce reliable results. Different income measures may be used in different valuation studies and appraisals, however. The income measure selected is dictated by the availability of market data and the purpose of the analysis.

> The application of income multipliers is a direct capitalization procedure. In developing an income or rent multiplier, it is essential that the income or rent of the properties used to derive the multiplier be comparable to that of the subject and that the specific multiplier derived be applied to the same income base.

Experienced appraisers understand that gross income multipliers and effective gross income multipliers are sensitive valuation tools. Small differences in each may have a great effect on the resulting value indications.

To illustrate the difference between various gross income multipliers, the following calculations are made using data for Sale A shown in Table 23.1. Note that the potential gross income for Sale A was indicated to be \$85,106 and the effective gross income was \$80,000.

$$\text{Potential Gross Income Multiplier} = \frac{\text{Sale Price}}{\text{Potential Gross Income}}$$

$$= \frac{\$368{,}500}{\$85{,}106}$$

$$= 4.33 \text{ (rounded)}$$

$$\text{Effective Gross Income Multiplier} = \frac{\text{Sale Price}}{\text{Potential Gross Income}}$$

$$= \frac{\$368{,}500}{\$80{,}000}$$

$$= 4.61 \text{ (rounded)}$$

After the gross income multiplier is derived from comparable market data, it must be applied on the same basis it was derived. In other words, an income multiplier based on effective gross income can only be applied to the effective gross income of the subject property. Similarly, an income multiplier based on potential gross income can only be applied to the potential gross income of the subject property. The timing of income also must be comparable. If sales are analyzed using next year's income expectation, the multiplier derived must be applied to next year's income expectation for the subject property.

Yield Capitalization

Yield capitalization is the more complex of the two fundamental methods used in the income capitalization approach to value. Within this methodology, various techniques are available for converting a series of future cash flows received over time into an indication of value.

Yield capitalization is used to convert future benefits into an indication of present value by applying an appropriate discount rate. To select an appropriate discount rate for a market value appraisal, an appraiser analyzes market evidence of the yields anticipated by typical investors, supported by market sales data, or both. When investment value is sought, the discount rate used should reflect the individual investor's requirements, which may differ from the requirements of typical investors in the market.

> Yield capitalization is used to convert future benefits, typically a periodic income stream and reversion, into present value by discounting each future benefit at an appropriate rate or by applying an overall rate (developed using one of the yield capitalization methods) that explicitly reflects the investment's income pattern, change in value, and yield rate.

To perform yield capitalization, an appraiser

1. Selects an appropriate projection period
2. Forecasts all future cash flows or cash flow patterns (including the reversion, if any)
3. Chooses an appropriate yield (or discount) rate
4. Converts future benefits into present value by discounting each annual future benefit or by developing an overall rate that reflects the income

pattern, value change, and yield rate using one of the various yield capitalization formulas

The application of capitalization rates that reflect an appropriate yield rate, the use of present value factors, and discounted cash flow analysis are all yield capitalization procedures. Mortgage-equity formulas and yield rate or value change formulas may be used to derive overall capitalization rates.

Like direct capitalization, yield capitalization should reflect market behavior. To apply the discounting procedure, appraisers must be familiar with the following concepts and techniques:

- income patterns
- capital return concepts
- the mathematics of the discounting process
- investor requirements or expectations–i.e., projection period, anticipated market growth, and inflation
- the selection of an appropriate discount rate

Discounting

Discounting is a general term used to describe the process of converting future cash flows into a present value. The discount rate is the rate used for the discounting process and may be a property yield rate, equity yield rate, or some other defined rate. In real estate appraisal practice, the most common methodology for valuing the total bundle of rights is the property yield rate (Y_O).

In the discounting process, periodic incomes and the reversion, if any, are converted into present value through discounting, which is based on the concept that benefits received in the future are worth less than the same benefits received today. The return on an investment compensates the investor for foregoing present benefits–i.e., the immediate use of capital–and accepting future benefits and risks. This return is usually called *interest* by lenders and *yield* by property owners and equity investors. The discounting procedure includes the expectation that the return of capital will be accomplished through periodic income, the reversion, or a combination of the two.

An investor seeks a total return that exceeds the amount invested. The present value of a prospective benefit must be less than its expected future benefits. A future payment is discounted to present value by calculating the amount that, if invested today, would grow with compound interest at a satisfactory rate to equal the future payment. The standard formula for discounting future value to present value is

$$\text{Present Value} = \frac{\text{Future Value}}{(1 + i)^n}$$

where i is the rate of return on capital per period (or the discount rate) that will satisfy the investor and n is the number of periods that the payment will be deferred. If a series of future payments is expected, each payment is discounted with the standard formula, and the present value of the payments is the sum of all the present values.

In discounting calculations, the amount paid (e.g., a loan payment to a lender) or received (e.g., a rent payment from a tenant) can be in the form of a single lump sum, a series of periodic installments such as rental income, or a combination of both. When income amounts are compounded or discounted, the rate used is the effective yield rate. On an annual basis, this rate is identical to the nominal yield rate. If income amounts are compounded or discounted more often than annually–e.g., semiannually or monthly–the nominal yield rate is divided by the number of compounding or discounting periods. For example, a nominal annual yield rate of 12% is an effective yield rate of 6% for semiannual conversion periods, or an effective yield rate of 1% for monthly conversions. Standard tables of factors, financial calculators, and computers can be used to facilitate the application of factors, but the user must select the appropriate conversion frequency–i.e., monthly, quarterly, or annually.

discounted cash flow (DCF) analysis
The procedure in which a discount rate is applied to a set of projected income streams and a reversion. The analyst specifies the quantity, variability, timing, and duration of the income streams and the quantity and timing of the reversion, and discounts each to its present value at a specified yield rate.

All present value problems consider the following:

1. The starting cost, value, or investment amount
2. The amount and timing of the periodic cash flows over time
3. The reversion or resale value
4. The yield rate that equates the cash flows and reversion to the starting value[1]
5. The amount of time (number of periods) between the initial cash flow and the reversion

Because each individual cash flow is considered separately, a discounted cash flow (DCF) analysis can be used to solve any problem when three of the factors are known.

In discounted cash flow analysis, the yield formula is expressed as

$$PV = \frac{CF_1}{1+Y} + \frac{CF_2}{(1+Y)^2} + \frac{CF_3}{(1+Y)^3} + \dots + \frac{CF_n}{(1+Y)^n}$$

where

PV = present value

CF = the cash flow for the period specified

Y = the appropriate periodic yield rate

n = the number of periods in the projection

1. In discounted cash flow analysis, a *yield rate* is usually an output, while a *discount rate* is usually an input. The terms tend to be used synonymously, but there is a subtle difference. A *discount rate* is applied to an income stream to calculate present value. That is, the income stream and discount rate are known, while *PV* is the unknown variable that is solved for. A *yield rate* is the rate that equates an income stream to a present value. In other words, the present value and income stream are known, whereas the yield rate is the unknown that is solved for.

cash flow
The periodic income attributable to the interests in real property

This standard discounting procedure is the foundation for all present value calculations.[2]

In DCF analysis, the quantity, variability, timing, and duration of cash flows are specified. In the formula, *cash flow* refers to the periodic income attributable to the interests in real property. Each cash flow is discounted to present value and all the present values are totaled to obtain the value of the real property interest being appraised. The future value of that interest–the reversion–is forecast at the end of the projection period and is also discounted. The cash flows discounted with the DCF process may be the net operating income to the entire property or the cash flows to specific interests–e.g., the cash flows to the equity interest (equity dividends) or debt service for the mortgage interest.

With the DCF process an appraiser can discount each payment of income and the reversion separately and add all the present values together to obtain the present value of the property interest being appraised. The formula treats the reversion as a cash flow that can be valued separately from the income stream. The formula can be used to develop opinions of

- total property value (V_O)
- loan value (V_M)
- equity value (V_E)
- leased fee value (V_{LF})
- leasehold value (V_{LH})
- the value of any other interest in real property

Projection Period and Holding Period

The *holding period* of an investment is defined as the term of ownership of the investment, whereas the *projection period* is a presumed period of ownership. In other words, the projection period is a period of time over which expected net operating income is projected for purposes of analysis and valuation. Although these terms are often used interchangeably, appraisers are more often concerned with the projection period applicable to the analysis in question. In some markets, the term *designated investment period* is used.

The projection period may vary with the investment and investor. The appraiser usually estimates a projection period that is consistent with investor expectations developed through surveys and interviews. In the selection of an appropriate projection period, the appraiser should consider lease expirations, vacancies, rollovers, anticipated capital improvements, and other atypical events that may cause cash flow aberrations.

Risk increases as the projection period of an investment increases for several reasons:

- Maintenance costs increase as a building ages.
- Remaining economic life declines as a building ages.
- Functional issues relating to competition from newer properties may force a property into a lower investment category.
- In general, as forecasts look farther into the future, the conclusions become less certain.

2. For formulas, tables, and sample applications of the six functions of one, see Appendix C.

Any series of periodic incomes, with or without a reversion, can be valued with the basic DCF formula. A wide range of formulas are available for valuing level annuities and increasing and decreasing annuities, which are introduced later in this chapter. These formulas have two benefits. First, they can be used as shortcuts to solve for property value, although if used as shortcuts they may be harder for the appraiser to explain and for the client to understand. Second, and more importantly, they provide a systematic method to evaluate real estate and the interactions of current value, income flows, and future value in a single problem-solving framework.

Most often financial calculators or computer spreadsheets are used to solve discounting problems mathematically. To apply compounding or discounting procedures, the appraiser must know

- the basic formulas
- how the various factors relate to one another
- how they may be used or combined to apply yield capitalization and develop an indication of value

Spreadsheets and standardized tables and factors are useful in solving various yield capitalization problems. However, in the final analysis, an opinion of value and conclusions about time, amount, and yield reflect the appraiser's judgment based on appropriate research of the subject property and relevant market data.

Estimation of a Yield Rate for Discounting

The estimation of an appropriate yield rate is critical to DCF analysis. To select an appropriate yield rate, an appraiser must verify and interpret the attitudes and expectations of market participants, including buyers, sellers, advisers, and brokers. Although the actual yield, or internal rate of return, on an investment cannot be calculated until the investment is sold, an investor may set a target yield for the investment before or during ownership. Historical yield rates derived from comparable sales may be relevant, but they reflect past, not future, benefits in the mind of the investor and may not be reliable indicators of the current required yield. Therefore, the estimation of yield rates for discounting cash flows should focus on the prospective or forecast yield rates anticipated by typical buyers and sellers of comparable investments. An appraiser can verify investor expectations by interviewing the parties to comparable sales transactions or reviewing offering materials for comparable properties recently offered for sale.

An appraiser narrows the range of indicated yield rates and selects an appropriate yield rate by comparing the physical, economic, financial, and risk characteristics of the comparable properties with the property being appraised and assessing the competition for capital in rival investments. In some situations, there may be reason to select a yield rate above or below the indicated range. The final estimation of a yield rate requires judgment, just as an appraiser uses judgment to select an overall capitalization rate or equity capitalization rate from the range indicated by comparable sales. In selecting a yield rate, the appraiser should analyze current conditions in capital and real estate markets and the actions, perceptions, and expectations of real estate investors.

Different Rates

Yield rates are primarily a function of perceived risks. Different portions of forecast future income may have different levels of risk and therefore different yield rates.[3] In lease valuation, for example, one rate might be applied to discount the series of net rental incomes stipulated in the lease, and a different rate might be applied to discount the reversion, which is known as the *split-rate method* or *bifurcated method*. One rate reflects the creditworthiness of the tenant as well as the benefits, constraints, and limitations of the lease contract, while the other is subject to free, open-market conditions. The decision to apply a single yield rate to all benefits or to apply different rates to different benefits should be based on investors' actions in the market and the method used to extract the yield rate. In all cases, the yield rate should be applied in the same way it was extracted.

Income Stream Patterns

After specifying the amount, timing, and duration of the cash flows to the property interest being appraised, the appraiser should identify the pattern that the income stream is expected to follow during the projection period. These patterns may be grouped into the following basic categories:

- variable annuity (irregular income pattern)
- level annuity
- increasing or decreasing annuity

The Nature of Annuities

Although the word *annuity* means an annual income, the term is used to refer to a program or contract specifying regular payments of stipulated amounts. Payments need not be annual, but the interval between payments is usually regular. An annuity can be level, increasing, or decreasing, but the amounts must be scheduled and predictable. Income characterized as an annuity is expected at regular intervals and in predictable amounts. Obviously real estate income or rental income can have the characteristics of an annuity. Monthly mortgage payments are perhaps the best example of an annuity. The pattern of income expected from a real estate investment may be regular or irregular. Various capitalization techniques have been developed to apply to a wide range of income patterns.

3. When future events that could profoundly influence the income-producing potential of a property may or may not occur, probability analysis may be appropriate. Probability analysis is frequently required when properties are subject to potential environmental hazards and compliance with environmental regulations is pending. For example, a site may require an undetermined level of environmental remediation, the remediation required may or may not be completed within a given time frame, or the environmental regulations governing the remediation may be modified. In those situations, probability analysis can help an appraiser develop a yield rate.

Variable Annuity: Nonsystematic Change

In a variable annuity, payment amounts may vary in each period. To value a variable annuity, the present value of each income payment is calculated separately and these values are totaled to obtain the present value of the entire income stream. This procedure is discounted cash flow analysis.

Any income stream can be valued as if it were a variable annuity. Level annuities and annuities that change systematically are subsets or regular patterns of income that can also be handled with special formulas that reflect the systematic pattern of the income stream. These shortcut formulas can save time and effort in certain cases, but valuing an income stream as a variable annuity with a calculator or computer program may be easier and will result in the same conclusion.

variable annuity
An income stream in which the payment amounts vary per period.

level annuity
An income stream in which the amount of each payment is the same; a level, unchanging flow of income that occurs at regular intervals over time.

ordinary annuity
A type of annuity in which cash flows are paid at the end of each period; also known as an *annuity in arrears*.

annuity payable in advance
A type of annuity in which cash flows are paid at the beginning of each period; also known as an *annuity due*.

Level Annuity

A level annuity is an income stream in which the amount of each payment is the same. It is a level, unchanging flow of income over time. The payments in a level annuity are equally spaced and regularly scheduled. Level annuities can be discounted in the same manner as variable annuities. However, compound interest tables simplify the calculation for level income patterns, while providing an identical result. There are two types of level annuities:

- ordinary annuities
- annuities payable in advance

Ordinary Annuity

An ordinary annuity, which is the most common type of level annuity, is distinguished by income payments that are received at the end of each period, often referred to as "in arrears." Standard fixed-payment mortgage loans, many corporate and government bonds, endowment policies, and certain lease arrangements are ordinary annuities.

Annuity Payable in Advance

An annuity payable in advance is a level annuity in which the payments are received at the beginning of each period. A lease that requires payments at the beginning of each month, like most apartment leases, creates an annuity payable in advance.

increasing annuity
An income stream of evenly spaced, periodic payments that is expected to increase in a systematic pattern.

step-up or step-down annuity
A type of increasing or decreasing annuity, usually created by a lease contract that calls for a succession of level annuities of different amounts to be paid in different periods of the lease term.

straight-line change per period
Refers to a type of annuity or income/property model that increases or decreases by a fixed amount per period; also called *constant amount change per period.*

exponential-curve (constant-ratio) change per period
Refers to a type of annuity or income/property model that increases or decreases at a constant ratio and, as a result, the increases or decreases are compounded.

Increasing or Decreasing Annuity

An income stream that is expected to change in a systematic pattern is either an increasing annuity or a decreasing annuity. Appraisers encounter three basic patterns of systematic change:

- step-up and step-down annuities
- straight-line (constant-amount) change per period annuities
- exponential-curve (constant-ratio) change per period annuities

Step-Up and Step-Down Annuities

A step-up or step-down annuity is usually created by a lease contract that calls for a succession of level annuities of different amounts to be paid in different periods of the lease term. For example, a lease might call for monthly payments of $500 for the first three years, $750 for the next four years, and $1,200 for the next six years. Over the 13-year term of the lease, there are three successive level annuities–one for three years, one for four years, and one for six years.

Straight-Line (Constant-Amount) Change per Period Annuity

An income stream that increases or decreases by a fixed amount each period fits the pattern of a straight-line (constant-amount) change per period annuity. These income streams are also called *straight-line increasing or straight-line decreasing annuities.* For example, a property may have an estimated first-year net operating income of $100,000 that is forecast to increase by $7,000 per year. Thus, the second year's net operating income will be $107,000, the third year's net operating income will be $114,000, and so forth. Similarly, the income stream of a straight-line decreasing annuity is expected to decrease by a constant amount each period.

Exponential-Curve (Constant-Ratio) Change per Period Annuity

An income stream with an exponential-curve (constant-ratio) change per period is also referred to as an *exponential annuity.* This type of income stream increases or decreases at a constant ratio and therefore the increases or decreases are compounded. For example, a property with an estimated first-year net operating income (I_O) of $100,000 that is forecast to increase 7% per year over each preceding year's cash flow will have an I_O in the second year of $107,000 ($100,000 × 1.07). However, the third year's I_O will be $114,490 ($107,000 × 1.07) and the fourth year's I_O will be $122,504 ($114,490 × 1.07).

Reversion

terminal capitalization rate (R_N)
The capitalization rate applied to the expected net income for the year immediately following the end of the projection period to derive the resale price or value of a property. Also called a *going-out*, *residual*, or *reversionary capitalization rate*.

balloon payment
The outstanding balance due at the maturity of a balloon mortgage.

As mentioned previously, income-producing properties typically provide two types of financial benefits–periodic income and the future value obtained from sale of the property or reversion of the property interest at the end of the projection period. The length of the projection period can usually be determined by reviewing the property's lease expiration dates or other significant, atypical events. The length of the projection period and the discount rate are interactive. Generally, the longer the projection period, the greater the risk and the higher the discount rate. This future cash flow is called a *reversion* because it represents the anticipated return of a capital sum at the end of the investment.

There are several ways to estimate a resale price or property reversion. A capitalization rate can be applied to the appropriate income for the year following the end of the forecast. When an overall capitalization rate is used to estimate a resale price, it is called a *terminal*, *going-out*, *exit*, or *residual capitalization rate* (R_N). This rate is different from the *going-in capitalization rate*–which is the overall capitalization rate found by dividing a property's net operating income for the first year after purchase by the present value of the property. The terminal, or residual, capitalization rate forecast is generally, though not necessarily, higher than the going-in capitalization rate. The terminal capitalization rate must reflect the reduction in the remaining economic life of the property and the greater risk associated with estimating net operating income at the end of the projection period. The balance of the mortgage could then be deducted from the resale price or property reversion to calculate the owner's net sale proceeds, or equity reversion, if an equity yield analysis is being performed.

A single property may include one or more property interests that have their own streams of periodic benefits and reversions. For example, a property may have an equity interest with equity cash flow as the periodic benefit and the equity reversion–i.e., property reversion minus the mortgage balance at loan maturity or property resale–as the reversionary benefit. The same property could have a mortgage with debt service as the periodic benefit and the mortgage balance (called a *balloon payment*) as the reversionary interest. A single property may also comprise both building and land components, e.g., a long-term ground lease as well as building improvements.[4]

The reversion is often a major portion of the total benefit to be received from an investment in income-producing property. If the investor's capital is not recaptured through some combination of cash flow

4. In situations involving long-term ground leases where the objective is to value the leasehold estate in the building, annual ground rent should be deducted before capitalizing the net operating income attributable to the leasehold estate.

net proceeds of resale
The net difference between the transaction price and the selling expenses of a property; refers to the property's reversion.

and reversion proceeds, the effective rate of return on the investment will be negative. For certain investments, all capital recapture is accomplished through the reversion, generally indicating higher risk. For other investment properties, part of the recapture is provided by the reversion and part is provided by the investment's income stream.

To judge how much of the return of an investment will be provided by the reversion, an appraiser acknowledges that three general situations could result from the original investment.

1. The property may increase in value over the projection period.
2. The property's value may not change–i.e., the value of the property at the end of the projection period may be equal to its value at the beginning of the period.
3. The property may decline in value over the period being analyzed.

Because these possible outcomes affect the potential yield of the investment and the amount of income considered acceptable, yield capitalization requires the appraiser to determine market expectations as to the change, if any, that will occur in the original investment or the property value over the projection period. (For leveraged investments, equity build-up may also occur through periodic debt service payments that include amortization.)

When a property is expected to be sold, the appraiser projects the reversion amount and considers the net proceeds of resale. The term *net proceeds of resale* refers to the net difference between the transaction price and the selling expenses, which may include brokerage commissions, legal fees, closing costs, transfer taxes, and possibly penalties for the prepayment of debt. The transaction price should be carefully analyzed to determine if costs of repair, capital improvements, and environmental remediation, if any, have been appropriately reflected. The transaction price may have to be adjusted to reflect extraordinary costs incurred by either party.

An appraiser establishes the likely value of the reversion in light of the expectations of investors in the market for the type of property being appraised. The appraiser may ask

- Do investors expect a change in the value of this type of property in this particular locale?
- By how much will values change and in which direction?

The appraiser analyzes and interprets the market and estimates the value of the future reversion based on the direction and the amount or percentage of change that investors expect. The use of personal computers and software to perform lease-by-lease analysis allows appraisers to make more accurate forecasts of future cash flows, which help them establish or estimate the reversion.

Discounting Models

Specific valuation formulas, called *income models* and *property models*, have been developed to solve and explain specific patterns of benefits without the need for a comprehensive DCF calculation.

The present value of any increasing, level, or decreasing income stream or of any irregular income stream can be calculated with DCF analysis. Specific valuation models or formulas, categorized as either income models or property models, have been developed for application to corresponding patterns of projected benefits.

Income models can be applied only to a stream of income. The present value of an expected reversion or any other benefit not already included in the income stream must be added to obtain the investment's total present value. When a property model is used, an income stream and a reversion are valued in one operation. Other present value models employ discounted cash flow analysis, which is discussed in Chapter 25.

Income Models

Valuation models can be applied to the following patterns of income:

- variable or irregular income
- level income
- straight-line (constant-amount) change per period income (i.e., the *J* factor)
- exponential-curve (constant-ratio) change per period income (i.e., the *K* factor)
- level-equivalent income

These models are not necessarily real estate- or property-specific, but they can be used to solve a variety of financial asset valuation problems that involve real estate.

Variable or Irregular Income

As mentioned previously, a discounting process or formula can be used to solve any present value problem. The present value of an uneven stream of income is the sum of the discounted benefits treated as a series of separate payments or reversions. This model simply totals all present values using the standard discounting formula. The routine can be applied as a property valuation model or an income valuation model because it can be adapted to include the final reversion as part of the final cash flow expected at the end of the last, or *n*th, period.

Level Income

When a lease provides for a level stream of income or when income can be projected at a stabilized level, one or more capitalization procedures may be appropriate depending on the investor's capital recovery expectations. Capitalization can be accomplished using what is known as *capitalization in perpetuity*. (No income stream is perpetual, but for the purposes of the analysis it is considered to be unchanged for the defined life of the improvements.) In the past, some appraisers calculated the present worth of an income stream using the Inwood premise or the Hoskold premise, which are discussed in Appendix C.[5]

Capitalization in perpetuity can be considered a property valuation model or an income valuation model. If, for example, a property is expected to generate level net operating income for a finite period of time and then be resold for the original purchase price, the property could be valued with capitalization in perpetuity simply by dividing the expected periodic income by an appropriate discount rate. In this model the discount rate and the overall capitalization rate are the same because the original investment is presumed to be recovered at the termination of the investment.

Straight-Line (Constant-Amount) Change per Period in Income

When income is expected to increase or decrease by a fixed amount per period, the periodic income over time can be graphically portrayed as a straight line. Thus, the term *straight-line* is used to describe this type of income pattern.

To obtain the present value of an annuity that has a starting income of d at the end of the first period and increases or decreases h dollars (or other unit of currency) per period for n periods, the following equation is used:

$$PV = (d + hn)\, a_{\overline{n}|} - \frac{h(n - a_{\overline{n}|})}{i}$$

where $a_{\overline{n}|}$ is the present value of $1 per period at a rate of i for n periods. In the formulas, h is positive for an increase and negative for a decrease.

The formula for valuing straight-line income patterns should not be confused with direct capitalization with straight-line recapture. Although direct capitalization with straight-line recapture may be seen as a model for valuing a particular income stream, the procedure can also be applied to properties in which the expected change in value is commensurate with the expected change in income. Therefore, direct capitalization with straight-line recapture and related concepts are discussed with property models later in this chapter. Again, the formula above for valuing straight-line income patterns applies to income streams only. Special tables of present value factors based on the formula are available.[6]

Exponential-Curve (Constant-Ratio) Change per Period in Income

The constant-ratio model represents an income pattern that increases or decreases at the same rate per period. Many real estate income streams are anticipated to increase following a pattern close to the constant-ratio premise, although typically on a short-term basis. Portrayed graphically, this type of income stream follows an exponential curve rather than a

5. Over time, the Hoskold premise has become less popular and rarely reflects the thinking of real estate investors. It is now considered appropriate only for certain types of investments, e.g., in calculating the replacement allowance for leasing equipment or personal property. A Hoskold capitalization rate can be easily constructed by adding the speculative rate to the sinking fund factor for the safe rate, e.g., the prevailing rate for insured savings accounts or government bonds.

6. See James J. Mason, ed. and comp., *American Institute of Real Estate Appraisers Financial Tables*, rev. ed. (Chicago: American Institute of Real Estate Appraisers, 1982), Table No. 5, Ordinary Annuities Changing in Constant Amount; and Charles B. Akerson and David C. Lennhoff, ed., *Capitalization Theory and Techniques Study Guide*, 3rd ed. (Chicago: Appraisal Institute, 2009) for keystrokes.

straight line. This income pattern is sometimes referred to as *changing at a compound rate*. Analysis of exponential-curve change is primarily accomplished with computers.

Level-Equivalent Income

All non-level income streams can be converted into a level-equivalent pattern. This is particularly useful when the assignment requires that the conclusion be expressed as a level income amount but the market is performing on a non-level basis. In most markets, leases include a provision for increases over time, usually in relation to an index such as a consumer price index (CPI). Therefore, in such a case the appraiser needs to first estimate the rent as it is found in the market, and then convert it into a level-income equivalent.

Converting income into a level equivalent has two steps:

1. Calculate the present value of the irregular income stream at the appropriate yield rate.
2. Calculate the level payment that has the same present value.

The second step can be accomplished by multiplying the present value by the installment to amortize one factor at the yield rate. Another way to adjust the income to a level equivalent is to calculate a factor that, when multiplied by the first year's income, results in the equivalent level income. When the income is forecast to change at a compound rate, the *K* factor can be used to adjust it to a level equivalent:

$$\text{Level Income} = K \text{ factor} \times I_O$$

Of course, the calculation for any pattern of income can easily be accomplished using either a financial calculator or a computer.

Property Models

When both property value and income changes are expected to follow a regular or predictable pattern, one of the yield capitalization models for property valuation may be applicable. The common yield capitalization models employ a capitalization rate, *R*, which is also used in direct capitalization. There is a difference, however, between direct capitalization and yield capitalization. In direct capitalization, the capitalization rate *R* is derived directly from market data, without explicitly addressing the expected rate of return on capital or the means of recapture. In yield capitalization, *R* cannot be determined without taking into account the income pattern, the anticipated rate of return on capital, and the timing of recapture. This does not mean that yield capitalization procedures are not market-oriented. On the contrary, for some property types yield capitalization procedures may represent the most realistic simulation of decision making in the marketplace.

Real estate investors are greatly influenced by expectations of change in property values. When an investor looks forward to property appreciation as a component of the eventual investment yield, that investor is anticipating that the total yield rate will be higher than the initial year's

property model
A short-cut formula to DCF analysis that converts a yield rate into a capitalization rate given certain specific patterns of income and change in value over a projection period.

conversion factor (*a*)
An element in yield and change formulas that converts the total change in capital value over the projection period into an annual percentage; varies with the pattern of the income stream and may be an annual sinking fund factor or an annual recapture rate; also called the *annualizer*.

expected rate of income–i.e., the overall capitalization rate. The total yield rate is a complete measure of performance that includes any property appreciation or depreciation upon sale and increase or decrease in income. The general formula for this relationship is:

$$Y = R + A$$

where Y is the yield rate, R is the capitalization rate, and A is the adjustment rate that reflects the change in income and value.

Thus, the capitalization rate for an appreciating property equals the total yield rate minus an adjustment for expected growth:

$$R = Y - A$$

Similarly, the capitalization rate for a depreciating property can be seen as the yield rate plus an adjustment for expected loss:

$$R = Y - (-A)$$

or

$$R = Y + A$$

Because A is often expressed as a function of the total relative change in property income and value, the Greek letter delta (Δ) is used to denote change. To calculate A it is usually necessary to multiply Δ by a conversion factor, such as an annual sinking fund factor or an annual recapture rate, to convert the total relative change in value into an appropriate periodic rate of change. The symbol for the annualizer is a. The general formula for R may be expressed as

$$R = Y - \Delta\, a$$

where R is the capitalization rate, Y is the yield rate, Δ is the total relative change in income over the projection period, and a is the annualizer or conversion factor.

This general formula for the capitalization rate can be adapted and used with typical income/value patterns for the property as a whole or for any property components. In the general formula, R, Y, and Δ apply to the total property and are expressed without subscripts. However, if there is a possibility of confusing the total property with any of its components, subscripts should be used for clarification–e.g., R_O. Once the appropriate capitalization rate has been determined, an indication of property value can be obtained by applying the following universal valuation formula:

$$Value = \frac{Income}{Capitalization\ Rate}$$

or

$$V = \frac{I}{R}$$

Level Income

When both income and value are expected to remain unchanged, a property may be valued by capitalization in perpetuity. (Again, for the purposes of the analysis, the income stream is considered to be unchanged for the defined life of the improvements.) According to the general formula, $R = Y - \Delta\ a$, the capitalization rate (R) becomes the yield rate (Y) when there is no change in value because Δ equals zero.

When level income with a change in value is projected over a period of n years, the general formula for R is adapted by substituting the sinking fund factor at rate Y over n years in place of the conversion factor (a). For example, consider a commercial property that will generate a stable net operating income of $25,000 per year for the next eight years. Total property appreciation of 40% is expected during this eight-year period because market rents are expected to exceed contract rents. The appraiser concludes that the appropriate yield rate is 11%. To solve this problem, the formula $R = Y - \Delta\ a$ is used with the sinking fund factor for 11% over eight years as a. According to the tables, the sinking fund factor is 0.084321, so R is calculated as follows:

$$R = 0.11 - (0.40 \times 0.084321) = 0.076272$$

$$\text{Value } (V) = \frac{I_O}{R}$$

$$V = \frac{\$25{,}000}{0.076272} = \$327{,}776$$

Property models used in solving for value can also be used to manipulate or explain a given set of market data to determine other unknowns. For example, in the problem above, only the net operating income and rate of change or appreciation in property value are known. While DCF analysis may be used as proof of the solution, it is not feasible to apply DCF analysis to solve the problem. This is true because only the rate of appreciation is known from the market, and the dollar amount of the future reversion and the current present value are unknown and interdependent. This illustrates the most significant benefits of the property models–i.e., the ability to make value decisions based on broad trends as well as the ability to explain market behavior.

Straight-Line (Constant-Amount) Changes in Income and Value

When income and value are expected to increase or decrease by fixed amounts per period according to the standard, straight-line pattern, property value can be estimated using direct capitalization with straight-line recapture. The general formula for the capitalization rate (R) can be adapted for use with the standard, straight-line income/value pattern by using the straight-line recapture rate as the conversion factor (a). The straight-line recapture rate is simply the reciprocal of the projection period. For example, if income is projected over a period of 25 years, the annual, straight-line recapture rate is 1/25, or 4%. Depreciation of 100% would indicate that the projection period is equal to the property's remaining economic life. The concept of a limited remaining economic life does not apply to appreciating properties, but 100% appreciation would indicate a projection period equal to the amount of time required for the property to double in value.

The straight-line capitalization procedure has historically been used to value wasting assets, i.e., investments whose income is declining as their asset base wanes. This classic procedure has limited applicability due to its underlying assumptions, but it should be thoroughly understood to ensure its proper use. The classic straight-line procedure is based on the expectation that capital will be recaptured in equal dollar amounts during the investment's economic life and that net income consists of a declining amount that represents the return of capital plus a declining return on the capital remaining in the investment. Total income, therefore, diminishes until the asset is worthless and all capital has been recovered.

The presumption that value and income will decline steadily is frequently inconsistent with market behavior. Nevertheless, the procedure has important uses. Straight-line recapture is appropriate whenever the projection of income and value in an investment corresponds with the assumptions implicit in the procedure. Classic straight-line recapture is most easily understood when it is applied to an investment in a wasting asset such as a perishable structure, a stand of timber, or a mineral deposit. The procedure is inappropriate for valuing an investment in land or another asset that can sustain value indefinitely.

For example, consider an investment in a partial interest in real estate such as a leasehold in which all improvements must be written off during the term of the lease. If $50,000 is invested in a 10-year leasehold expected to earn 8% per year as a yield on capital, what flow of income to the investor would be required to return the entire amount of the investment on a straight-line basis during the 10-year period and, in addition, yield 8% per year to the investor?

Yearly recapture would, of course, be one-tenth of $50,000, or $5,000. The investor is entitled to a return on unrecaptured capital amounting to 8% of $50,000 in the first year, 8% of $45,000 in the second year, 8% of $40,000 in the third year, and so forth (see Table 24.1). The income flow starts at $9,000 the first year and drops by $400 each year after that. The total income payable at the end of the tenth and final year would be $5,400, of which $5,000 would be the last installment of the return of capital and the other $400 would be the interest due on the capital remaining in the investment during the tenth year. Thus, the investor achieves 100% capital recovery plus an 8% return on the outstanding capital, assuming non-level income.

Note that the recapture rate amounts to 10% of the original investment and is simply the reciprocal of the economic life. Also, all income is presumed to be payable at the end of each year, and the yields are always computed at the end of the year on the amount of capital outstanding during the year. Based on the starting income, the capitalization rate in this example would be $9,000/$50,000, or 18%. The 18% capitalization

Table 24.1 Periodic Return of and Return on Capital

End of Year	Invested Capital	Return of Capital	Return on Capital	Total Income
0	$50,000	–	–	–
1	45,000	$5,000	$4,000	$9,000
2	40,000	5,000	3,600	8,600
3	35,000	5,000	3,200	8,200
4	30,000	5,000	2,800	7,800
5	25,000	5,000	2,400	7,400
6	20,000	5,000	2,000	7,000
7	15,000	5,000	1,600	6,600
8	10,000	5,000	1,200	6,200
9	5,000	5,000	800	5,800
10	0	5,000	400	5,400

rate could also be calculated by adding the 10% recapture rate to the 8% yield rate.

The straight-line capitalization procedure reflects some useful mathematical relationships:

$$\text{First Period Return on Investment} = \text{Original Value} \times \text{Yield Rate}$$
$$\text{Periodic Change in Value} = \text{Original Value} \times \text{Periodic Rate of Change}$$
$$\text{Periodic Change in Income} = \text{Periodic Change in Value} \times \text{Yield Rate}$$

When the decline in income and value reflects these relationships, the periodic rate of change is the recapture rate and the reciprocal of the recapture rate is the economic life.

The traditional concept of straight-line recapture can be expanded to remove some of its theoretical constraints and facilitate a broader range of practical applications. The expectation of a predictable decline in income can be expanded to include any predictable change, which allows the appraiser to consider growing assets as well as wasting assets. A predictable rate of change within the foreseeable future can also eliminate the need to consider the full economic life of a property. Although there are significant theoretical differences, the expanded straight-line concept corresponds mathematically to classic straight-line recapture.

Under both the expanded and classic straight-line concepts, changes in value and income are presumed to occur on a straight-line basis. The basic requirements for a satisfactory return on, and complete recovery of, invested capital are also preserved. However, the expanded concept does not require that capital be recaptured in annual installments throughout the economic life of a property. Rather, the property could be resold for a predictable amount at some point during its economic life, thereby providing for partial or complete return of the invested capital at the time of resale.

The straight-line capitalization rate is simply a combination of the yield rate and the straight-line rate of change, which is expressed in the general formula $R = Y - \Delta\ a$, where Δ is the relative change in value in n periods and a is $1/n$. For example, consider a leased fee interest that will produce income to the leased fee (I_{LF}) of $19,000 the first year. This income stream is expected to decline thereafter in the standard straight-line pattern and value is expected to fall 25% in 10 years. The anticipated income pattern must match up with the lease contract. To appraise the leased fee to yield 12%, the formula $R_{LF} = Y_{LF} - \Delta_{LF}\ a$ is used, where the subscript LF denotes the leased fee.

$$R_{LF} = 0.12 - (-0.25 \times 0.1) = 0.145$$

$$\text{Value} = \frac{I_{LF}}{R}$$

$$\text{Value} = \frac{\$19{,}000}{0.145} = \$131{,}034$$

The classic and expanded straight-line concepts are popular because they are simple and do not require the use of compound interest tables. However, straight-line concepts have theoretical and practical limitations. The straight-line premise is seldom a realistic reflection of investor expectations of changing income and value.

Exponential-Curve (Constant-Ratio) Changes in Income and Value

When both income and value are expected to change at a constant ratio, the capitalization rate can be determined without tables using the general formula

$$R = Y - \Delta\ a$$

where $\Delta\ a$ is the relative change in value and income for one period. Thus, $\Delta\ a$ can be replaced with the periodic compound rate of change (CR). The formula then becomes

$$R = Y - CR$$

where Y is the yield rate per period and CR is the rate of change per period. An expected loss is treated as a negative rate of change, and the formula becomes

$$R = Y - (\text{-}CR)$$

or

$$R = Y + CR$$

If both income and value are expected to change at the same rate, the capitalization rate is expected to remain constant. Therefore, this pattern of growth or decline is sometimes referred to as the *frozen cap rate pattern*. For example, suppose an income-producing property is expected to produce net operating income of $50,000 for the first year. Thereafter both net operating income and value are expected to grow at a constant ratio of 2% per year. In other words, 2% is the expected ratio of the increase in income for any year to the income for the previous year. The ratio of the increase in value for any year to the value for the previous year is also 2%. To appraise the property to yield 11%, the formula is

$$R_O = Y_O - CR_O$$
$$R_O = 0.11 - 0.02 = 0.09$$
$$\text{Value} = \frac{\$50{,}000}{0.09} = \$555{,}556$$

The elements in the above equation can be transposed so that

$$Y_O = R_O + CR_O$$

The overall yield rate, therefore, is equal to the overall capitalization rate plus the periodic adjustment, provided the rate of change is anticipated to continue at the same rate into the foreseeable future. Property models based on an exponential pattern of change in income and value often reflect the thinking of investors in the market.

Variable or Irregular Income and Value Changes

When income and value are not expected to follow a regular pattern of change, the present value of a property can be obtained by applying the standard discounting formula separately to each projected benefit, including the final reversion. This is often done using discounted cash flow analysis rather than an income or property model. Examples of applications of discounted cash flow analysis are provided in Chapter 26.

Level-Equivalent Income

As noted previously, any pattern of income can be converted into a level-equivalent income. Therefore, the level income property model, $R = Y - \Delta a$, can be used to solve for the value of any pattern of income once that income has been converted into its level equivalent. Suppose, for example, the appraiser is valuing a property with net operating income of \$200,000, growing at 4% per year. If the value is expected to increase 15% over a five-year projection period ($\Delta_O = 15\%$) and the appropriate yield rate is 12%, the value can be calculated by first calculating the level-equivalent income and then dividing that income by an overall capitalization rate developed using the level income property model.

To calculate the level-equivalent income, first calculate the present value of the cash flows at the 12% yield rate:

Year	Net Income
1	\$200,000
2	\$208,000
3	\$216,320
4	\$224,973
5	\$233,972

Present value at 12% is \$774,096. This is easily converted to a level equivalent by multiplying it by the installment to amortize one factor, 0.277410.

$$\text{Level-Equivalent Income} = \$774{,}096 \times 0.277410 = \$214{,}742$$

Next, the overall capitalization rate is developed using the level income property model.

$$R_O = Y_O - \Delta\, a$$
$$R_O = 0.12 - 0.15\ (0.157410^*)$$
$$R_O = 0.096389$$

* Sinking fund factor

The value can then be obtained with the formula $V = \frac{I}{R}$ as follows:

$$V = \frac{\$214{,}742}{0.096389} = \$2{,}227{,}879$$

There are many other ways to solve this problem. The level income capitalization rate, for example, could have been divided by the *K* factor for income growing at 4% per year for 5 years and a 12% yield rate. That factor, 1.073709, is easily found using a financial calculator, a computer, or published tables. The capitalization rate developed using the *K* factor, 0.089772, would then be divided into the first year's net operating income of $200,000 to yield the same value conclusion. In fact, because the calculation is so easily obtained–for any income pattern–from a financial calculator or computer, little emphasis is given to the use of precalculated factors. The factors are useful, however, in presenting the analysis to a client.

Discounted Cash Flow Analysis and Investment Analysis

Discounted cash flow (DCF) analysis is an appropriate tool for valuing any pattern of regular or irregular income.[1] In many markets and for many property types, DCF analysis is the technique that investors prefer. The proper application of DCF analysis identifies the market conditions investors are anticipating as of the date of value.

Some critics argue that DCF analysis is too speculative, but the technique is not an unsupported prediction by an appraiser. Appraisers who use DCF analysis are simply identifying what investors expect on the date of appraisal and build into their pricing models. Whether the expectations of investors are realized or not, the appraisal will be prepared properly if the appraiser has correctly identified the investor's expectations on the date of appraisal.

Applicability of DCF Analysis

Discounted cash flow analysis can be used both to estimate present value and to extract a yield or discount rate from a comparable sale. Generally, DCF analysis is used to solve for present value given the rate of return or to solve for the rate of return given the purchase price.

In typical appraisal work, an appraiser begins by developing detailed spreadsheets. These spreadsheets show itemized incomes, expenses,

1. Statement on Appraisal Standards No. 2 of the Uniform Standards of Professional Appraisal Practice addresses criteria for proper DCF analysis as well as unacceptable practices.

Discounted cash flow (DCF) analysis is a procedure in which a yield rate is applied to a set of income streams and a reversion to determine whether the investment property will produce a required yield given a known acquisition price. If the rate of return is known, DCF analysis can be used to solve for the present value of the property. If the property's purchase price is known, DCF analysis can be applied to find the rate of return.

and cash flows year by year, or sometimes month by month, over the presumed period of ownership or another projection period that the market suggests. The cash flows, including the net resale price, are then discounted at an appropriate rate (or rates) to derive an indication of present value. In this way, an appraiser can account for all cash flows in and out of the real property interest being appraised and estimate the timing of these cash flows so that the time value of money is properly recognized in the analysis. Alternatively, if the yield is sought, these cash flows are calculated against the purchase price being realized.

Critics of the technique point out that projections not warranted by market evidence can result in unsupported market value indications and that the results of the analysis can change significantly due to even small changes in the projections. Other critics object to the uncertainty of forecasting financial results five or 10 years into the future and cite this as a reason for not using or relying on the DCF technique. However, these arguments ignore the reality of the real estate marketplace. Investors do make forecasts and rely on DCF analysis, particularly in regard to large, investment-grade, multitenant properties such as shopping centers and office buildings and properties with nonstabilized incomes such as new buildings that will need to be leased up.

When yield capitalization was first expanded in applications of the valuation process by L. W. Ellwood in the 1960s, there was initial confusion over mathematical processes and relationships that are now commonly understood. At first, many appraisers mistakenly believed that yield capitalization could only apply to long-term, dependable income streams. Ellwood held two positions that were considered novel at the time but were factual expressions of already accepted appraisal principles.

- First, he recognized that any form of capitalization was useless and potentially misleading unless the net income to be capitalized was accurately developed with market support.
- Second, he established that the yield rate for capitalization should be the market yield rate that would relate that net income (over time) to market value.

Ellwood believed that variations could be used to test and understand market behavior. For example, if the incomes including the reversion were expressed in an income statement, even a statement covering only five years, the effects of lesser uncertainty in the early property incomes and the greater uncertainty of the reversion amount would be mitigated in present value discounting processes. In capitalization, the contribution to present value decreases as the time elapsed from the date of value increases, so greater weight is afforded to those "knowns" that are closest to the date of value. Although the discounting processes involved once required significant amounts of time (for calculations and to search for rates in printed tables), modern appraisers with access to computer software can perform the calculations almost instantly.

In keeping with the principle of anticipation, market-supported forecasting is the essence of valuation. Hence, it must be approached in the same way that all market data extractions are accomplished–i.e., with diligent research and careful verification. Discounted cash flow analysis can only provide accurate results if the forecasts developed are based on accurate, reliable information. Unless a contractual level or patterned income is involved, most real estate incomes will vary from year to year. The range of incomes may increase over time, particularly with changes in business cycles or local property markets. It is most common for appraisers to develop a "stabilized" income stream, which may be level or exhibit some consistent rate of change, to represent a property's income for yield capitalization purposes. This practice follows procedures commonly applied by buyers and sellers, and the application of the technique should mirror the reasoning and behavior of those market participants.

Investment Analysis

In addition to developing an opinion of value or extracting a yield rate from comparable sales, discounted cash flow analysis techniques are often used to test the performance of real estate investments at a desired rate of return. Measures of investment performance include

- net present value

Forecasting

In making forecasts an appraiser employs the same procedure applied by investors who use DCF analysis in their decision making. The procedural steps typically include forecasting income, vacancy, operating and capital expenses, and equity income (if appropriate) over ownership periods of 5 to 15 years. In some markets and in some situations, 10 years is cited as an average or standard projection period or a typical ownership period. In others, the forecast period may be shorter or longer. When appropriate, debt service and after-tax cash flow may also be forecast. The residual income from the sale of the property at the end of the forecast period is also estimated.

Typical forecast categories to be addressed in DCF analysis include

- current market rental rates, lease expiration dates, and expected rental rate changes
- lease concessions and their effect on market rent
- existing base rents and contractual base rent adjustments
- renewal options
- existing and anticipated expense recovery (escalation) provisions
- tenant turnover
- vacancy loss and collection allowance
- operating expenses and changes over the projection period
- net operating income
- capital items including leasing commissions and tenant improvement allowances
- reversion and any selling or transaction costs
- a discount or yield rate (or rates)

- internal rate of return
- payback period
- profitability index (or benefit/cost ratio)
- time-weighted rate

Used alone, these measures are not perfect, but as a collection of tools they have proven their effectiveness. They reflect a common market understanding and are useful in typical real estate applications.

Net Present Value and the Internal Rate of Return

Net present value (*NPV*) and the internal rate of return (*IRR*) are two discounted cash flow models widely used to measure investment performance and develop decision-making criteria. Net present value (dollar reward) is the difference between the present value of all positive cash flows and the present value of all negative cash flows, or capital outlays. When the net present value of the positive cash flows is greater than the net present value of the negative cash flows or capital outlays, the investment exceeds the return requirements of the investor. If the reverse relationship exists (i.e., negative cash flows are greater than positive cash flows), the investment is not considered feasible.

Net present value (*NPV*) and the internal rate of return (*IRR*) are two discounted cash flow models used for measuring investment performance.

net present value (*NPV*)
The difference between the present value of all expected investment benefits (*PV*) and the present value of the capital outlays (*CO*), i.e., $NPV = PV - CO$.

internal rate of return (*IRR*)
The annualized yield rate or rate of return on capital that is generated or capable of being generated within an investment or portfolio over a period of ownership. Alternatively, the indicated return on capital associated with a projected or pro forma income stream. In other words, the *IRR* is the rate that discounts all returns from an investment, including returns from its termination, to a present value that is equal to the original investment.

A net present value of zero indicates that the present value of all positive cash flows equals the present value of all negative cash flows or capital outlays. The rate of discount that makes the net present value of an investment equal zero is the internal rate of return. In other words, the *IRR* is the rate that discounts all returns from an investment, including returns from its termination, to a present value that is equal to the original investment.

A number of decision rules for applying the *NPV* can be established. For example, suppose that a property with an anticipated present value of $1,100,000 for all investment returns over a 10-year projection period can be purchased for $1,000,000. If one investor's *NPV* goal is zero, this investment exceeds that criterion. It also meets a second investor's goal for an *NPV* of $100,000, but it would not qualify if the goal were $150,000.

Net present value does consider the time value of money, and different discount rates can be applied to different investments to account for general risk differences. However, this method cannot handle different required capital outlays. For example, it cannot differentiate between an *NPV* of $100,000 on a $1,000,000 capital outlay and the same *NPV* on a $500,000 capital outlay. Therefore, this technique is best used in conjunction with other measures.

A common example of the use of an *NPV* analysis is called a *hurdle rate analysis*. Some investors, particularly those involved in minerals property investments, use a stated yield rate, which is the minimum acceptable rate of return for that investor, to determine the extent to which a potential investment can exceed that minimum. If there is a surplus of *NPV* above zero to justify further attention, the investor can then spend the time and resources to pursue a more precise estimate of potential investment yield if the investment otherwise appears to be worth the exercise.

By understanding the limitations and pitfalls appraisers may encounter using the *IRR*, practitioners can avoid wasted effort and false conclusions. The search for a single *IRR* within a plausible range is not always successful. Unusual combinations of cash flows may produce strange results, and more than one *IRR*–or in rare cases no *IRR*–may be indicated.

> The *IRR* has notable limitations. Unusual combinations of cash flows may produce more than one *IRR*. The *IRR* must be viewed with suspicion when net cash flows to an investment at a zero rate of return have a negative cumulative value. A negative *IRR* may be interpreted as a rate of loss, but it is theoretically meaningless. Moreover, as a measure of return on invested capital, the *IRR* is not valid for investments that are "100% financed" or "financed out" and require little or no equity capital.

More Than One Internal Rate of Return

Consider a real estate investment in which the investor puts down \$2,300, borrows \$10,000, and pays 10% interest only, with the principal to be repaid in a lump sum at the end of 10 years. The investor's net cash flows can then be tabulated as shown in Table 25.1.

The internal rate of return for the net cash flows after financing can be obtained through graphic analysis. Net present values are calculated for even discount rates between 0% and 24% and plotted on a graph. Table 25.2 and Figure 25.1 indicate not one but two internal rates of return. Using a computer, the two *IRR*s are calculated as 4.50839% and 18.3931%.

Multiple rates like these are interesting from a theoretical viewpoint, but it is difficult to accept more than one internal rate of return

Table 25.1 Net Cash Flow

Year	Cash Flow before Loan/Interest	Loan	Interest	Net Cash Flow
0	–\$12,300*	\$10,000	\$0	–\$2,300
1	\$2,000	0	–\$1,000	\$1,000
2	\$2,000	0	–\$1,000	\$1,000
3	\$2,000	0	–\$1,000	\$1,000
4	\$2,000	0	–\$1,000	\$1,000
5	\$1,000	0	–\$1,000	0
6	\$1,000	0	–\$1,000	0
7	\$1,000	0	–\$1,000	0
8	\$1,000	0	–\$1,000	0
9	\$1,000	0	–\$1,000	0
10	\$9,000†	–\$10,000	–\$1,000	–\$2,000

* Initial cash outlay

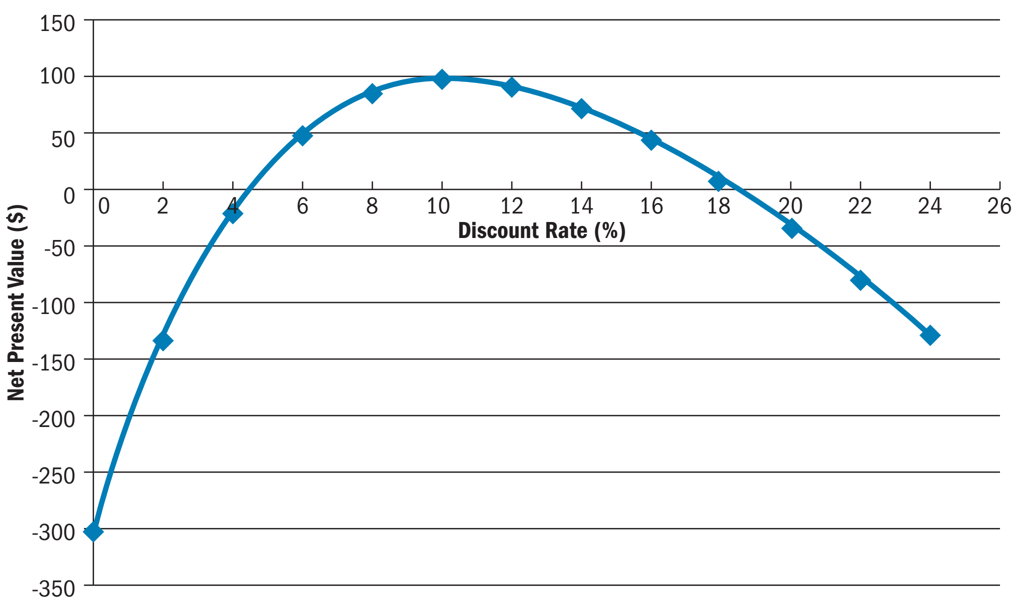
† Income and proceeds from sale

as a useful measure of performance. In real estate investment analysis, the presence of multiple internal rates of return usually suggests that some other measure of performance would be more appropriate or that the cash flows or time frame should be adjusted to permit a more meaningful analysis. Close examination of the example presented here reveals some characteristics of the *IRR* that may not be apparent in more typical examples.

Table 25.2 Table of Net Present Values

Discount Rate	Net Present Value
0	-$300
2	-$133
4	-$21
6	$48
8	$86
10	$99
12	$93
14	$74
16	$45
18	$8
20	-$34
22	-$80
24	-$128

Figure 25.1 Graphic Solution to Example



Negative Net Present Value at Zero Rate of Return

The cumulative value of the net cash flows in Table 25.1 is negative. Negative net cash flows total $4,300, while positive net cash flows total $4,000. Therefore, the net present value–i.e., the difference between the present value of expected benefits, or positive cash flows, and the present value of capital outlays, or negative cash flows–with no discounting or at a zero discount rate is -$300 (see Figure 25.1). This should be a warning sign to the analyst.

Under these conditions, the internal rate of return cannot be positive unless the mixture of positive and negative cash flows over time is such that the net present value increases with increases in the discount rate until the net present value reaches zero. This type of reverse discounting is mathematically valid, but it is contrary to the practical notion of reducing net present value by increasing the discount rate. It is not surprising that the internal rate of return in cases like this is difficult to comprehend and of questionable use.

Negative Internal Rate of Return

If the net present value of an investment at a 0% rate of return is negative, a negative internal rate of return may be indicated. The *IRR* is generally understood to be a positive rate of return, but a negative *IRR* may be interpreted as a rate of loss. Any prospective rate of loss will normally discourage capital investment.

The concept of a negative internal rate of return has theoretical, as well as practical, limitations. A glance at the *IRR* equation reveals that a negative *IRR* of 100% or more has no meaning because it involves division by zero or powers of a negative number.

Little or No Equity

Because the internal rate of return is a measure of the return on invested capital, it cannot be used to measure the performance of opportunities that require no investment of capital. Some investments can be "financed out"–i.e., financed with loans that cover 100% or more of the capital required. If the projected net cash flows are all positive, there is no *IRR*. Obviously, no discount rate can make a series of exclusively positive benefits equal zero.

The same rationale can be applied to investments calling for very low equity or a very small down payment in relation to expected returns. For example, a profit of $1 on an investment of $1 amounts to a 100% rate of return. A return of $100 on an investment of $1 indicates a 10,000% rate of return. When the investment is very small, slight changes in income can cause astronomical changes in the rates of return and loss. The internal rate of return is an impractical yardstick for such investments.

However, the *IRR* can be a valuable indicator in analyzing investments that are 100% financed at the start and expected to operate at a loss for a period of time. In these arrangements, the early negative cash flows may represent a significant investment of equity capital, and the prospective *IRR* may be the best measure of performance. It may also be useful to compare the prospective *IRR* before financing with an interest rate that reflects the cost of capital. The difference can be used as a measure of prospective leverage.

Reinvestment Concepts

The internal rate of return on the capital within an investment can be applied to a single property or to an entire investment portfolio. No assumption is made as to how the investor actually employs funds that are received during the investment's ownership. The income from a real estate investment may be reinvested in another project at another rate of return, stored in a vault, or spent, but the *IRR* is not affected. Regardless of whether or not an investor in fact reinvests capital withdrawn from the investment at any given rate, a defining characteristic of the internal rate of return is that it is mathematically consistent with reinvestment at the same rate of interest as the *IRR*. This establishes a framework for distinguishing between the internal rate of return and other measures of investment return that make explicit reinvestment assumptions.

Incorporating a reinvestment concept in investment analysis is useful when viewing returns within the context of overall portfolio performance. It is a fundamental concept of finance that to calculate a rate of return on an investment and to compare two or more alternative investments, all of the funds in an investment must be considered over the entire period of analysis. Income-producing real estate typically generates both a return on and a return of invested capital over the life of the investment. The rate of return can differ with various reinvestment assumptions. There are potential problems with the concept of an internal rate of return, but its use does not force any particular reinvestment assumptions, even though it is consistent with reinvestment at the same rate as the *IRR*.

As discussed above, one problem associated with the internal rate of return is that certain situations can produce mathematical results that support more than one rate. A different rate of return concept with a specific reinvestment premise is sometimes used to avoid multiple *IRR*s. Although the assumption of a specific reinvestment rate other than the *IRR* does not result in an internal rate of return, reinvestment assumptions are applied in a number of rate of return concepts that make up a family of *IRR*-related measures.

The *IRR with reinvestment* is based on the expectation that all income from a project can be immediately reinvested at a specified rate and left to grow at that rate until the end of the investment projection period. The combined results of the investment's earnings and reinvestment are then reflected in one overall rate of return. The *IRR* with reinvestment traces the expected total performance of the original capital sum at work in more than one investment, rather than ignoring what occurs with portions of the capital investment during the ownership period. This measure can also be used

> Reinvestment concepts may be incorporated into *IRR* analysis. The adjusted or modified *IRR* (*AIRR* or *MIRR*) is an internal rate of return with reinvestment. The financial management rate of return (*FMRR*) is a modified internal rate of return with a specified borrowing rate.

to prevent multiple solutions to the internal rate of return equation. The *IRR* with reinvestment is often called the *adjusted* or *modified IRR* (*AIRR* or *MIRR*). The formula for the *MIRR* appears in Appendix C.

The *IRR with a specified borrowing rate* is another variation of the internal rate of return that can be used to prevent multiple rates. It is sometimes called the *IRR for investment* or *financial management rate of return* (*FMRR*). The *IRR* for investment specifies an interest rate for the borrowed funds needed during the period when the investment is producing negative cash flows. As with other rates derived from the internal rate of return, the *FMRR* recognizes that there are different risks and potential earnings that apply to the funds withdrawn from the original investment. The concept of financial management indicates that lower rates will be paid on borrowed funds and that risk management will permit the investor to eventually earn a higher rate of return on the real estate investment. Again, to derive the *FMRR*, the entire amount of invested capital is analyzed over the life of the real estate investment, as is the case with other rates that assume reinvestment (*AIRR* and *MIRR*).

Applicability

The internal rate of return can be as important to the real estate investor as the interest rate is to the mortgage lender. In fact, the two measures are equivalent. The interest rate on a mortgage is the same as the mortgagee's yield, or the internal rate of return, unless points are involved. The internal rate of return is not a meaningful measure of all investments and, even when it is meaningful, it is not the only possible criterion. It is, however, a fundamental and pure measure of a particular investment's financial performance. In general, the internal rate of return is a valuable analytical tool if the decision maker understands its attributes and limitations and has access to complementary or alternative analytical techniques.

Other Measures of Performance

Popular alternative measures of financial performance or profitability include

- payback period
- profitability index or benefit/cost ratio
- time-weighted rate

These yardsticks do not measure performance or profit on the same scale or under the same assumptions as the internal rate of return. Their usefulness depends on the situation and the user's preferences. Neither the internal rate of return nor any alternative measure is superior in all situations.

Payback Period

As a measure of investment return, the payback period is seldom used alone. It is commonly employed in conjunction with other measures such as the internal rate of return. The payback period (*PB*) is defined as the length of time required for the stream of net cash flows produced by an investment to equal the original cash outlay. The breakeven point is reached when the investment's cumulative income is equal to its cumulative loss. The payback period can be calculated from either before-tax or after-tax cash flows, so the type of cash flow selected should be identified. The equation for payback period may be expressed as follows:

$$PB = \frac{\text{Equity Capital Outlay}}{\text{Annual Net Equity Cash Flows}}$$

Because real estate appraisers typically account for income as if received annually at the end of the period, full payback is not considered to occur until the end of a year. Therefore, the payback period indicated by the prior equation will be rounded up to a whole number, i.e., to the end of the next year.

This measure of performance is used by investors who simply want to know how long it will take them to recapture the funds they have invested. In theory, an investment with a payback period of three years would be preferable to one with a payback period of five years, all else being equal. Similarly, an investment that will return the investor's capital in six years would be unacceptable to an investor who seeks investment payback within four years.

For an equity investment that is expected to produce equal cash flows, the payback period is simply the reciprocal of the equity capitalization rate:

$$PB = \frac{1}{R_E}$$

where the equity capitalization rate (R_E) is rounded up to the next whole number. If annual equity cash flows are not expected to be equal over the payback period, the equity cash flows for each year must be added until the sum equals or exceeds the equity capital outlay. This point indicates the year in which payback occurs.

Although the payback period is simple and easily understood, it has a number of drawbacks. First, it measures the amount of time over which invested money will be returned to the investor, but it does not consider the time value of the money invested. A five-year investment payback for a $100,000 investment that pays $10,000 in Year 1 and $90,000 in Year 5 is not distinguished from the payback for a $100,000 investment that pays $90,000 in Year 1 and $10,000 in Year 5. The time value of money allows the first investment to use an additional $80,000 (i.e., the difference between the $90,000 paid in the second investment and the $10,000 paid in the first investment) from the second year through the fifth.[2]

payback period (*PB*)
The length of time required for the stream of cash flows produced by the investment to equal the original cash outlay.

Another shortcoming of the payback period is that it does not consider the effect of any gain or loss of

2. A more sophisticated, but less popular, measure is the discounted payback period, which recognizes the time value of money at a stipulated rate of return. In this context the payback period is the amount of time required for the discounted benefits to equal the discounted costs.

invested capital beyond the breakeven point and does not specifically account for investment risks. An investment with a three-year payback may be far riskier than another investment with a five-year payback, but the shorter period generally appears preferable. Thus, this measure of performance should only be used to compare investments with similar investment characteristics or in conjunction with other performance measures in carefully weighted applications.

Despite its shortcomings, the payback period is used by investors in situations like feasibility analyses for the renovation of apartment buildings. Investors make decisions about renovation (e.g., how much new investment to make, if any) by considering how soon they can recoup their investment. For example, if an investor's payback objective is for a two-year holding period and the investor will recoup the dollar amount in two years in the form of higher rent, then the renovation will be performed. Even investors in large assets are able to use this simple, but pragmatic, approach with no discounting.

Profitability Index

Although measuring the investment proceeds per dollar invested is too imprecise for general use, a refinement of this technique is commonly applied in investment analysis. The profitability index (*PI*), which is also called the *benefit/cost ratio*, is defined as the present value of the anticipated investment returns (benefit) divided by the present value of the total initial and annual, if any, capital outlay (cost). The formula is

$$PI = \frac{\text{Present Value of Anticipated Investment Returns}}{\text{Present Value of Total Capital Outlay}}$$

This measure employs a desired minimum rate of return or a satisfactory yield rate. The present value of the anticipated investment returns and the capital outlay are calculated using the desired rate as the discount rate. If, for example, the capital outlay is \$12,300 and the present value of the benefits, based on a satisfactory yield rate of 10%, is \$13,100, the profitability index is \$13,100/\$12,300 = 1.065.

A profitability index greater than 1.0 indicates that the investment is profitable and acceptable in light of the chosen discount rate. A profitability index of less than 1.0 indicates that the investment cannot generate the desired rate of return and is not acceptable. A profitability index of exactly 1.0 indicates that the opportunity is just satisfactory in terms of the desired rate of return and, coincidentally, the chosen discount rate is equal to the anticipated internal rate of return. The discount rate used to compute the profitability index may represent a minimum desired rate, the cost of capital, or a rate that is considered acceptable in light of the risks involved.

A profitability index is particularly useful in comparing investments that have different capital outlay requirements, different time frames for receiving income or other investment returns, and different risk

profitability index (*PI*)
The present value of anticipated investment returns (benefits) divided by the present value of the capital outlay (cost); also called *benefit/cost ratio*.

time-weighted rate
The average of all actual, instantaneous rates over a period of time.

characteristics. A profitability index is commonly used in conjunction with other measures, particularly with net present value. When combined, these measures provide special insights into the investments under consideration.

Time-Weighted Rate

A time-weighted rate is technically an average of all actual rates at different points over a period of time. It is similar to the rate of growth for capital invested in a mutual fund in which all dividend income is automatically reinvested. The time-weighted rate, which is also known as the *unit-method rate* or the *share-accounting rate*, is used primarily to measure the performance of a portfolio manager, not the performance of the portfolio itself.

Applications of the Income Capitalization Approach

Chapters 21 through 25 described the basic theory and procedures of the income capitalization approach and introduced a number of specific techniques. The examples presented in this chapter illustrate the most common techniques used in applying the income capitalization approach.

Applications of Income and Expense Analysis

As discussed in Chapter 22, a thorough analysis of the income and expenses of the subject property and comparable properties is the starting point for application of the capitalization procedures. The forecast of income and expenses can be for a single year, if direct capitalization is going to be used, or for multiple years, if a yield capitalization technique is more appropriate.

Sample One-Year Income and Expense Forecast

The property being appraised, Southside Apartments, is a three-year-old, 55-unit apartment project with total annual rent collections of $367,200 at 100% occupancy. Additional information needed for the income and expense forecast follows.

- Open parking is included in the rent.
- Additional income from coin-operated equipment averages about $1,380 per year at full occupancy so the total, annual potential gross income at 100% occupancy is $368,580.

- Annual vacancy and collection loss is estimated at 4% and local management services are available for 5% of effective gross income.
- Last year's real estate tax bill was $17,875, but taxes are expected to be $18,700 by the end of this year.
- The owner carries $1 million in fire and extended coverage insurance and pays an annual premium of $1,567. The appraiser believes that this coverage should be increased to $1.2 million with a premium of $1,880 ($1.2 \times \$1,567 = \$1,880$). The additional expense for other insurance coverage is $770 per year and is a typical requirement.
- The part-time building superintendent receives an annual salary of $16,800, including fringe benefits.
- The cost to cover site maintenance and snow removal averages $5,900 per year.
- Building tenants pay their own utilities, including gas and electricity for individual apartment heating and air-conditioning units. Based on the expenses of the comparables and anticipated rate changes, the electricity for public space is expected to cost $2,200 in the coming year. Expenses for other utilities, including water, consistently run about $1,000 each year.
- Historically, repair and maintenance expenses have ranged from $24,000 to $26,000 per year, including some capital expenditures.
- Trash removal costs $45 per month, pest control costs are $65 per month, and the cost of supplies is estimated at $1,100 per year.
- Most of the apartments are rented on one-year leases, with a typical redecorating cost of $500 per apartment every third year.
- Public space is minimal, and redecorating this space costs about $2,500 every third year.
- Miscellaneous expenditures are projected at $325 per year.
- The appraiser anticipates that capital replacement will accelerate, and the reconstructed operating statement should include a separate replacement allowance for such capital items in addition to normal repair and maintenance expenses.
- Exterior painting, which is estimated to cost $4,650 in the present market, is scheduled to be done every three years.
- All the apartments have electric stoves, refrigerators, dishwashers, garbage disposals, and bathroom exhaust fans, so a replacement allowance of $1,300 per apartment is required. The economic lives of these items vary, but they are estimated to average 10 years.
- The replacement of carpeting costs the owner about $900 per unit, and the average economic life of carpeting is six years.
- The roof is considered to have a 20-year life and a replacement cost of $18,000.

The operating statement shown in Table 26.1 reflects these estimates. The numerical precision of each entry is approximate, and in most cases the appraiser is rounding to the closest $5 or $10, which is well within the estimated accuracy of the data.

Table 26.1 Southside Apartments: Reconstructed Operating Statement

Income		
Potential gross annual income		
Rents 11 units @ $500/mo.	$66,000	
12 units @ $525/mo.	75,600	
16 units @ $575/mo.	110,400	
16 units @ $600/mo.	115,200	
Subtotal	$367,200	
Other income	+ 1,380	
Total potential gross income @ 100% occupancy	$368,580	
Less vacancy and collection loss @ 4%	− 14,743	
Effective gross income		$353,837
Operating expenses		
Fixed		
Real estate taxes	$18,700	
Insurance		
Fire and extended coverage	1,880	
Other	770	
Subtotal	$21,350	
Variable		
Management ($353,837 × 0.05)	$17,692	
Superintendent	16,800	
Site maintenance and snow removal	5,900	
Electricity	2,200	
Other utilities	1,000	
Repair and maintenance	25,000	
Trash removal ($45 × 12)	540	
Pest control ($65 × 12)	780	
Supplies	1,100	
Interior decorating*	10,000	
Other	325	
Subtotal	$81,337	
Replacement allowance		
Exterior paint ($4,650/3)	$1,550	
Kitchen and bath equipment ($1,300 × 55)/10	7,150	
Carpeting ($900 × 55)/6	8,250	
Roof ($18,000/20 years)	900	
Subtotal (5.04% of *EGI*)	$17,850	
Total operating expenses		− $120,537
Operating expense ratio ($120,537/$353,837) = 34.07%		
Total expenses per unit ($120,537/55) = $2,192 per unit		
Net operating income		$233,300
Net operating income ratio ($233,300/$353,837) = 65.93%		

* 55 units × $500 = $27,500; $27,500 + $2,500 = $30,000; $30,000/3 = $10,000

Sample Multiyear Income and Expense Forecast

The analysis that follows (Table 26.2) is based on a six-year forecast of the income and expenses generated by the apartment building described in the preceding example. All the techniques described in these two examples are used to develop a net operating income estimate for the first year of the forecast. Estimates for the other years are based on

Table 26.2 Income and Expense Analysis (Multiyear Forecast)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Income						
Potential gross income	367,200.00	378,216.00	389,562.48	401,249.35	413,286.84	425,685.44
Other income	+ 1,380.00	+ 1,421.40	+ 1,464.04	+ 1,507.96	+ 1,553.20	+ 1,599.80
Vacancy and collection loss	− 14,743.00	− 15,129.00	− 15,582.00	− 16,050.00	− 16,531.00	− 17,027.00
Effective gross income	353,837.00	364,508.40	375,444.52	386,707.32	398,309.04	410,258.24
Operating expenses						
Fixed expenses						
Real estate taxes	18,700.00	19,261.00	19,838.83	20,433.99	21,047.01	21,678.43
Insurance						
Fire and extended coverage	1,880.00	1,936.40	1,994.49	2,054.33	2,115.96	2,179.44
Other	770.00	793.10	816.89	841.40	866.64	892.64
Variable expenses						
Management	17,692.00	18,222.76	18,769.44	19,332.53	19,912.50	20,509.88
Superintendent	16,800.00	17,640.00	18,522.00	19,448.10	20,420.51	21,441.53
Site maintenance and snow removal	5,900.00	6,077.00	6,259.31	6,447.09	6,640.50	6,839.72
Electricity	2,200.00	2,365.00	2,542.38	2,733.05	2,938.03	3,158.38
Other utilities	1,000.00	1,030.00	1,060.90	1,092.73	1,125.51	1,159.27
Repair and maintenance	25,000.00	25,750.00	26,522.50	27,318.18	28,137.72	28,981.85
Trash removal	540.00	556.20	572.89	590.07	607.77	626.01
Pest control	780.00	803.40	827.50	852.33	877.90	904.23
Supplies	1,100.00	1,133.00	1,166.99	1,202.00	1,238.06	1,275.20
Interior decorating	10,000.00	10,300.00	10,609.00	10,927.27	11,255.09	11,592.74
Other	325.00	334.75	344.79	355.14	365.79	376.76
Replacement allowance						
Exterior painting	1,550.00	1,550.00	1,550.00	1,550.00	1,550.00	1,550.00
Kitchen and bath equipment	7,150.00	7,150.00	7,150.00	7,150.00	7,150.00	7,150.00
Carpeting	8,250.00	8,250.00	8,250.00	8,250.00	8,250.00	8,250.00
Roof	900.00	900.00	900.00	900.00	900.00	900.00
Total operating expenses	120,537.00	124,052.61	127,697.91	131,478.20	135,398.99	139,466.08
Operating expense ratio	34.07%	34.03%	34.01%	34.00%	33.99%	33.99%
Total expenses per unit	$2,191.58	$2,255.50	$2,321.78	$2,390.51	$2,461.80	$2,535.75
Net operating income	$233,300.00	$240,455.79	$247,746.61	$255,229.12	$262,910.04	$270,792.15
Net operating income (rounded)	$233,300	$240,456	$247,747	$255,229	$262,910	$270,792

Note: Dollar amounts are shown to two decimal places in this table. Other tables in this chapter are displayed with rounding to the nearest whole dollar, but amounts are not rounded for internal calculations, which can result in apparent mathematical errors.

existing lease provisions and expected forecasts regarding lease renewals and growth rates applied to other income and operating expenses. The following conclusions are reached:

- Market rents are anticipated to increase 3% annually as are the receipts from the coin-operated equipment in the property.
- Operating expenses are forecasted to increase 3% annually, with the exception of the superintendent's salary, which will increase an average of 5% per year, and the cost of electricity for common areas, which is expected to increase 7.5% annually.

Applications of DCF Analysis

The first two DCF analyses that follow concern a 10,000-sq.-ft. shopping center. The first example provides an overview of the procedures used to forecast and discount cash flows into value. The second example shows how to extract a yield rate from a comparable sale. These are followed by a third example, which illustrates the application of DCF analysis to subdivision analysis.

Forecasting and Discounting Cash Flows into Value

The property being appraised is the leased fee interest in a small strip shopping center consisting of five units of 2,000 square feet each. The following information is gathered for the DCF analysis:

- Market rents are currently $22.00 per square foot per year, and the appraiser's analysis of market rents over the past five years indicates that they have increased at a compound rate of 2.5% per year and that the market expects that pattern to continue.
- The lease on Store A will run for two more years at a rent of $0.91 per square foot per month, or $10.95 per square foot per year. An interview with the tenant indicates that the tenant intends to renew the lease at the market rate when the lease expires.
- Store B has a 10-year lease with six years remaining. The rent is currently $1.78 per square foot per month and will increase at a rate of 5% per year or one-half the change in the consumer price index (CPI), whichever is greater. The CPI is expected to increase 4% per year over the next five years.
- Stores C, D, and E were recently leased for 10 years. These leases and all new leases are set at market rent with provisions to keep the rents at market rates throughout the projection period.
- The landlord is responsible only for real estate taxes, exterior maintenance, management, and capital items. Tenants are responsible for all other expenses.
- Taxes are currently $7,000 per year. The tax assessor reviews and reassesses properties every three years. The subject property was reviewed one year ago, and taxes are expected to increase by about $800 with each subsequent review. There is a market expectation

that the rate of change will probably remain the same over the next two reviews, i.e., the period of the income and expense analysis.

- General exterior maintenance, including cleanup and landscaping, costs $200 per month. This expense is expected to increase each year by $20 per month.
- Property management fees are set at 5% of the effective gross income.
- A nominal collection loss of 0.5% of scheduled rent is anticipated.
- The roof should be replaced during the second year at a cost of $30,000 (see Table 26.3), but no other exterior repairs or replacements are expected during the projection period.
- Income for the sixth year of the investment is forecast and used to estimate the resale price of the property at the end of the five-year projection period. The income for Year 6 of this forecast is the income for the first year of operation under the new owner. The net resale price of the property in five years is expected to be approximately $3,086,000, calculated as net operating income for Year 6 capitalized at a terminal capitalization rate of 7% less a sales expense of 3% of the sale price. (In discounted cash flow calculations, the terminal capitalization rate is usually higher than the implied going-in capitalization rate–i.e., the capitalization rate in Year 1–for a variety of reasons. For example, at the end of the projection period the improvements will be older, more expensive to maintain, and closer to the end of their economic lives, which may affect the property's economic performance in competition with newer properties. Also, an income projection farther into the future involves more risk than a projection closer to the present date.)

The appraiser has determined through diligent research that a leased fee yield rate of 11% is proper and is using the five-year discounted cash flow analysis shown in Table 26.3 to estimate the value of the leased fee estate.

Extracting a Yield Rate from a Comparable Sale

In the subject property's market area, a 12,000-sq.-ft. strip shopping center with four tenants was recently purchased for $817,000. Table 26.4 shows the buyer's projected income and expense data for the five-year expected holding period and for Year 6, which is used for the reversion calculation.

At the end of the five-year projection period, the investor expects to resell the property at a terminal capitalization rate of 6.5% less sales costs of 5%, resulting in a forecast reversion of $887,373. To solve for a yield rate (in this case, an internal rate of return, or *IRR*), the appraiser uses a mathematical trial-and-error process in which various overall yield rates are tested against the known sale price and cash flows. These repetitive calculations are handled with the special functions of financial calculators and spreadsheet software.

Solving for the expected overall yield rate using a financial calculator and the cash flows shown in Table 26.5 produces a yield rate of 7.8%

Table 26.3 Five-Year DCF Analysis of a Shopping Center

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Income						
Store A	$21,900	$21,900	$46,228	$47,383	$48,568	$49,782
Store B	$38,676	$40,610	$42,640	$44,772	$47,011	$49,361
Store C	$44,000	$45,100	$46,228	$47,383	$48,568	$49,782
Store D	$44,000	$45,100	$46,228	$47,383	$48,568	$49,782
Store E	$44,000	$45,100	$46,228	$47,383	$48,568	$49,782
Subtotal	$192,576	$197,810	$227,550	$234,305	$241,282	$248,489
Collection loss (0.5%)	– $963	– $989	– $1,138	– $1,172	– $1,206	– $1,242
Effective gross income	**$191,613**	**$196,821**	**$226,413**	**$233,134**	**$240,076**	**$247,247**
Expenses						
Taxes	$7,000	$7,000	$7,800	$7,800	$7,800	$8,600
Maintenance	$2,400	$2,640	$2,880	$3,120	$3,360	$3,600
Management*	$9,581	$9,841	$11,321	$11,657	$12,004	$12,362
Subtotal	$18,981	$19,481	$22,001	$22,577	$23,164	$24,562
Net cash flow	**$172,632**	**$177,340**	**$204,412**	**$210,557**	**$216,912**	**$222,685**
Replacement allowance	$0	$30,000	$0	$0	$0	$0
Net operating income	$172,632	$207,340	$204,412	$210,557	$216,912	$222,685
***PV* of $1 @ 11% factor†**	× 0.900901	× 0.811622	× 0.731191	× 0.658731	× 0.593451	
Present value of income stream	$155,525	$168,281	$149,464	$138,700	$128,726.52	
Subtotal						$740,697
Present value of net resale price‡	$3,085,771	×	0.593451		=	$1,831,254
Total leased fee present value indication						$2,571,951

* Calculated as 5% of effective gross income.

† The present value of $1 is calculated as $1/(1 + i)^n$. These factors are preprogrammed in financial calculators and computer spreadsheets.

‡ Calculated as Year 6 net operating income capitalized at a terminal capitalization rate of 7% ($222,685/0.07) less a selling expense of 3% of sale price (3,181,214 × 0.97).

Note: Dollar amounts are rounded in the displayed amounts but not in internal calculations, which can result in apparent mathematical errors.

Table 26.4 Buyer's Income and Expense Forecast

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6*
Income						
Store 1	$10,000	$10,400	$10,816	$11,249	$11,699	$12,165
Store 2	17,676	18,210	18,888	19,453	19,941	20,835
Store 3	13,151	13,677	14,224	14,793	15,385	16,000
Store 4	19,726	20,515	21,348	22,189	23,077	24,000
Subtotal	$60,553	$62,802	$65,276	$67,684	$70,102	$73,000
Expenses						
Taxes	$6,600	$6,600	$6,600	$7,200	$7,200	$7,200
Maintenance	810	875	953	1,060	1,108	1,210
Management	3,020	3,133	3,256	3,374	3,515	3,625
Collection loss	300	257	243	240	264	250
Subtotal	**10,730**	**10,865**	**16,252**	**11,874**	**17,287**	**12,285**
Net cash flow	$49,823	$51,937	$43,824	$55,810	$47,615	$60,715
Replacement allowance	0	0	5,200	0	5,200	0
Net operating income	$49,823	$51,937	$49,024	$55,810	$52,815	$60,715

* Income in first year under new ownership.

Table 26.5 Projected Cash Flow in Each Year

Period	Cash Flow
0	-$817,000
1	$49,823
2	$51,937
3	$49,024
4	$55,810
5	$52,815 (cash flow)
	$887,373 (reversion)

(rounded). As an additional check, other comparable sales could be analyzed and the resulting yield rates reconciled to provide additional market support for the overall yield rate estimate.

Discounted Cash Flow Analysis in Subdivision Development Analysis

The following example illustrates how discounted cash flow analysis may be applied in subdivision analysis to estimate raw land value. Subdivision development analysis can also be used to estimate the value of completed homes, condominium units, super pads, or other types of property that is commonly subdivided. The projection of income and absorption in discounted cash flow analysis allows appraisers to develop an opinion of value at the point in the development timeline that is appropriate for the appraisal assignment.

In this case, a 20-acre tract of vacant land is being considered for development as a residential subdivision with 48 lots. It is projected to take six months to plat the subdivision, achieve entitlements, and construct the infrastructure for the entire subdivision. After permitting and construction are completed, a two-year absorption period is estimated to market the entire lot inventory. Discounting will be conducted over all five semiannual phases. The market supports an average retail price of $40,000 per lot in the first semiannual marketing period. Average lot prices will increase $2,000 in each succeeding six-month period. Expenses are projected as follows:

- Survey, site plan, and development fees over the permitting stage are estimated to be $35,000 in the first semiannual period. Holding costs for real estate taxes, developer overhead, fee, and other related costs over the permitting and construction stage are estimated at about $1,300.
- On-site construction costs, including infrastructure improvements within the subdivision and soft costs, are $10,500 per lot for a total cost of $504,000 spread over Periods 1, 2, and 4 as shown in Table 26.6.
- Off-site development costs are also required as part of the subdivision approval by local authorities. This adds $5,000 per lot for a total of $240,000 for off-site road and other improvements. The holding costs and taxes over the construction period are accounted for as

part of the $1,300 cost of the permitting phase. The absorption costs include marketing at 7% of gross sales and legal and closing costs at 2% of gross sales.

- After the lots are built, taxes are accounted for in the holding costs over the remaining absorption period. Real estate taxes are estimated at $400 per year for each developed lot in inventory in each period (calculated for the average number of lots in inventory in each six-month period at $200 per lot). Miscellaneous costs over the absorption period are $3,000 per six-month period.
- Administration costs and supervision costs (sometimes referred to as the *developer's fee*) are $10,000 per six-month period, which is appropriate given the relatively small size of this project.

Table 26.6 shows a discounted cash flow analysis of the income and expenses associated with the projections for the hypothetical project over the 2½-year permitting, construction, and absorption period. The

Table 26.6 DCF Analysis (with No Line-Item Entrepreneurial Incentive)

	Semiannual Period					
Description	**1**	**2**	**3**	**4**	**5**	**Total**
Beginning lot inventory	0	48	36	24	12	
Number of developed lots	48	0	0	0	0	48
Lots sold	0	12	12	12	12	48
Ending lot inventory	48	36	24	12	0	
Cumulative lots sold	0	12	24	36	48	
Average lot price		$40,000	$42,000	$44,000	$46,000	
Gross lot sales income	$0	$480,000	$504,000	$528,000	$552,000	$2,064,000
Less: Permitting stage costs						
Survey, site plan, and fees	$35,000					$35,000
Holding costs during permitting and construction	$1,300					$1,300
Less: Construction stage costs						
On-site direct and indirect construction costs	$384,000	$95,000		$25,000		$504,000
Off-site construction costs	$240,000					$240,000
Less: Absorption phase costs						
Marketing		$33,600	$35,280	$36,960	$38,640	$144,480
Legal/closing		$9,600	$10,080	$10,560	$11,040	$41,280
Miscellaneous		$3,000	$3,000	$3,000	$3,000	$12,000
Holding costs during absorption		$8,400	$6,000	$3,600	$1,200	$19,200
Less: Administrative/supervision costs	$10,000	$10,000	$10,000	$10,000	$10,000	$50,000
Subtotal expenses	$670,300	$159,600	$64,360	$89,120	$63,880	$1,047,260
Net proceeds	-$670,300	$320,400	$439,640	$438,880	$488,120	$1,016,740
Present value calculation						
Periodic discount rate	11.50%	semiannual period				
Present value factor	0.896861	0.8043596	0.7213988	0.64699441	0.580264	
Present value per period	-$601,166	$257,717	$317,156	$283,953	$283,238	$540,898
Indicated land value	$540,898					
Rounded	$540,000					

DCF analysis anticipates that lot sale prices will increase and expenses will reflect the pattern shown in the 30-month projection. A yield rate of 23% (or 11.5% over each six-month period) based on market-derived rates from similar subdivision development sales is used with no line-item entrepreneurial incentive. (Published surveys from national data providers are also used as sources of yield rates.) Accordingly, all the entrepreneurial incentive associated with the project is accounted for in the selection of the yield rate. After applying the yield rate to the net proceeds, the indicated land value for the raw land in "as is" condition at the time of the appraisal can be rounded to $540,000.

Note that some market analysts do not discount the negative cash flows in the beginning of the projection period or use a much lower discount rate, which can be appropriate when discount rates are properly supported by credible market data. Similarly, some market participants may prefer to have a separate allocation for entrepreneurial incentive as a line-item expense in the list of development expenses, which is possible with the application of a separate discount rate for the remaining cash flow after entrepreneurial incentive is accounted for. When what is known as the *bifurcated method* or *split-rate method* is used, a separate discount rate is selected in conjunction with the line-item incentive used for the calculation. Line-item incentive is a percentage of gross sales, not a yield rate. In Table 26.7 an 8% line-item entrepreneurial incentive is included in the DCF analysis. The appropriate yield rate derived from market data is 15.5% with the given line-item entrepreneurial incentive of 8% of gross lot sales each period. The total present value is rounded to $540,000, the same as the land value conclusion derived using the nonbifurcated yield rate method with no line-item entrepreneurial incentive.

As demand decreases for vacant residential lots, absorption periods increase and, all else being the same, the land value of acreage will be lower where subdivision development is the highest and best use. Under poor market conditions, especially with levels of lot prices flat or stagnant and the time frame for market absorption growing longer, land values will typically decrease. This affect is demonstrated in the example shown in Table 26.8, which uses the same figures shown in Table 26.6 except that the required marketing time to sell the lot inventory has increased and lot values are flat for the initial marketing period with a lower increase over the last two years.

In this example, the six-step market analysis process reveals that in this recovering market, after permitting and construction are completed, a four-year absorption period will be required to market the entire lot inventory. Discounting will be conducted over all nine semiannual phases. The market supports a current average retail price of $40,000 per lot, which is anticipated to remain constant for the first two years (four periods) of absorption. Beginning in Year 3 of the absorption period, retail lot values are anticipated to increase $1,000 each succeeding six-month period. The projected expenses are the same as those shown

Table 26.7 DCF Analysis (with Line-Item Entrepreneurial Incentive)

		Semiannual Period					
Description		**1**	**2**	**3**	**4**	**5**	**Total**
Beginning lot inventory		0	48	36	24	12	
Number of developed lots		48	0	0	0	0	48
Lots sold		0	12	12	12	12	48
Ending lot inventory		48	36	24	12	0	
Cumulative lots sold		0	12	24	36	48	
Average lot price			$40,000	$42,000	$44,000	$46,000	
Gross lot sales income		$0	$480,000	$504,000	$528,000	$552,000	$2,064,000
Less: Permitting stage costs							
Survey, site plan, and fees		$35,000					$35,000
Holding costs during permitting and construction		$1,300					$1,300
Less: Construction stage costs							
On-site direct and indirect construction costs		$384,000	$95,000		$25,000		$504,000
Off-site construction costs		$240,000					$240,000
Less: Absorption phase costs							
Marketing			$33,600	$35,280	$36,960	$38,640	$144,480
Legal/closing			$9,600	$10,080	$10,560	$11,040	$41,280
Miscellaneous			$3,000	$3,000	$3,000	$3,000	$12,000
Holding costs during absorption			$8,400	$6,000	$3,600	$1,200	$19,200
Less: Administrative/supervision costs		$10,000	$10,000	$10,000	$10,000	$10,000	$50,000
Less: Line-item entrepreneurial incentive							
Percent of gross sales	(8.0%)	$0	$38,400	$40,320	$42,240	$44,160	$165,120
Subtotal expenses		$670,300	$198,000	$104,680	$131,360	$108,040	$1,212,380
Net proceeds		-$670,300	$282,000	$399,320	$396,640	$443,960	$851,620
Present value calculation							
Periodic discount rate	7.75%						
Present value factor		0.9280742	0.8613218	0.7993706	0.74187525	0.6885153	
Present value per period		-$622,088	$242,893	$319,205	$294,257	$305,673	$539,940
Indicated land value		$539,940					
Rounded		$540,000					

in Table 26.6. The initial development costs are also the same, as are the holding costs over the permitting and construction stage, the on-site construction costs, and the off-site development costs. Holding costs including taxes are $1,300 for the permitting phase. After the lots are built, taxes are estimated at $400 per year for each developed lot in inventory in each six-month period (calculated for the average number of lots in inventory in each six-month period at $200 per lot). Miscellaneous costs over the absorption period are the same at $3,000 per six-month period, together with administrative costs of $10,000 per period. The remaining holding costs are also unchanged with marketing sales costs of 7% of gross sales and legal and closing costs of 2% of gross sales. The yield rate is the same at 23%, or 11.5% for each six-month period, based on market-derived rates for similar subdivision development with no line-item entrepreneurial incentive.

Table 26.8 Discounted Cash Flow under Poor Market Conditions

Description		Semiannual Period 1	2	3	4	5	6	7	8	9	Total
Beginning lot inventory		0	48	42	36	30	24	18	12	6	
Number of developed lots		48	0	0	0	0	0	0	0	0	48
Lots sold		0	6	6	6	6	6	6	6	6	48
Ending lot inventory		48	42	36	30	24	18	12	6	0	
Cumulative lots sold		0	6	12	18	24	30	36	42	48	
Average lot price			$40,000	$40,000	$40,000	$40,000	$41,000	$42,000	$43,000	$44,000	
Gross lot sales income		$0	$240,000	$240,000	$240,000	$240,000	$246,000	$252,000	$258,000	$264,000	$1,980,000
Less: Permitting stage costs											
Survey, site plan, and fees		$35,000									$35,000
Holding costs during permitting and construction		$1,300									$1,300
Less: Construction stage costs											
On-site direct and indirect construction costs		$384,000	$95,000		$25,000						$504,000
Off-site construction costs		$240,000									$240,000
Less: Absorption phase costs											
Marketing			$16,800	$16,800	$16,800	$16,800	$17,220	$17,640	$18,060	$18,480	$138,600
Legal/closing			$4,800	$4,800	$4,800	$4,800	$4,920	$5,040	$5,160	$5,280	$39,600
Miscellaneous			$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$3,000	$24,000
Holding costs during absorption (taxes)			$9,000	$7,800	$6,600	$5,400	$4,200	$3,000	$1,800	$600	$38,400
Less: Administrative/supervision costs		$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$90,000
Less: Line-item profit incentive											
Percentage of gross sales	0.0%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal expenses		$670,300	$138,600	$42,400	$66,200	$40,000	$39,340	$38,680	$38,020	$37,360	$1,110,900
Net proceeds		-$670,300	$101,400	$197,600	$173,800	$200,000	$206,660	$213,320	$219,980	$226,640	$869,100
Present value calculation											
Periodic discount rate	11.5%										
Present value factor		0.896861	0.8043596	0.7213988	0.64699441	0.580264	0.520416	0.466741	0.418602	0.375428	
Present value per period		-$601,166	$81,562	$142,548	$112,448	$116,053	$107,549	$99,565	$92,084	$85,087	$235,730
Indicated land value		$235,730									
Rounded		$235,000									
Previous land value financial feasible subdivision development		$540,000	$27,000	per acre							
Land value supported under poor marketing conditions		$235,000	$11,750	per acre							
Difference		-56.5%									

In this example the prolonged absorption period and minimal lot value increases over the absorption period reflect a significantly lower land value conclusion of $235,000. This amount is about 57% less than the land value supported under the initial scenario in Table 26.6. In order for the developer to achieve the same level of profit (23% yield rate), the highest land value supported is $235,000.

The application of DCF analysis is useful as a method for checking the reasonableness of value indications derived from other methods applied to estimate the value of vacant land with development potential. Comparing the value indication derived from DCF analysis with a land value indication derived using sales comparison allows an appraiser to test the feasibility of a proposed project and solve for the appropriate discount rate and associated line-item profit allocation. If the value indication from the DCF analysis is less than the value indication from the sales comparison technique of land valuation, the appraiser may judge the proposed project to be infeasible. Often multiple development scenarios may be applied to provide support for a highest and best use conclusion.

Developers who are also home builders may perform a subdivision development analysis that begins with the sale prices of the finished homes. Appraisers may also use this type of analysis to develop raw land or finished lot values. However, the cost of constructing the homes must be deducted, and care must be taken in selecting the discount rate and in allocating the entrepreneurial incentive between land and improvements in accordance with market practices.

Analysis of Office/Retail Building Investment

The analysis that follows is based on a five-year forecast of the future benefits from an office/retail building investment. Net operating income is estimated for each year. The proceeds from resale of the property at the end of the fifth year are also estimated.

Property Analysis

The subject property is a three-story office/retail building with 32,100 square feet of gross building area. On the first level at street grade, 4,018 square feet of usable area is allocated to a retail tenant. The building also has a ground-floor office with a rentable area of 4,500 square feet and 4,018 square feet of usable area, indicating a load factor of 12% ((4,500 – 4,018)/4,018). The same load factor applies to the rest of the building, which is office space.

The building was originally constructed approximately 20 years ago and underwent a major renovation about two years ago. Currently, three tenants occupy the building and a fourth tenant has just signed a lease. Lease terms and data on expenditures and other property and market information are described below and summarized in Tables 26.9, 26.10, and 26.11.

Rationale for the Forecast

The appraiser determines that investors in office buildings similar to the subject property typically forecast net operating incomes or equity incomes over a five-year projection period. To establish a purchase price that will justify the risk inherent in the proposed investment, the forecast net operating incomes or equity incomes and the reversion are discounted at an appropriate yield rate.

To simulate typical investor analysis, the appraiser

1. Analyzes current income, establishes the market rent level for each tenant's space, and forecasts future income for each year of a six-year period based on existing leases, probable lease renewal at market rent, and expected vacancy experience.
2. Forecasts other income, including income from escalation clauses contained in existing leases and expected escalation provisions in new leases.
3. Forecasts future property expenses after analyzing historical operating expenses, the experience of competitive properties, and the current budget for the property.
4. Estimates net operating income.
5. Estimates property reversion.
6. Forecasts mortgage debt service based on existing or proposed financing terms.
7. When appropriate, estimates the equity income to be generated by the property in each year of the forecast projection period.
8. Estimates the reversionary benefits to be received at the end of the projection period (in this case, Year 6 I_O using an 8.5% terminal capitalization rate). If a significant capital expenditure or change in leases in the sixth year–i.e., the year of reversion–is expected, the projection period may be extended to incorporate this event. This will ensure that the analysis is not influenced by an unusual event in the reversion year used to calculate the reversion value.

In developing an opinion of market value, an appraiser must apply these steps in a manner that reflects the thinking of market participants. In this sample application, the appraiser begins by assembling pertinent information on comparable office buildings in the same market as the subject property. To verify the data, the appraiser interviews one of the participants, usually the buyer, to determine the net operating income (or equity income) forecast of each building owner associated with each comparable property.

Tenants and Leases in the Subject Property

Tenant 1, a national restaurant tenant, is located on the first floor (4,018 usable square feet). The tenant moved in shortly after renovation, two years ago, and pays $19.50 per square foot of rentable area per year on an absolute net lease basis fixed for 10 years. This tenant has the right to renew for another 10 years at market rent.

Tenant 2, a law firm, occupies 4,911 square feet of usable area on the first floor and 8,929 square feet of usable area on the second floor. This local firm has experienced considerable growth over the past 10 years and moved to the subject building to accommodate this expansion. The lease began two years ago and has a term of 10 years with an option to renew at market rents. The tenant is currently paying rent of $15.75 per square foot of rentable area per year, with an expense stop of $4.25 per square foot. The lease calls for the rent to increase at 2% per year.

Tenant 3 occupies 6,786 square feet of usable area on the third floor and currently pays $17 per square foot of rentable area per year on a full-service basis. An escalation clause provides for a 3.5% annual increase in rent over the five-year term of the lease, which began two years ago. This tenant has an option to renew for another five years at a fixed rent of $20 per square foot of rentable area per year full service and has indicated an intention to do so. At the time of renewal, the owner will give the tenant a tenant improvements (TI) allowance of $4 per square foot of rentable area to refresh the space. The leasing commission at the time of renewal is estimated at 2% of total contract rent, and it is due in full at the time of renewal.

The remainder of the space, 2,143 square feet of usable area on the third floor, has just been leased to Tenant 4 at $16 per square foot of rentable area per year with rents escalating at 3.5% per year and an expense stop of $5.00 per square foot. The term of the lease is seven years. For this new tenant, the TI allowance is $12 per square foot of rentable area and the leasing commission is 4% of total contract rent. The commission is paid during the first month.

Relevant lease information is summarized in Figure 26.1, and the rental income for each lease is forecast in Table 26.9.

Forecast Operating Expenses and Reimbursements

Property taxes are $64,000 due at the end of the year. Property insurance is $0.23 per square foot of rentable area per year. Property management is 4% of effective gross rental income. Common area maintenance (CAM) is $3.25 per square foot of rentable area per year. Property taxes are expected to grow at 4% per year, while insurance and CAM are expected to grow at 3% per year over the next 10 years.

The total operating expenses for each year in the six-year projection period are calculated in Table 26.10, and operating expense reimbursements are summarized in Table 26.11.

Capital Expenses

At the time of renovation, the owners elected to postpone replacement of the roof. However, all parties agree that a capital expenditure of $40,000 will be required in about four years to replace the roof. In Table 26.12, the leasing expenses and capital costs are listed in the year those charges are incurred.

Figure 26.1 Lease Abstracts

Tenant 1	
Creditworthiness	High—national credit tenant
Usable area	4,018 sq. ft.
Rentable area	4,500 sq. ft.
Term of lease	10 years (began 2 years ago)
Escalation clause	None
Renewal clause	Yes—right to renew for another 10 years at market rental rate
Contract/forecast rent	$19.50 per sq. ft. per year (rentable)
Tenant 2	
Creditworthiness	Good
Usable area	13,840 sq. ft.
Rentable area	15,500 sq. ft.
Term of lease	10 years (began 2 years ago)
Escalation clause	2% annually
Renewal clause	Yes—right to renew at market rental rate
Contract/forecast rent	$15.75 per sq. ft. per year (rentable)
Tenant 3	
Creditworthiness	Average
Usable area	6,786 sq. ft.
Rentable area	7,600 sq. ft.
Term of lease	5 years (began 2 years ago)
Escalation clause	3.5% annually
Renewal clause	Right to renew for 5 additional years at $20 per sq. ft. per year fixed
Contract/forecast rent	3 years at $17 per sq. ft. per year, 5 years at $20 per sq. ft. per year (rentable)
Tenant 4	
Creditworthiness	Average
Usable area	2,143 sq. ft.
Rentable area	2,400 sq. ft.
Term of lease	7 years
Escalation clause	3.5% annually
Renewal clause	None
Contract/forecast rent	$16 per sq. ft. per year (rentable)

Table 26.9 Summary of Forecast Contract Rental Income

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Tenant 1	$87,750	$87,750	$87,750	$87,750	$87,750	$87,750
Tenant 2	$244,125	$249,008	$253,988	$259,067	$264,249	$269,534
Tenant 3	$129,200	$133,722	$138,402	$152,000	$152,000	$152,000
Tenant 4	$38,400	$39,744	$41,135	$42,575	$44,065	$45,607
Potential income	$499,475	$510,224	$521,275	$541,392	$548,064	$554,891

Table 26.10 Total Forecast Operating Expenses Over Projection Period

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Property taxes	$64,000	$66,560	$69,222	$71,991	$74,871	$77,866
Property insurance	$6,900	$7,107	$7,320	$7,540	$7,766	$7,999
Property management	$21,491	$22,083	$22,692	$23,662	$24,112	$24,574
Common area maintenance	$97,500	$100,425	$103,438	$106,541	$109,737	$113,029
Total operating expenses	$189,891	$196,175	$202,672	$209,734	$216,486	$223,468

Table 26.11 Forecast Operating Expense Reimbursements Over Projection Period

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Tenant 1	$28,257	$29,175	$30,125	$31,159	$32,144	$33,163
Tenant 2	$31,454	$34,617	$37,888	$41,451	$44,845	$48,355
Tenant 3	$0	$0	$0	$0	$0	$0
Tenant 4	$3,070	$3,560	$4,067	$4,618	$5,144	$5,687
Total operating expense reimbursements	$62,781	$67,352	$72,080	$77,228	$82,133	$87,205

Table 26.12 Leasing Expenses and Capital Costs

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Leasing commissions	$11,949			$15,200		
Tenant improvements	$28,800			$30,400		
Capital costs				$40,000		

Other Research

Investors allocate a vacancy allowance of at least 5% of potential rental income even when a property is fully occupied. In addition, reversionary capitalization rates for similar buildings are approximately 8.5%, a five-year projection period is typically used for analysis, and selling expenses are estimated at approximately 3%. Investors are typically using a 9.5% discount rate when discounting the cash flows before debt service and the reversion to arrive at a value indication. Market participants are not deducting a replacement allowance before calculating net operating income, but they are deducting leasing fees and capital expenses before calculating cash flow before debt service. In Table 26.13, cash flow before debt service is calculated for each year of the five-year projection period along with the sixth year for purposes of calculating the reversion.

Reversion Calculation

The resale price is forecast by applying an 8.5% overall capitalization rate to the net operating income for the year after the projection period (Year 6). The net operating income for Year 6 represents the projected

Table 26.13 Forecasting Cash Flows

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Income						
Tenant 1	$87,750	$87,750	$87,750	$87,750	$87,750	$87,750
Tenant 2	244,125	249,008	253,988	259,067	264,249	269,534
Tenant 3	129,200	133,722	138,402	152,000	152,000	152,000
Tenant 4	38,400	39,744	41,135	42,575	44,065	45,607
Potential rental income	$499,475	$510,224	$521,275	$541,392	$548,064	$554,891
Other income	$0	$0	$0	$0	$0	$0
Expense reimbursements						
Tenant 1	$28,257	$29,175	$30,125	$31,159	$32,144	$33,163
Tenant 2	31,454	34,617	37,888	41,451	44,845	48,355
Tenant 3	0	0	0	0	0	0
Tenant 4	3,070	3,560	4,067	4,618	5,144	5,687
Total expense reimbursements	$62,781	$67,352	$72,080	$77,228	$82,133	$87,205
Total income	$562,256	$577,576	$593,355	$618,620	$630,197	$642,096
Vacancy & collection allowance (5%)	– 24,974	– 25,511	– 26,064	– 27,070	– 27,403	– 27,745
Effective gross income	$537,282	$552,064	$567,291	$591,551	$602,793	$614,351
Operating expenses						
Property taxes	$64,000	$66,650	$69,222	$71,991	$74,871	$77,866
Property insurance	6,900	7,107	7,320	7,540	7,766	7,999
Property management	21,491	22,083	22,692	23,662	24,112	24,574
Common area maintenance	97,500	100,425	103,438	106,541	109,737	113,029
Total operating expenses	$189,891	$196,175	$202,672	$209,734	$216,486	$223,468
Net operating income (I_o)	$347,391	$355,890	$364,619	$381,817	$386,308	$390,883
Leasing commissions	11,949			15,200		
Tenant improvements	28,800			30,400		
Capital costs				40,000		
Cash flow before debt service	**$306,642**	**$355,890**	**$365,619**	**$296,217**	**$386,308**	

income for Year 1 under the next owner. In this application, sales expenses of 3% are deducted to determine the net resale price:

$$\frac{\text{6th Year } I_o}{\text{Terminal Cap. Rate}} = \text{Reversion Value}$$

$$\frac{\$390{,}883}{0.085} = \$4{,}598{,}624$$

Reversion Value	$4,598,624
– Selling Expenses	– $138,959
Reversion =	$4,459,665

The Investor's Desired Rate of Return

The value of the property can be estimated by calculating the present value of the net cash flow for each year of the five-year projection period and adding the present value of the cash flow from the sale of the property in Year 6 (the net resale price). Suppose the typical investor requires an overall yield rate (Y_O) of 9.5%. At a 9.5% discount rate, the present value of the cash flow before debt service and reversion is $4,145,870 (see Table 26.14). This means that the investor would expect to earn a 9.5% rate of return if $4,145,870 is paid for the property.

Table 26.14 Discounting of Income Streams and Reversion

Period	Cash Flow before Debt Service	Present Value Factors	Present Value
Year 1	$308,154	0.913242	$281,419
Year 2	$357,564	0.834011	$298,212
Year 3	$366,460	0.761654	$279,116
Year 4	$298,222	0.695574	$207,435
Year 5	$388,497	0.635228	$246,784
Reversion proceeds	$4,459,665	0.635228	$2,832,904
Total present value			$4,145,870

Additional Analysis

Although property value was estimated by discounting the projected cash flow for each year rather than by applying a formula to develop an overall capitalization rate, an overall capitalization rate is implied in the solution. In this case, the overall capitalization rate (R_O) for Year 1 is 8.38% ($347,391/$4,145,870). This overall capitalization rate is lower than the 8.5% capitalization rate applied to the estimated net operating income for Year 6 to estimate the resale price.[1] The overall capitalization rate of 8.38% implied by a value estimate of $4,145,870 was calculated using the net operating income for Year 1.

This example illustrates the need to consider carefully the anticipated pattern of net operating income when selecting an overall capitalization rate to be used in direct capitalization or a property model for yield capitalization. Capitalization rates can differ significantly for properties with different patterns of net operating income beyond the first year and different resale potential. The absence of a regular income pattern does not necessarily mean that detailed DCF analysis is the only method that should be considered. The appraiser may discover that one of the standard valuation models can be adjusted to compensate for a deviation from the regular income pattern or that a special valuation model can be devised to solve the problem at hand.

1. See D. Richard Wincott, "Terminal Capitalization Rates and Reasonableness," *The Appraisal Journal* (April 1991): 253-260. If, over the projection period, a substantial capital expenditure is allocated for the refurbishment or renovation of an aging property, R_N may equal or be less than R_O. Such a relationship between R_N and R_O is also likely when current income exceeds market levels or when current market conditions are inferior to those anticipated at the end of the projection period.

27

The Cost Approach

Like the sales comparison and income capitalization approaches, the cost approach is based on market comparisons. In the cost approach, appraisers compare the cost of the subject improvements to the cost to develop similar improvements as evidenced by the cost of construction of substitute properties with the same utility as the subject property. The estimate of development cost is adjusted for market-extracted losses in value caused by the age, condition, and utility of the subject improvements or for locational problems. The land value is then added, usually based on comparison with sales of comparable sites. The sum of the value of the land and the improvements is adjusted for the rights included with the subject property again based on market comparisons.

The cost approach reflects market thinking because market participants relate value to cost. Buyers of real property tend to judge the value of an existing structure not only by considering the prices and rents of similar buildings, but also by comparing the cost to create a new building with optimal physical condition and functional utility. Moreover, buyers adjust the prices they are willing to pay by estimating the costs to bring an existing structure up to the physical condition and functional utility they need.

> In the cost approach, a property is valued based on a comparison with the cost to build a new or substitute property. The cost estimate is adjusted for the depreciation evident in the existing property.

It is important to note that the cost approach is a theoretical breakdown of the property into land and building components. It is theoretical because market participants sell rights, not land and buildings. The breakdown into land and building components is important because it creates many issues that would not be relevant in the other approaches, where the land is not separated from the buildings. For example, the allocation of external obsolescence is an issue for the cost approach, but not for the income capitalization and sales comparison approaches.

To apply the cost approach, an appraiser estimates the market's perception of the difference between the property improvements being appraised and a newly constructed building with optimal utility (i.e., the ideal improvement identified in highest and best use analysis). In its classic form, the cost approach produces an opinion of the value of the fee simple estate. If the purpose of the appraisal is to estimate the value of an interest other than fee simple, an adjustment will be required. For example, a property rights adjustment could be made as a lump-sum adjustment at the end of the cost approach. This would be particularly important when the interest appraised is the leased fee encumbered by a long-term lease.

In applying the cost approach, an appraiser must distinguish between two cost bases–reproduction cost and replacement cost–and use one of the two consistently throughout the analysis. The market and physical condition of the appraised property usually suggest whether an exact replica of the subject property (reproduction cost) or a substitute property of comparable size and use (replacement cost) would be the basis of a more suitable comparison. The term *modern equivalent asset* is used in international valuation standards to describe an asset that provides "similar function and equivalent utility to the asset being valued" rather than a replica designed and constructed using current materials and techniques.[1]

Appraisers estimate the cost to construct existing structures and site improvements (including direct costs, indirect costs, and an appropriate entrepreneurial incentive or profit) using one of three traditional techniques:

- the comparative-unit method
- the unit-in-place method
- the quantity survey method

Appraisers then deduct all depreciation in the property improvements from the cost of the new structure as of the effective appraisal date. (Outside the United States, the term *depreciated replacement cost method* is often used to describe the application of the cost approach in this manner.) The amount of depreciation present is estimated using one or more of three fundamental methods:

- the market extraction method
- the economic age-life method
- the breakdown method

cost approach
A set of procedures through which a value indication is derived for the fee simple estate by estimating the current cost to construct a reproduction of (or replacement for) the existing structure, including an entrepreneurial incentive or profit; deducting depreciation from the total cost; and adding the estimated land value. Adjustments may then be made to the indicated fee simple value of the subject property to reflect the value of the property interest being appraised.

1. International Valuation Standards Council, *Technical Information Paper 2: The Cost Approach for Tangible Assets* (London: IVSC, 2012), Paragraph 8, s.v., "Modern Equivalent Asset."

When the value of the land is added to the cost of the improvements less depreciation, the result is the indicated value of the fee simple estate by the cost approach.

This chapter provides an outline of the cost approach (see Figure 27.1) and explains the fundamental appraisal concepts that support this approach to value. Chapters 28 and 29 discuss the specifics of building cost and depreciation estimates—i.e., the essential techniques applied to develop a convincing opinion of value using the cost approach.

Relation to Appraisal Principles

Substitution

The principle of substitution is basic to the cost approach. This principle affirms that a knowledgeable buyer would pay no more for a property than

Figure 27.1 Classic Cost Approach Analysis

Estimated cost new (replacement cost or reproduction cost)			
Direct costs		________	
Indirect costs		________	
Entrepreneurial incentive (or profit)		________	
Subtotal			________
Less: Depreciation			
Physical deterioration	________		
Deferred maintenance	________		
Incurable short-lived items	________		
Incurable long-lived items	________		
Subtotal		________	
Functional obsolescence			
Curable			
Item 1	________		
Item 2	________		
. . .	________		
Incurable			
Item 1	________		
Item 2	________		
. . .	________		
Subtotal		________	
External obsolescence			
Location	________		
Market	________		
Subtotal		________	
Subtotal			________
Plus: Depreciated cost of site improvements (including entrepreneurial incentive or profit)			________
Plus: Estimated land value			________
Total estimated cost (fee simple)			________
Property rights adjustment			________
Value indication of cost approach for the interest being appraised			________

the cost to acquire a similar site and construct improvements of equivalent desirability and utility without undue delay. In the cost approach, existing properties can be seen as substitutes for the property being appraised, and their value is also measured relative to the value of a new, optimal property. In short, the cost of property improvements on the effective date of the appraisal plus the accompanying land value provides a measure against which prices for similar improved properties may be judged.

Supply and Demand

Shifts in supply and demand cause prices to increase or decrease. As a result, a single property may have different values over time. If costs do not shift in proportion to price changes, the construction of buildings will be more or less profitable and the value of existing buildings will increase or decrease commensurately. If costs of production increase faster than values, new construction will be less profitable or may not be financially feasible. In other words, the incentive for developers to build is directly tied to supply and demand.

Contribution

The principle of contribution, which holds that the value of an individual component of a property is measured in terms of how much it contributes to the value of the property as a whole, is integral to the application of the cost approach. The various methods of estimating building costs are based on the contributions of the individual components of a property. International Valuation standards identify the summation method as a technique used in the cost approach to value an entire asset by adding the separate values of the asset's component parts.[2]

Conversely, the principle of contribution implies that the value of a component may be measured as the amount its absence would detract from the value of the property as a whole. From this perspective, the estimation of depreciation can be seen as an application of the principle of contribution.

In the application of the cost approach, the amount each component contributes to the value of the property as a whole is measured in relation to the highest and best use of the property. For example, if the highest and best use of the property is for the conversion of the existing improvements to an alternative use, items that must be changed for the property to achieve its highest and best use would suffer from some form of depreciation.

In the cost approach, the effect on value of a deficiency or superadequacy is addressed in the estimate of a form of depreciation known as *functional obsolescence*. The deficiency or superadequacy can be identified by comparing the existing improvements with the ideal improvement and then treated by making a deduction from the cost of the improvements. As the improvements depreciate, the site often contributes a higher percentage of total property value. As the ratio of land

2. Ibid., Paragraph 8, s.v., "Summation Method."

value to total property value approaches 100%, the likelihood that the improvements will be demolished or remodeled and that the property will be redeveloped to a new highest and best use increases.

Externalities

The construction cost and market value of a property may be affected differently by conditions that are external to the property. For example, externalities such as inflation or natural disasters may increase material and labor costs without a corresponding increase in market values. Real estate values do not always run parallel with other economic trends. On the other hand, an external event such as the completion of a sewer line may increase the value of a property but have no effect on its cost. Gains or losses in value caused by externalities may accrue to the land, the site, the building, or the property as a whole. Rising construction costs can significantly affect the market value of new construction and, in turn, the demand for and market value of older, substitute properties.

In the cost approach, a loss in building value due to external causes is attributed to external obsolescence, which is covered in detail in Chapter 29. Externalities can be temporary and may work in positive and negative directions over the life of a building improvement.

Highest and Best Use

In the first series of tests of highest and best use, an appraiser analyzes the site as though vacant and available to be developed to its highest and best use and identifies an ideal improvement or course of development. If the site is improved, the appraiser performs a second highest and best use analysis comparing the existing improvements to the ideal improvements. Thus, a parcel of land may have one highest and best use as though vacant, and the existing combination of the site and improvements may have a different highest and best use as improved. Existing improvements have a value equal to the amount they contribute to the site, or they may penalize the property value if they have outlived their usefulness. This penalty is often measured by the cost to raze and remove the obsolete improvements from the site.

Existing improvements are rarely identical to the ideal improvements, unless they are new construction, and even then, they may be an overimprovement or underimprovement by comparison with the ideal. For example, a new building that is poorly designed for the market is worth less than its cost because of the functional obsolescence in its design, which is discussed in more detail later in this chapter. An accurate and detailed analysis of highest and best use is critical to the cost approach because the comparison of the existing improvement and the ideal improvement based on the highest and best use identifies any forms of depreciation that are present in the building.

Stabilization

The value of a property indicated by the cost approach is the value of a fee simple estate. For properties that are leased, the cost approach assumes stabilized occupancy and income. An appraiser considers the holding costs that accrue during the leasing phase of property development along with other indirect costs such as leasing commissions, marketing costs, and rent concessions. Tenant finish costs may also be necessary to achieve stabilized occupancy and, if so, they must be added as a direct cost. Also, a property with rents that are higher or lower than market rents may be stabilized in terms of occupancy, but the value developed by the cost approach may still require an adjustment. As an alternative, factors such as tenant finish costs and non-market rents could be recognized in the process of reconciling the value indications of the other approaches to value.

Applicability and Limitations

In any market, the value of a building can be related to its cost. The cost approach is particularly important when a lack of market activity limits the usefulness of the sales comparison approach and when the property to be appraised–e.g., a one-unit residence–is not amenable to valuation by the income capitalization approach. Because cost and market value are usually more closely related when properties are new, the cost approach is important in estimating the market value of new or relatively new construction. The approach is especially persuasive when land value is well supported and the improvements are new or suffer only minor depreciation and, therefore, approximate the ideal improvement that is the highest and best use of the land as though vacant. The cost approach can also be applied to older properties given adequate data to measure depreciation.

The cost approach may be used to develop an opinion of market value (or some other type of value the appraisal assignment may require such as use value or fair value) of proposed construction, special-purpose or specialty properties, and other properties that are not frequently exchanged in the market. Buyers of these properties often measure the price they will pay for an existing building against the cost to build less depreciation or against the cost to purchase an existing structure and make any necessary modifications. If comparable sales or comparable rentals are not available, current market indications of depreciated cost, or the costs to acquire and refurbish an existing building, would be the best reflections of market thinking and, thus, of market value.

When the physical characteristics of comparable properties differ significantly, the relative values of these characteristics can sometimes be identified more precisely with the cost approach than with the sales comparison approach. Because the cost approach starts with the cost to construct a replica or a substitute property with optimal physical and functional utility, it can help an appraiser determine accurate adjustments for physical differences in comparable sale properties. If, for example, an appraiser must make an adjustment

> The cost approach is most applicable in valuing new or proposed construction when the improvements represent the highest and best use of the land as though vacant and the land value is well supported.

Depending on the purpose of the appraisal assignment, the cost approach can be used to develop an opinion of the market value or use value of special-purpose properties and properties that are not frequently exchanged in the market.

for inadequate elevators in a comparable property, the cost to cure the deficiency can be used as a basis for this adjustment. Thus, the cost approach provides the appraiser with data to use both in estimating depreciation and in deriving an adjustment to apply in the sales comparison approach.

The cost approach is especially useful when building additions or renovations are being considered, which is a key issue in highest and best use analysis. The approach can be used to estimate whether the cost of an improvement, including an entrepreneurial incentive, will be recovered through an increased income stream or in the anticipated sale price. The analysis of feasibility rent can help identify and prevent the construction of overimprovements.

Because the cost approach requires that land and improvements be valued separately, it is also useful in appraisals for insurance purposes, when uninsurable items must be segregated from insurable items. In valuation for financial reporting (i.e., accounting purposes), the cost approach is applied to estimate depreciation for income tax purposes. In cases where land value tends to make up a considerable portion of overall property value (such as agricultural properties or high-exposure commercial outparcels), the cost approach can take on greater significance in the reconciliation of the value indications of all the approaches to value applied because the cost approach is the only one requiring a separate conclusion of land value.

Finally, an estimate of probable building and development costs is an essential component of feasibility studies, which test the investment assumptions on which land use plans are based. A proposed development is considered financially feasible when market value exceeds total building and development costs plus a reasonable, market-supported estimate of entrepreneurial incentive (i.e., the anticipated profit necessary for an entrepreneur to proceed with the project).

A higher value indication from the application of the cost approach than from the sales comparison or income capitalization approaches may suggest that the real estate development is not economically feasible. If the cost approach indicates a higher value for an existing building, then the appraiser may need to take a closer look at one or more of the inputs—land value, current cost, depreciation, or entrepreneurial incentive. For older properties or properties in fluctuating markets, an inaccurate estimate of the remaining economic life could result in depreciation being understated, resulting in a higher value indication in the cost approach. When a higher or lower value is produced in the cost approach, that value indication is usually compared against the results of one or more of the other approaches and explained in the final reconciliation step of the valuation process.

When improvements are considerably older or do not represent the highest and best use of the land as though vacant, the physical deterioration, functional obsolescence, and external obsolescence may be more difficult to estimate. Furthermore, relevant comparable data may be lacking or the data available may be too diverse to indicate an appropriate estimate of entrepreneurial profit (i.e., the profit actually earned from a completed project). These conditions may make the cost approach less reliable.

One of the weaknesses of the cost approach, from an investment perspective, is the assumption that newly constructed improvements are immediately available on the date of the appraisal. An investor looking at options for an immediate purchase may consider the months or years required to develop and construct a new property to be an unacceptable delay. From the perspective of that investor, the cost approach would have no relevance.

Another problem arises if the asset being valued is clearly obsolete.[3] According to the principle of substitution, a buyer would pay no more for a property than the cost of buying or building a property of equal utility. Therefore, a property that has no utility would not be recreated, and the value of the property would be low. Any salvage value that remains is likely to be discovered in the test of financial feasibility in the appraiser's analysis of highest and best use of the subject property.

Even though the cost approach may have an advantage over the sales comparison and income capitalization approaches when reliable data on comparable sales and rents is scarce, that same lack of data can weaken the credibility of the estimate of land value that is an essential step in the application of the cost approach. All the appraisal methods used in land valuation depend on sales comparison and income capitalization techniques.

Appraisers must remember that the cost approach results in an indication of the value of the fee simple estate. To value real estate held in leased fee or property subject to other partial interests, appraisers must make adjustments to reflect the specific real property rights being appraised, such as a leased fee interest. An example of adjusting for property rights is shown in Chapter 29.

Procedure

After gathering all relevant information and analyzing data for the market area, site, and improvements, an appraiser follows a series of steps to derive a value indication by the cost approach. The appraiser will

1. Estimate the value of the site as though vacant and available to be developed to its highest and best use.
2. Determine which cost basis is most applicable to the assignment: reproduction cost or replacement cost.
3. Estimate the direct (hard) and indirect (soft) costs of the improvements as of the effective appraisal date.

3. Ibid., Paragraph 17.

4. Estimate an appropriate entrepreneurial incentive or profit from analysis of the market.
5. Add the estimated direct costs, indirect costs, and entrepreneurial incentive or profit to arrive at the total cost of the improvements.
6. Estimate the amount of depreciation in the improvements and, if necessary, allocate it among the three major categories:
   - physical deterioration
   - functional obsolescence
   - external obsolescence
7. Deduct estimated depreciation from the total cost of the improvements to derive an estimate of their depreciated cost.
8. Estimate the contributory value of any site improvements that have not already been considered. (Site improvements may be appraised at their contributory value–i.e., directly on a depreciated-cost basis–but may be included in the overall cost calculated in Step 3 and depreciated if necessary.)
9. Add land value to the total depreciated cost of all the improvements to develop the market value of the property.
10. Adjust for personal property (e.g., furniture, fixtures, and equipment) or intangible assets that are included in the appraisal.
11. Adjust the value conclusion, which reflects the value of the fee simple estate, for the property interest being appraised to arrive at the indicated value of the specified interest in the property.

Land Value

In the cost approach, the estimated market value of the land or site is added to the depreciated cost of the improvements. The value of the land depends on its highest and best use. Land value can be estimated using various techniques, which are discussed in Chapter 17. Appraisers must remember that the land value estimates produced with these techniques reflect the value of the fee simple estate. If a land lease is involved and it is not at market terms, this could have a positive or negative effect on value.

Reproduction Cost versus Replacement Cost

The cost to construct an improvement on the effective appraisal date may be developed as either the estimated reproduction cost or estimated replacement cost of the improvement. The theoretical base (and classic starting point) for the cost approach is reproduction cost, but replacement cost is more commonly used because it may be easier to obtain and can reduce the complexity of depreciation analysis. An important distinction must be made between the terms:

- Reproduction cost is the estimated cost to construct, as of the effective appraisal date, an exact duplicate or replica of the building being appraised, insofar as possible, using the same materials, construction standards, design, layout, and quality of workmanship, and embodying all the deficiencies, superadequacies, and obsolescence of the subject improvements.

- Replacement cost is the estimated cost to construct, as of the effective appraisal date, a substitute for the building being appraised using contemporary materials, standards, design, and layout. When this cost basis is used, some existing obsolescence in the property may be cured. Replacement cost may be the only alternative if reproduction cost cannot be estimated.

The decision to use reproduction cost or replacement cost is often dictated by the age of the structure, its uniqueness, and any difference between its intended use at the time of construction and its current highest and best use. In theory, the use of either reproduction cost or replacement cost should yield the same indication of value after proper application, but in practice both cost estimates and depreciation estimates may be different. If reproduction cost or replacement cost is used inconsistently, double-counting of items of depreciation and other errors can be introduced into the analysis. The cost basis selected for a particular appraisal should be clearly identified in the report to avoid misunderstanding and must be applied consistently throughout the cost approach to avoid errors in developing an opinion of value.

The use of replacement cost can eliminate the need to measure some, but not all, forms of functional obsolescence such as superadequacies and poor design. Replacement structures usually cost less than identical structures (i.e., reproductions) because they are constructed with materials and techniques that are more modern, more readily available, and less expensive in the current market. Also, correcting deficiencies may result in lower costs. Thus, a replacement cost estimate is usually lower and may provide a better indication of the existing structure's contribution to value. A replacement structure typically does not suffer functional obsolescence resulting from superadequacies. However, if functional problems persist in the hypothetical replacement structure, an amount must be deducted from the replacement cost. Estimating replacement cost generally simplifies the procedure for measuring depreciation in components of superadequate construction. An example of functional obsolescence would be the absence of a desirable feature such as air-conditioning in an existing improvement in a market where this feature is standard. This form of obsolescence would be corrected in a replacement building.

Estimating reproduction cost can be complicated because the improvements may include materials that are no longer available and construction standards or codes may have changed. Nevertheless, reproduction cost usually provides a better basis for measuring de-

reproduction cost

The estimated cost to construct, at current prices as of the effective date of the appraisal, an exact duplicate or replica of the building being appraised, using the same materials, construction standards, design, layout, and quality of workmanship and embodying all the deficiencies, superadequacies, and obsolescence of the subject building.

replacement cost

The estimated cost to construct, at current prices as of the effective appraisal date, a substitute for the building being appraised, using modern materials and current standards, design, and layout.

preciation from all causes when that sort of measurement is necessary.

direct costs
Expenditures for the labor and materials used in the construction of improvements; also called *hard costs*.

indirect costs
Expenditures or allowances for items other than labor and materials that are necessary for construction, but are not typically part of the construction contract. Indirect costs may include administrative costs, professional fees, financing costs and the interest paid on construction loans, taxes and the builder's or developer's all-risk insurance during construction, and marketing, sales, and lease-up costs incurred to achieve occupancy or sale. Also called *soft costs*.

Cost Estimates

To develop cost estimates for the total building, appraisers must consider direct costs (also known as *hard costs*) and indirect costs (also known as *soft costs*). Both direct and indirect costs are essential to a reliable cost estimate. (The traditional data sources and appraisal techniques used to estimate building costs are discussed in Chapter 28.)

Direct construction costs include the costs of material and labor as well as the contractor's profit required to construct the improvement on the effective appraisal date. The overhead and profit of the general contractor and various subcontractors are usually part of the construction contract and therefore are direct costs that should always be included in the cost estimate. In more complex projects, where multiple contractors, construction staging, or other complications are involved, a management fee may be required. Indirect costs are expenditures or allowances that are necessary for construction but are not typically part of the construction contract. These costs can include, but are not limited to, the cost of architectural and engineering services, loan origination fees, carrying costs during construction, title insurance fees, appraisal and legal fees, leasing and marketing costs, and developer's overhead and profit. Because the entrepreneur provides the inspiration, drive, and coordination necessary to the overall project, the cost approach should include an appropriate entrepreneurial incentive or profit, which is discussed later in this chapter. A construction contingency is not usually a soft cost but rather a hard cost.

Because the quality of materials and labor greatly influences costs, appraisers should be familiar with the costs of the materials used in the property being appraised. A building can cost substantially more than is typical if items such as walls and windows are overinsulated or thicker slabs are used to accommodate greater floor loads. Many newer structures contain elements that may not be found in older buildings with which they compete. At one time the market may have considered features such as Internet connectivity, networking and telecommunications capabilities, and adequate, reliable power in "smart" office buildings to be high-tech overimprovements. These features may not have contributed as much value as they cost at the time of installation, but as demand for the building materials and features continues to increase so does their contribution to value.

The competitive situation in the local market can also affect cost estimates. Actual contractor bids based on the same set of specifications can vary substantially. A contractor who is working at capacity is inclined to make a high bid, while one who needs the work is likely to submit a lower figure. The items cited in the Table 27.1 reflect typical costs incurred in a balanced market. In markets that are out of balance, higher costs may result from a prolonged absorption period–e.g., additional marketing or carrying costs, tenant improvements, leasing commissions, and administrative expenses. The increase in costs can contribute to external obsolescence.

Some indirect costs, such as architectural fees and property taxes, are generally related to the size and cost of the project. These are often estimated as a percentage of direct costs. Other costs, such as leasing and sales commissions, are related to the type of property or market practice. Still others, such as fees for appraisals and environmental studies, are a function of the time required to accomplish the task. The indirect costs of carrying an investment during and after construction are a combination of all of the above. Although total indirect costs are sometimes estimated as a percentage of direct costs, more detailed studies of these costs are recommended. When a cost estimating service is used, it is important for appraisers to be able to identify which costs are

Table 27.1 Examples of Direct Costs and Indirect Costs

Direct Costs

- Building permits
- Materials, products, and equipment
- Labor used in construction
- Equipment used in construction and depreciation of equipment during construction
- Security during construction
- Contractor's shack and temporary fencing
- Material storage facilities and transportation costs
- Power line installation and utility costs
- Contractor's profit and overhead, including job supervision, coordination and management (when appropriate), worker's compensation, and fire, liability, and unemployment insurance
- Performance bonds

Indirect Costs

- Architectural and engineering fees for plans, plan checks, surveys to establish building lines and grades, and environmental studies
- Appraisal, consulting, accounting, and legal fees
- All-risk insurance expense and ad valorem taxes during construction
- The cost of carrying the investment in land and contract payments during construction*
- The cost of carrying the investment in the property after construction is complete but before stabilization is achieved
- Supplemental capital investment in tenant improvements and leasing commissions
- Marketing costs, sales commissions, and any applicable holding costs to achieve stabilized occupancy in a normal market
- Administrative expenses of the developer
- Local government development levies

* If construction financing is required, the points, fees or service charges, and interest on construction loans are indirect costs.

already included in the cost estimates and which need to be added by the user of the cost service.

Entrepreneurial Incentive and Entrepreneurial Profit

Entrepreneurs (developers, contractors, investors, and others) compete against each other in the real estate marketplace, and any building project will include an economic reward (above and beyond direct and indirect costs) sufficient to convince an entrepreneur to take on the risk associated with that project in that market. For a new building that is the highest and best use of the site, the difference between the market value and the total cost of development (i.e., the sum of land value and direct and indirect costs) is the profit–or loss–realized:

Market Value – Total Cost of Development = Profit (or Loss)

Whether or not a profit is actually realized depends on how well the entrepreneur has analyzed the market demand for the property, selected the site, and constructed the improvements. In the case of income-producing properties, the profit realized will also depend on the entrepreneur's ability to obtain the proper tenant mix and negotiate leases in a reasonable amount of time.

The term *entrepreneurial incentive* refers to the amount an entrepreneur expects or wants to receive as compensation for providing coordination and expertise and assuming the risks associated with the development of a project. In contrast, *entrepreneurial profit* refers to the difference between the total cost of development and marketing and the market value of a property *after* completion and achievement of stabilized occupancy and income.[4] In short, incentive is anticipated while profit is earned. Ultimately, if the entrepreneur sees no potential to make a profit, a new building will not be built.

The concept of entrepreneurial profit is distinct from the broader idea of economic profit, which is defined as "the difference between sales revenue and the full opportunity cost of resources involved in producing goods."[5] In perfectly competitive and efficient markets, economic profit is effectively zero in the long run because new firms enter industries that are earning excess profits, which raises the price of scarce productive resources and lowers the market price

entrepreneurial incentive

The amount an entrepreneur expects to receive for his or her contribution to a project. Entrepreneurial incentive may be distinguished from entrepreneurial profit (often called *developer's profit*) in that it is the expectation of future profit as opposed to the profit actually earned on a development or improvement.

entrepreneurial profit

A market-derived figure that represents the amount an entrepreneur receives for his or her contribution to a project and risk; the difference between the total cost of a property (cost of development) and its market value (property value after completion), which represents the entrepreneur's compensation for the risk and expertise associated with development. An entrepreneur is motivated by the prospect of future value enhancement (i.e., the entrepreneurial incentive). An entrepreneur who successfully creates value through new development, expansion, renovation, or an innovative change of use is rewarded by entrepreneurial profit. Entrepreneurs may also fail and suffer losses.

4. Historically, *entrepreneurial profit* has been the more common term in general usage and serves as a broader term in the discussion of the cost approach. In this text, the term *entrepreneurial incentive*, which is a more recent addition to the appraisal lexicon, is used specifically in reference to a situation that calls for a forecast of the reward an entrepreneur expects to receive at the completion of a real estate development.

5. Paul A. Samuelson and William D. Nordhaus, *Economics*, 13th ed. (Boston: McGraw-Hill/Irwin, 1989), 980.

of output as the market moves toward equilibrium where market price equals the sum of the opportunity costs of all resources used in production. In contrast, the terms *entrepreneurial profit* and *entrepreneurial incentive* are used in the application of the cost approach to refer to the normal and expected component of value included in a value estimate when an appraiser adds in an amount of typical, expected project profit.

As a market-derived figure, an estimate of entrepreneurial profit or entrepreneurial incentive is only as reliable and precise as the available market data warrants. For example, for several years following the economic downturn in 2008, a dearth of new construction left appraisers with little current data on development activity, making estimates of entrepreneurial incentive difficult to forecast. Nevertheless, most market areas have a typical or appropriate range of expected reward that can be determined through market research, usually through interviews with developers and other market participants about anticipated, acceptable, and actual levels of profit achieved in the market. The range of profit will vary for different types of structures and with the nature or scale of a given project. The entrepreneurial incentive for a proposed development may be higher where creative concepts, greater risk, or unique opportunities have market acceptance. Less risky, more standard competitive projects may merit a lower measure of profit. For example, the first speculative high-rise office park in a suburban market is likely to require greater entrepreneurial incentive than a new residential subdivision development in a community with demonstrable population growth.

The stage of development, and the different levels of risk and expertise that may be required at different stages, can affect the amount of entrepreneurial profit earned. For example, an entrepreneur can start earning a reward from the start of the project. This reward can increase

Contributions of the Entrepreneur, Developer, and Contractor

In analyzing the components of reward and compensation received (or anticipated) by an entrepreneur, appraisers may choose to further distinguish between the concepts of project profit, entrepreneurial profit, developer's profit, and contractor's profit:

- *Project profit* is the total amount of reward for entrepreneurial coordination and risk.
- *Entrepreneurial profit* refers to the portion of project profit attributable to the efforts of the entrepreneur, distinct from the efforts of the developer, if one is present. In projects in which the entrepreneur and the developer are one and the same, the entrepreneurial profit is equivalent to total project profit.
- *Developer's profit* represents compensation for the time, energy, and expertise of an individual other than the original entrepreneur—usually, in large projects, the person responsible for managing the overall development process.
- *Contractor's profit* (including subcontractors' fees) is essentially a portion of the project's overhead and is not usually reflected in the entrepreneurial reward.

The measure of project profit used in cost approach calculations usually includes both a developer's profit and an entrepreneurial profit. The profit a contractor receives is often already reflected in the fee a contractor charges and would therefore be included in the direct costs.

as land is acquired, plans are drawn up, permits are approved, financing is secured, contracts are signed, construction is completed, and units are sold off or leased. It can be difficult to estimate exactly how much entrepreneurial profit would be earned at each stage of construction, although lenders may require interim values that reflect financing costs and taxes during the construction and leasing phases.

In practice, separating the value impact of the entrepreneurial coordination from other market influences can be difficult, particularly during periods of little new construction. To ensure the reasonableness of an estimate of entrepreneurial incentive or entrepreneurial profit, appraisers should carefully examine the source of additional property value over and above the total cost of development and the effects of supply and demand for properties of that type in the subject property's market area. For example, some appraisers point out that the value associated with the amenities of a property may be such that the sale price of the property could significantly exceed the sum of the costs of the land, building, and marketing (e.g., in an overheated seller's market where sale prices are inflated).

Some appraisers also observe that entrepreneurial profit often represents a theoretical profit in build-to-suit, owner-occupied properties. The owner-occupant may consider any additional operating profit due to the property's efficient design to be an incentive. However, the entrepreneurial profit might only be realized years after the property is built when it sells to a similar owner-occupant at a premium because the property is suitable and immediately available, unlike new construction or conversion of a different property. In this case, entrepreneurial profit is likely to become obscured over time by changing market conditions. For certain types of specialized owner-occupied improvements, such as public buildings, no entrepreneurial profit may ever be realized because the owner neither anticipates nor wants a profit.

The way in which comparable properties have been developed affects the availability of data. Appraisers are sometimes able to calculate entrepreneurial profit from actual comparable costs for speculatively built properties such as condominiums and multifamily developments. In the value estimate of a speculatively built property, entrepreneurial profit represents a return to the entrepreneur for the skills employed and the risks incurred, although the actual return may differ from the anticipated return. In large-scale developments, however, the issue is complicated because the entrepreneurial profit may not reflect the proportionate contributions of the improved site and the improvement to the overall property value. Developers of tract subdivisions, for example, often realize most of their profit on the value of the houses built on the finished lots, not necessarily on the value of the lots, which could be analyzed as a separate investment opportunity with its own separate measure of entrepreneurial profit.

Data on entrepreneurial profit for custom-built properties may not be available if the property owner who contracted the actual builders was acting as the developer. The prices of upscale, custom-built properties often reflect the attractiveness of these amenity-laden properties as well as the high costs of the materials used. Thus, the breakdown of costs for custom-built properties may not be comparable to the breakdown for speculatively built properties, which further complicates the task of estimating a rate of entrepreneurial profit. Theoretically, however, the value of custom-built properties should also reflect an entrepreneurial profit.

Appraisers should also scrutinize the cost data on which the value estimate is based to determine whether or not an allowance for entrepreneurial incentive or entrepreneurial profit has already been made. If this is not done, the contribution of the entrepreneur could be included twice. Data derived from sales of comparable sites often includes a profit for the land developer. Cost-estimating services quote direct costs (e.g., contractor's profit) and indirect costs (e.g., sales costs), but they may or may not provide estimates of entrepreneurial incentive or entrepreneurial profit. Because different sources of data reflect costs in different ways, appraisers should identify where the entrepreneurial incentive or profit is considered in an estimate–i.e., whether it is an item already included in the sum of total cost and land value or a stand-alone item added to the sum of total cost and land value.

Depreciation

The market recognizes the occurrence of losses in the value of improvements due to the effects of age, wear and tear, and other causes, and the appraiser interprets how the market perceives the collective effect of all forms of depreciation. In short, depreciation is the difference between the contributory value of an improvement and its cost at the time of appraisal:

Cost of Improvement – Contributory Value of Improvement = Depreciation

where *Cost of Improvement* is either reproduction cost or replacement cost. By estimating the depreciation incurred by an improvement and deducting this estimate from the improvement's reproduction or replacement cost, an appraiser can conclude the depreciated cost of the improvement. This depreciated cost approximates the improvement's contribution to the property's market value. (Techniques for estimating depreciation are discussed in Chapter 29.)

Depreciation in an improvement can result from three major causes operating separately or in combination:

- wear and tear from regular use, the impact of the elements, or damage, which is known as *physical deterioration* and may be curable or incurable
- a flaw in the structure, materials, or design that diminishes the function, utility, and value of the improvement, which is known as *functional obsolescence* and again may be curable or incurable
- a temporary or permanent impairment of the utility or salability of an improvement or property due to negative influences outside the property, which is known as *external obsolescence* and is incurable

Depreciation in Appraising and Accounting

Many of the terms appraisers use are also used by accountants, economists, and other real estate professionals. The term *accrued depreciation*, which appeared in earlier editions of *The Appraisal of Real Estate*, was originally borrowed from accounting practice. In accounting, *accrued depreciation* (or alternatively *accruals for depreciation*) refers to the total depreciation taken on an asset from the time of purchase to the present, which is normally deducted from an asset's account value to derive net book value. While *accrued depreciation* was used in an appraisal context for many years in the past, the simpler and more concise term *depreciation* is equally suitable and has been used in the most recent editions of the textbook.*

Book depreciation is an accounting term that refers to the amount of capital recapture written off for an asset on the owner's books for income tax or financial reporting purposes. Under the current generally accepted accounting principles (GAAP) in the United States, the term has typically been used in income tax calculations to identify the amount allowed as accruals for the retirement or replacement of an asset under the federal tax laws. Book depreciation may also be estimated using a depreciation schedule set by the Internal Revenue Service. Book depreciation is not market-derived like the depreciation estimates developed by appraisers. Instead, various formula-based techniques (e.g., the straight-line method, the units of production method, the declining balance method, the sum-of-the-years'-digits method) have been used to calculate scheduled depreciation.

The International Financial Reporting Standards treat depreciation in a similar fashion as US GAAP with two significant distinctions:

1. The estimates of useful life and residual value of the property are reviewed at least at each annual reporting date, which can be more frequent than under US GAAP.
2. The available depreciation models include the cost model (similar to US GAAP) and the fair value–based revaluation model (which allows for the revaluation of property on a company's books when fair value can be measured).

International Accounting Standard 16: Property, Plant, and Equipment details the methods of estimating depreciation for financial reporting purposes.

Financial Accounting Standards Board Accounting Standards Codification Topic 820: Fair Value Measurements and Disclosures (formerly known as SFAS 157) calls for market-supported depreciation that is broader than depreciation for financial reporting purposes (an allocation of historical cost) or tax purposes (based on specified service lives).

* The term *total depreciation* also remains in use by appraisers, although *depreciation* is used without modification in this textbook in most cases to refer to estimates of both the total amount of depreciation that a property suffers from or the amount of depreciation attributable to a particular form of depreciation (i.e., a part of the whole).

External obsolescence may result from adverse market conditions. Because of its fixed location, real estate is subject to external influences that usually cannot be controlled by the property owner, landlord, or tenant.

> Depreciation is the difference between the market value of an improvement and its reproduction or replacement cost at the time of appraisal. The depreciated cost of the improvement can be considered an indication of the improvement's contribution to the property's market value.

Theoretically, depreciation can begin in the design phase or the moment construction is started, even in a functional building that is the highest and best use of a site. Improvements are rarely built under ideal circumstances, and their construction takes considerable time. During the construction process, physical deterioration can be temporarily halted or even corrected, but physical deterioration tends to persist throughout the life of the improvements. Moreover, as time goes on and a building's features become dated in comparison to new buildings, functional obsolescence sets in. Consider, for example, The difficulty of estimating depreciation in older properties may diminish the reliability of the cost approach in valuing those properties.

an industrial building that was built in the early 1970s. The structure's 18-foot-high ceilings, which were the market standard at the time of construction, might be considered totally inadequate now that greater clear heights are the norm. New buildings can have functional obsolescence even before they are constructed, which is usually attributable to a design that does not meet market standards.

In the cost approach, the depreciation attributable to all causes is extracted from the market (or calculated when market extraction is not possible) and deducted from the current cost to arrive at the depreciated cost:

Current Cost – Total Depreciation Applicable = Depreciated Cost

The depreciated cost of all improvements (or their contribution to value) and the land value are added together to provide an indication of the market value of the property:

Depreciated Cost + Land Value = Market Value

Depreciation is a penalty only insofar as the market recognizes it as causing a loss in value. For some older buildings, the value loss due to apparent depreciation may be offset by a temporary scarcity relative to demand or by an improvement's historical or architectural significance. In these situations, an appraiser should exercise caution not to penalize a property unduly in the cost approach.

As mentioned earlier, an appraiser's use of reproduction cost rather than replacement cost to derive a current cost estimate will affect the estimation of depreciation. Some forms of functional obsolescence are eliminated when replacement cost is used, but other forms remain unaffected. Consider an industrial building with poor access for trucks and with a 28-foot ceiling height in a market where 24-foot ceiling heights are the norm. A replacement cost estimate could be based on a building with a 24-foot ceiling height, while a reproduction cost estimate would be based on a building with a 28-foot ceiling height. By using replacement cost instead of reproduction cost, the appraiser eliminates the superadequacy attributable to the story height but not the deficiency caused by poor access to the street. Moreover, any additional costs of ownership caused by the superadequacy would not be eliminated in the replacement cost estimate. If the excess story height were the cause of additional heating, cooling, insurance, or property taxes, the superadequacy would also cause additional depreciation. An appraiser using replacement cost would have to consider any excess operating costs associated with the superadequate construction.

Property Rights Adjustments

The value indication developed using the classic cost approach procedure is the value of the fee simple interest in the property at stabilized occupancy and at market rent. Property rights adjustments can be made to account for leased fee or leasehold property that is leased at a below-market rate or is empty or partially leased. A leased fee or leasehold adjustment would be necessary when a tenant is paying more or less than market rent. Other property rights adjustments may be necessary to account for the time and expense of bringing a building to a stabilized occupancy level such as a new building's initial lease-up period.

The estimation of a property rights adjustment generally involves the use of sales comparison or income capitalization techniques. For example, the value of the lost revenue (i.e., what is known as a *shortfall*) during a new building's lease-up period could be discounted at an appropriate rate considering the risk of the shortfall.

Building Cost Estimates

To apply the cost approach to value, appraisers estimate the cost of the improvements as of the effective date of appraisal. To prepare this sort of estimate, appraisers need to understand construction plans, specifications, materials, and techniques. They can access a variety of publications, computer software, and accompanying data available for this purpose, or the work can be done with the assistance of expert cost estimators. In either case, the appraiser is responsible for the result, and any existing improvements should be carefully reviewed and described by all individuals who are delegated to estimate costs.

Proposed improvements may be valued based on plans and specifications provided that the appraiser discloses that the improvements have not yet been built. In this situation, the completion of the improvements as specified would be an extraordinary assumption or special assumption of the appraisal, which would have to be clearly disclosed in the appraisal report. Residential appraisers are commonly asked to provide an opinion of prospective value under the extraordinary assumption or special assumption that a property will be completed as planned. Nonresidential appraisers are also asked to value property that has not yet been completed, and sometimes two prospective values are called for: (1) the value at the time of completion and (2) the value when stabilized occupancy and income are achieved. The values may be based on the extraordinary assumptions or special assumptions that the improvements will be completed as proposed on a future date (for the value upon completion) and that the property will be stabilized (for the value upon reaching stabilization).

Sources of Cost Data

Construction contracts for buildings similar to the building being appraised provide a primary source of comparable cost data. Some appraisers maintain comprehensive files of current cost data, including current costs for completed houses, apartments, hotels, office buildings, retail buildings, and industrial buildings. Another common source is a developer's construction budget, which an appraiser obtains when appraising a proposed development for construction financing purposes. These costs can provide a basis for calculating the cost to construct a proposed building or an equivalent to an existing building. Contract-reporting services may indicate building areas or a general building description, the low bids, and the contract award. Appraisers can then obtain any missing information, such as the breakdown of office and warehouse space in an industrial property, and classify the building type for filing purposes. When cost comparable files are carefully developed and managed, they can supply authentic square-foot costs on buildings of all types for use in appraisal assignments.

> Cost data may be obtained from construction contracts, building contractors, and published or computer-assisted cost-estimating services.

In the absence of construction contract data, local building contractors and professional cost estimators can be reliable sources of data. These sources can often be found online. In an active market, cost information can also be obtained by interviewing local property owners who have recently added building or land improvements similar to those found on the subject property. If work contracts and accounting records of recently improved properties are available, they can provide significant details.

Cost-Estimating Services

Many cost-estimating services publish data for estimating the current cost of improvements. The most recognized services in the United States include the following:

- Marshall & Swift/Boeckh (www.marshallswift.com and www.msbinfo.com)
- McGraw-Hill Construction Dodge (http://construction.com/dodge/)
- RSMeans Cost Data (www.rsmeans.com)

Data provided by cost-estimating services can be used to confirm estimates developed from local cost data.

Published cost manuals usually include benchmarks for direct unit costs but rarely include benchmarks for indirect costs–such as escrow fees, legal fees, interest on construction loans, financing fees, carrying charges, and property taxes–because these are site specific. For example, *Marshall Valuation Service* costs do not include construction loan points and permanent loan fees, so appraisers often research ranges of rates through discussion with lenders of the respective types of loans. Appraisers should recognize when published cost estimates do not include indirect costs.

Appraisers research their markets to determine which costs are most applicable to specific appraisal assignments. National cost services list the benchmark cost of many site improvements separately, rather than as part of building costs. This data includes the costs of roads, storm drains, rough grading, soil compaction, utilities, and jurisdictional utility hookup fees and assessments. Demolition costs are usually not provided by published cost services, but they can often be obtained from actual costs or demolition contractors. Also, entrepreneurial incentive or entrepreneurial profit is generally not included in cost service data. Appraisers usually estimate those costs separately and then include them in the estimate of total cost.

Although buildings can be measured in several ways, appraisers should measure buildings according to local custom. However, appraisers must understand the measurement technique used by the cost service in order to use that service's data effectively. Several cost-estimating services publish manuals or maintain electronic databases that break down costs into square foot increments. Unit costs for building types usually start with a building of a certain size (i.e., a base area), which serves as a benchmark. Then additions or deductions are made to account for the actual area in square feet and the building components in the subject property.

Cost Index Trending

Cost manuals and electronic databases periodically update the cost index tables that reflect changes in the cost of construction over a period of years. Cost indexes can be used to convert a known cost as of a past date into a current cost estimate. Sometimes cost index tables can be used to adjust costs for different geographic areas. Cost index

Common Construction-Related Costs Typically Not Included in Cost Manuals

- Cost of land acquisition and assemblage
- Trade fixtures
- Personal property
- Specialized equipment
- Permanent financing fees
- Marketing costs, leasing commissions, rent concessions, fill-up costs
- Real estate taxes
- Entrepreneurial incentive and developer's overhead and profit

Cost index trending may be used to convert historical data into a current cost estimate.

trending is also useful for estimating the current cost of one-of-a-kind items when standard costs are not available. However, there are practical limitations in applying this procedure because the reliability of the current cost indication tends to decrease as the time span increases.

As an example of cost index trending, suppose the contract cost for constructing a building in January 2010 was $1 million. Suppose the index for January 2010 was 285.1 and the current index is 327.3. To trend the historical cost into a current cost, the current cost index is divided by the historical cost index and the resulting ratio is multiplied by the historical cost. In this case the current cost is calculated as follows:

$$\frac{327.3}{285.1} = 1.148$$

$$1.148 \times \$1{,}000{,}000 = \$1{,}148{,}000$$

Problems may arise when cost index data is used to estimate current cost. The accuracy of the figures cannot always be determined, especially when it is not clear which components are included in the data (e.g., only direct costs or direct costs with some indirect costs). Furthermore, historical costs may not be typical for the time period, and the construction methods used and building codes in effect at the time of the historical cost may differ from those applicable on the effective appraisal date.

Cost-Estimating Methods

The three traditional cost-estimating methods are

- the comparative-unit method (or calculator method)
- the unit-in-place method
- the quantity survey method (or segregated cost method)

The quantity survey method produces a cost estimate based on a detailed inventory of the labor, materials, and equipment used in the subject improvements. The comparative-unit and the unit-in-place methods provide less detail, but they are the primary bases for the cost estimates used in most appraisals.

comparative-unit method
A method used to derive a cost estimate in terms of dollars per unit of area or volume based on known costs of similar structures that are adjusted for time and physical differences; usually applied to total building area. The comparative-unit method is an indication of the replacement cost new, which reflects current building standards and materials.

Comparative-Unit Method

The comparative-unit method is used to derive a cost estimate measured in dollars (or some other currency) per unit of area. The method employs the known costs of similar structures adjusted for market conditions and physical differences. Indirect costs may be included in the unit cost or computed separately. If the comparable properties and the subject property are in different markets, an appraiser may need to make an adjustment for location.

Estimating Entrepreneurial Incentive or Entrepreneurial Profit

Regardless of the general cost-estimating method applied, estimates of entrepreneurial incentive or entrepreneurial profit should be derived through market analysis and interviews with developers to determine the expectations of entrepreneurial reward required as motivation to undertake a particular development. Questions often asked of developers include the following:

- What percentage amount of profit was expected?
- If profit is expressed as a percentage, is it a percentage of (a) direct costs, (b) direct and indirect costs, or (c) direct and indirect costs plus land value?
- What is included in the percentage?
- Did the project meet expectations?
- Would you do another project for the same percentage of profit?

The actual entrepreneurial profit earned is a record of results and can differ from the anticipated profit (i.e., the incentive) that originally motivated the entrepreneur to proceed. A typical level of anticipation or incentive should be used in the cost estimate.

Depending on market practice, entrepreneurial incentive or entrepreneurial profit may be estimated in different ways:

- as a percentage of direct costs
- as a percentage of direct and indirect costs
- as a percentage of total current development cost, i.e., direct and indirect costs plus site value

In some markets, entrepreneurs may have a threshold amount that would induce them to take on a development project, and the appropriate amount of incentive could be a flat fee in that case rather than a percentage of a certain combination of development costs.

Presumably, the dollar amount of entrepreneurial incentive would be the same regardless of how it is calculated—e.g., as 22%, 20%, or 15% of the appropriate base cost selected, as shown below. In the following example, an appraiser investigated the dollar amount of certain costs and ratios (or relative percentages) of entrepreneurial incentive attributable to the same set of costs and then calculated entrepreneurial incentive:

Base Cost	% Applied	Entrepreneurial Incentive
Direct Costs	22.0% × \$545,000	= \$120,000 (rounded)
Direct Costs + Indirect Costs	20.0% × (\$545,000 + \$55,000)	= \$120,000
Direct Costs + Indirect Costs + Land Value	15.0% × (\$545,000 + \$55,000 + \$200,000)	= \$120,000

Estimating an appropriate amount of entrepreneurial incentive remains a challenge for appraisers because expectations of profit vary with different market conditions and property types. Consistent relationships between profit and other costs are difficult to establish and sources are difficult to find. Other professionals define *profit* differently than appraisers do.

Unit costs vary with size. All else being equal, unit costs decrease as building areas increase. This reflects the fact that plumbing, heating units, elevators, doors, windows, and similar building components do not usually cost proportionately more in a larger building than in a smaller one and that other efficiencies and economies of scale may occur.

The comparative-unit method is relatively simple and practical, and it is widely used. Unit cost figures are usually expressed in terms of gross building dimensions converted into square or cubic feet (or meters where appropriate). Total cost is estimated by comparing the subject building with similar, recently constructed buildings for which contract prices are available. The trend in costs between the date of the contract (or construction) and the effective appraisal date should be factored into the comparison.

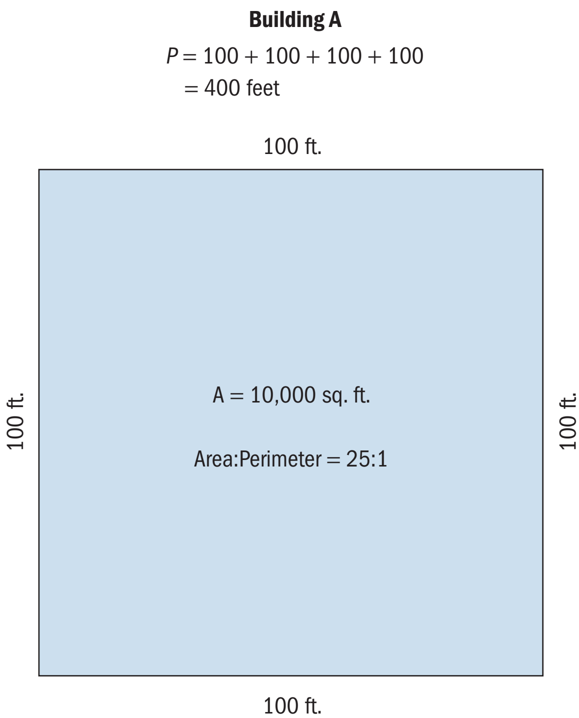
Most appraisers using the comparative-unit method apply unit cost figures developed using data from a recognized cost service. Unit costs for the benchmark buildings found in cost-estimating manuals usually start with a base building of a specified size. Adjustments or refinements are then made to the base cost for any differences between the subject building and the benchmark building. If the subject building is larger than the benchmark building, the unit cost is usually lower. If the subject building is smaller, its unit cost will probably be higher. The cost data obtained from a recognized cost service is usually the replacement cost new, which reflects current building standards and materials. It is not an indication of reproduction cost new.

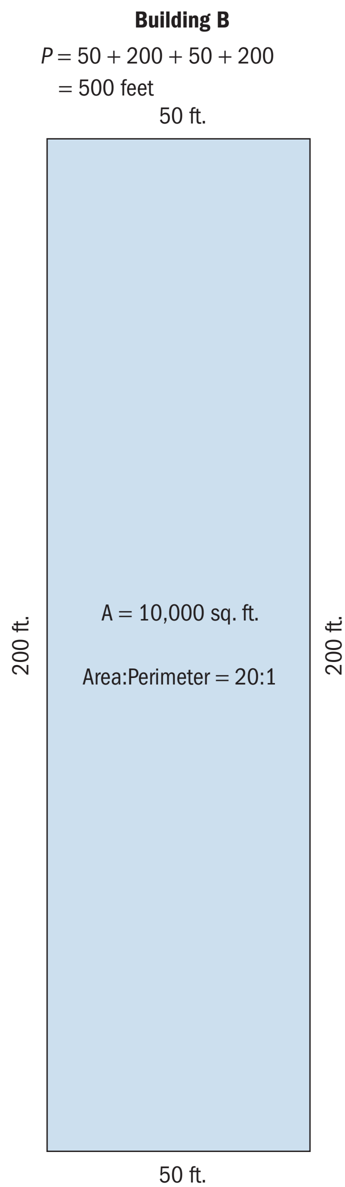
Because few buildings are identical in terms of size, design, and quality of construction, the benchmark building is often different from the subject building. Different roof designs, interior design characteristics, and irregular perimeters and building shapes can affect comparative-unit costs substantially. Figure 28.1 illustrates this situation. For example, the larger perimeter of Building B in the illustration results in higher unit costs. Most cost services include adjustment criteria to alter or adjust the base cost to the specific characteristics of the subject structure. However, all elements may not be addressed by the cost service, and a more "building-specific" cost analysis developed using the unit-in-place method may be needed.

To develop a reliable estimate with the comparative-unit method, an appraiser first identifies the construction class and type of structure, and then calculates the unit cost from similar improvements or adjusts the unit cost figure to reflect variations in size, shape, finish, and other characteristics. For example, the building classes for warehouse structures in *Marshall Valuation Service* are *A*, *B*, *C*, *D*, D_{POLE}, and *S*. Each of those classes refers to a particular type of basic construction (e.g., *C* corresponds to concrete masonry block with metal or wood roof structure and *S* to preengineered metal frame and roof structure), and the type of construction ranges from *low-cost* to *excellent*. In addition, the unit cost applied in the comparative-unit method should reflect any changes in cost levels between the date of the benchmark unit cost and the effective appraisal date. The ratio between the costs of mechanical equipment and the basic building shell has increased consistently through the years. Equipment tends to increase unit building costs and depreciate more rapidly than other building components.

To use area cost estimates, an appraiser assembles, catalogs, and analyzes data on actual building costs. These costs should be divided into general construction categories, and separate figures should be used to account for special finishes or equipment. The overall area unit cost can then be broken down into its components, which may help the appraiser adjust a known cost for the presence or absence of items in later comparisons.

Figure 28.1 Unit Costs of Buildings with Different Shapes





Cost of Walls

	Building A	**Building B**	
Unit cost	$50	$50	per linear foot
Perimeter	× 400	× 500	feet
Total cost	$20,000	$25,000	
Area	10,000	10,000	square feet
Unit cost	$2.00	$2.50	per square foot

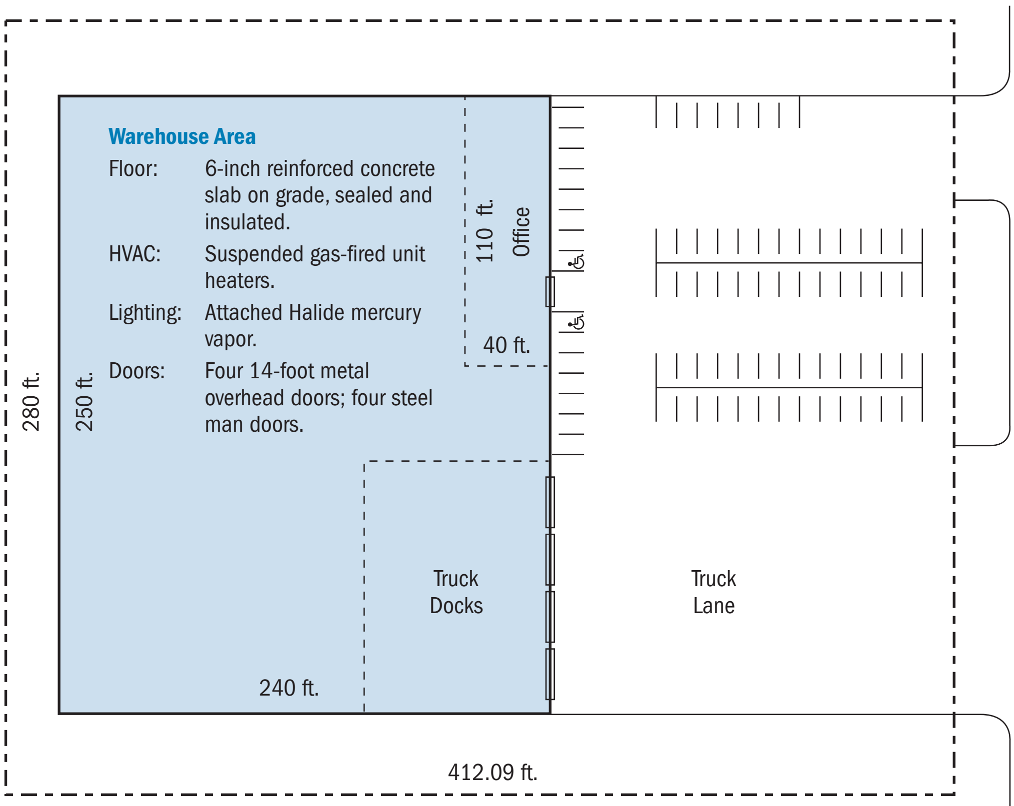
The apparent simplicity of the comparative-unit method can be misleading. To develop dependable unit cost figures, appraisers must exercise judgment and carefully compare the subject building with similar or standard structures for which actual costs are known. Errors can result if appraisers select a unit cost that is not comparable to the building being appraised. When it is correctly applied, however, the method produces reasonably accurate estimates of cost.

The warehouse shown in Figure 28.2 will be used to illustrate the comparative-unit method (and later the unit-in-place and quantity survey methods). For the purpose of this example, the warehouse is of Class C, average construction.[1]

Figure 28.2 Plan of a Warehouse

Basic Construction

Building structure:	Reinforced concrete spread footings and 12-inch stem wall; 6-inch steel framing w/ 6-inch pipe columns 50-foot o.c.; 8-inch masonry block exterior walls; painted exterior finish.
Roof structure:	Steel bar joists w/ insulated metal roof deck with single-ply EPDM 20-year roof covering.
Electrical:	OK.
Site improvements:	80% asphalt paving and balance landscaping.



Office Area

Office finish:	300 linear feet painted drywall partitions; suspended acoustical grid w/ recessed fluorescent lighting; two three-fixture ADA restrooms; commercial-grade glue-down carpet floor covering; aluminum storefront w/ insulated glazing; four natural gas heat and electric forced-air rooftop unit HVAC.

1. *Marshall Valuation Service* (Feb 2012), 14.

Table 28.1 shows how comparative-unit costs from a published cost manual can be applied to the warehouse building. Calculations such as those shown can be used to confirm a cost indication obtained from construction contracts for similar properties in the same market as the property being appraised on or near the effective appraisal date. Published data can be used independently when no local cost data is available.

In Table 28.1 an adjustment for the warehouse's sprinkler system was made using a square-foot unit cost. The appraiser should note whether it is a wet or dry system. In other cases, similar adjustments may be appropriate for observed physical differences in the amount of office area, construction features, or specific HVAC equipment.

Cost manuals rarely include all indirect costs or an allowance for entrepreneurial incentive or profit, so adjustments must often be made to obtain an indication of the total cost. In Table 28.1 adjustments are made for

- indirect costs not included in the base price quoted in the cost manual

Table 28.1 Comparative-Unit Method (Calculator Method)

Base cost per sq. ft.	60,000 sq. ft. @		$44.89	per sq. ft.
Add for sprinkler system per sq. ft.		+	$2.10	per sq. ft.
Subtotal			$46.99	per sq. ft.
Adjustment for building height		×	1.086	
Subtotal			$51.03	per sq. ft.
Adjustment for area/perimeter		×	0.839	
Subtotal			$42.82	per sq. ft.
Current cost multiplier		×	1.03	
Subtotal			$44.10	per sq. ft.
Local cost multiplier		×	1.10	
Total building cost per sq. ft.			$48.51	per sq. ft.
Total direct costs for building	60,000 sq. ft. @ $48.51 per sq. ft.		$2,910,572	
Landscaping/paving costs	55,385 sq. ft. @ $3.50 per sq. ft.		$193,848	
Total direct costs for building and site improvements			$3,104,420	
Indirect costs not included in cost manual*		×	1.08	
Subtotal			$3,352,774	
Indirect costs from completion to stabilized occupancy*		×	1.05	
Subtotal			$3,520,412	
Entrepreneurial incentive at 10% of total direct and indirect costs		×	1.10	
Total cost for warehouse building and site improvements			$3,872,454	
Land value	115,385 sq. ft. @ $3.25 per sq. ft.	+	$375,001	
Total development cost new			$4,247,455	

* Note: Contractor's overhead and profit and some other indirect costs are included in these base costs and adjustments. The source of published cost data should be studied for a complete understanding of what is included in quoted costs. For purposes of simplicity, a percentage was applied to account for indirect costs.

- indirect costs after construction needed to achieve typical stabilized occupancy[2]
- entrepreneurial incentive calculated as a percentage of total direct and indirect costs

The estimated land value was derived through sales comparison. The unit cost of the site improvements (i.e., landscaping and paving) shown in Table 28.1 was derived from a cost manual and adjusted for current and local cost multipliers, and the direct costs of the landscaping and paving were included with the direct costs of the building improvements in this example to account for indirect costs and entrepreneurial incentive attributable to all improvements.

Table 28.1 indicates the cost of the warehouse building plus the land value, but the result shown is more likely to represent the value of a close substitute than a duplicate structure. Cost services use typical buildings for their base cost, so an appraiser can apply the comparative-unit method, develop reliable adjustment amounts and factors, and produce a reasonable property value estimate.

Construction contracts normally include other improvements to the land, such as parking, driveways, water retention basins, underground drainage facilities, rail sidings, fences, and landscaping. The possible combinations and varied value contributions of these improvements can cause a wide divergence in unit cost if the total contract is related to the size of the major improvement only. Therefore, when actual contract costs from the local market are used in the comparative-unit method, it is imperative that the costs of these other improvements be excluded from the determination of the base price so that these costs are not counted twice (first implicitly in the base unit cost and then again explicitly as an adjustment based on actual costs).

Unit-in-Place Method

In the unit-in-place method (also known as the *segregated cost method*), individual unit costs for various building components are applied to the various subcomponents in the structure or to linear, area, volume, or other appropriate measures of these components. Using this method, appraisers compute a unit cost based on the actual quantity of materials used plus the labor of assembly required for each unit of area. For example, the cost can be applied based on the square feet of floor area or linear feet of wall of a certain height. The same procedure is applied for other structural components.

Unit-in-place cost estimates are made using specific cost data for standardized structural components as installed, such as the following:

2. The cost to achieve stabilized occupancy may be nominal for a single-tenant building or a typical owner-occupied building. However, large multitenant warehouse, office, or apartment properties can have substantial lease-up costs, promotional expenses, or other costs (or losses in income) that must be considered.

Structural Component	Unit
Excavation	Dollars per cubic yard
Foundation	Dollars per linear foot of foundation or cubic yard of concrete
Floor construction	Dollars per square foot
Interior partitions	Dollars per linear foot
Roofing	Dollars per square foot (i.e., 100 square feet of roof area)

The unit-in-place concept is not limited to cubic, linear, or area units. The measure on which the cost is based may be the measure employed in a particular trade, such as the cost per ton of air-conditioning. The unit-in-place concept may also be applied to the cost of complete, installed components such as the cost of a roof truss that is fabricated off site, delivered, and erected.

unit-in-place method
A cost-estimating method in which total building cost is estimated by adding together the unit costs for the various building components as installed; also called the *segregated cost method*.

All unit costs are totaled to provide the estimated direct cost of the entire improvement. Unit-in-place cost estimates may be based on an appraiser's compiled data, but they are usually obtained from a cost-estimating service that provides updated monthly figures. Contractor's overhead and profit may be included in the unit cost figures provided by some cost services, or they may be accounted for separately. The appraiser must know exactly what is included in any unit price quoted. Indirect costs are usually accounted for separately. For example, leasing and marketing costs are typically not included in cost service data, so appraisers often consult leasing agents as a source of information for estimates of leasing commissions of a new project. The objective of the unit-in-place procedure is to count all appropriate costs and avoid any double-counting.

The following example shows how the cost of a brick veneer wall would be calculated on a unit-in-place basis. Costs such as these vary with market conditions and location. The figures shown are used only for purposes of illustration.

Description	Cost	Unit
4-in. face brick, installed: common bond, ½-in. struck joints, mortar, scaffolding, and cleaning included	$460.00	per 1,000 bricks
Dimension lumber, erected: 2-in.-x-4-in. wood stud framing, 16 inches on center	$360.00	per 1,000 bd. ft.
Sheathing, installed: impregnated 4 ft. x 8 ft., ½-in.	$0.42	per sq. ft.
Insulation, installed: 2½-in., foil backing on one side	$0.22	per sq. ft.
Gypsum board: ½-in. with finished joints	$0.30	per sq. ft.
Paint: primer and one coat flat	$0.25	per sq. ft.

From this data the cost per square foot of wall can be estimated as follows:

Description	**Cost**	**Unit**
Bricks	$3.45	per 7½*
Wood stud framing	$0.24	per ⅔ bd. ft.*
Sheathing	$0.42	per sq. ft.
Insulation	$0.22	per sq. ft.
½-in. gypsum board	$0.30	per sq. ft.
Paint	+ $0.25	per sq. ft.
Total for finished wall	$4.88	per sq. ft.

* To calculate a total unit cost, the unit cost of certain construction elements must be converted to the unit measure of the total cost. In this example, each square foot of wall requires 7½ bricks and ⅔ board feet of wood stud framing.

After calculating the unit cost of $4.88 per square foot, the appraiser can estimate the total cost of a veneer wall that meets these standards without detailing the quantities of material and labor. In practice, a cost analyst would refine the procedure by adjusting for waste and extra framing for windows and doors, which require wall openings, lintels, and facing corners.

The unit costs for all components can be calculated in a similar fashion. Once these are established, the appraiser can estimate the cost of an entire building. When fully developed, the unit-in-place method provides a substitute for a complete quantity survey and produces an accurate cost estimate with considerably less effort. Table 28.2 illustrates how the unit-in-place method can be used to estimate the reproduction cost of the warehouse shown in Figure 28.2.

In Table 28.2 adjustments are made for the following:

- indirect costs not included in the cost manual's base price
- indirect costs after construction needed to achieve typical stabilized occupancy
- entrepreneurial incentive calculated as a percentage of total direct and indirect costs

Note the difference in total adjustments for indirect costs in Tables 28.1 and 28.2. As the cost of the property is broken down into more precise increments using the unit-in-place method, a smaller portion of the total indirect costs is included in the base price quoted in the cost manual for each building component. The single figure of cost per square foot that is used in the comparative-unit method accounts for more of the total indirect costs than the individual cost figures for excavation, site, foundation, framing, and so on. Therefore, the adjustment for "indirect costs not included in cost manual" in the comparative-unit method is smaller than the same adjustment in the unit-in-place method.

In the unit-in-place method, the value of site improvements may be estimated separately on a depreciated-cost basis and added to the depreciated cost of the improvements, or the cost of site improvements can be included as a direct cost as shown in Table 28.2 and thereby be adjusted for entrepreneurial incentive like the other construction costs.

Table 28.2 Unit-In-Place Method

			$ per Unit	
Excavation	Building	60,000 sq. ft.	0.42	$25,200
	Site	115,385 sq. ft.	0.34	$39,231
Foundation		940 linear ft.	36.25	$34,075
CMU wall	Base	13,160 sq. ft.	22.80	$300,048*
	2.00%/ft. over 14-ft. base	0.08	–	$24,004 †
Floor (concrete)		60,000 sq. ft.	4.01	$240,600
Floor (asphalt tile)		4,400 sq. ft.	2.24	$9,856
Ceiling (acoustical tile)		4,400 sq. ft.	7.40	$32,560
Ceiling (suspended grid)		4,400 sq. ft.	1.47	$6,468
Roof joists and deck		60,000 sq. ft.	12.10	$726,000
Roof cover and insulation		60,000 sq. ft.	3.53	$211,800
Plumbing (three-piece restrooms)				
Fixtures		9 fixtures	3,450	$31,050
Drains		6 units	605	$3,630
Sprinkler system		60,000 sq. ft.	2.16	$129,600
HVAC				
Warehouse		55,600 sq. ft.	1.56	$86,736
Office		4,400 sq. ft.	6.70	$29,480
Electrical and lighting				
Warehouse		55,600 sq. ft.	4.82	$267,992
Office		4,400 sq. ft.	11.10	$48,840
Interior partitions				
Walls		4,400 sq. ft.	3.89	$17,116
Doors		10 doors	103.00	$1,030
Overhead doors	4 10×14-ft. doors	560 sq. ft.	35.71	$19,998
Landscaping and paving		55,385 sq. ft.	$3.50	$193,848
Miscellaneous specified items				$50,000
Subtotal				$2,529,162
Current cost multiplier				× 1.03
Subtotal				$2,605,037
Local cost multiplier				× 1.10
Subtotal				$2,865,541
Architectural and engineering fees at 5% of direct costs				× 1.05
Total direct costs				$3,008,818
Indirect costs not included in cost manual‡				× 1.12
Subtotal				$3,369,876
Indirect costs from completion to stabilized occupancy‡				× 1.05
Subtotal				$3,538,369
Entrepreneurial incentive at 10% of total direct and indirect costs				× 1.10
Total cost of building and site improvements				$3,892,206
Land value		115,385 sq. ft.	$3.25	+ $375,001
Total development cost new				$4,267,207

* Calculated as Perimeter × Base Wall Height (14 feet) × Unit Cost (per sq. ft.)

† Calculated as Base Cost of CMU Wall × (2% × (Wall Height – 14 feet))

‡ Note: Contractor's overhead and profit and some indirect costs are included in the base costs. Architect's fees and other indirect costs are not. The source of published cost data should be studied for a complete understanding of what is included in the quoted costs. For purposes of simplicity, a percentage was applied to account for indirect costs.

Quantity Survey Method

The most comprehensive and accurate method of cost estimating is the quantity survey method, which is more often applied by contractors or professional cost estimators than appraisers. A quantity survey reflects the quantity and quality of all materials used in the construction of an improvement and all categories of labor required. Unit costs are applied to these figures to arrive at a total cost estimate for materials and labor. Then the contractor adds a margin for contingencies, overhead, and profit.

Depending on the size of the project and the resources of the contractor, the quantity survey and cost calculations may be prepared by a single cost estimator or by a number of subcontractors, whose bids are compiled by a general contractor and submitted as the final cost estimate. In either case, the analysis details the quantity, quality, and cost of all materials furnished by the general contractor or subcontractor and the appropriate cost allowances.

A general contractor's cost breakdown for the warehouse shown in Figure 28.2 is summarized in Table 28.3. This is only a summary. The specific quantities and costs are not indicated.

Contractor bids do not usually include indirect costs or entrepreneurial incentive or profit. The analysis illustrated in Table 28.3 reflects indirect costs and the calculation of entrepreneurial incentive as a percentage of total direct and indirect costs. In the examples presented, indirect costs are considered in various stages of the cost-estimating procedure. A breakdown of the costs that make up these estimates is preferred to the percentage adjustment, and the appraiser should provide a breakdown to support the percentages applied. Note that when the direct costs of the individual elements of construction are broken down into discrete amounts, as shown in Table 28.3, less of the total indirect costs is accounted for in those cost figures than in the figures for other cost-estimating methods. Thus, the percentage adjustment for total indirect costs is higher.

Site improvements such as parking facilities, landscaping, and signage are commonly included in a general contractor's bid and should be included in a cost estimate of all improvements. In this case, landscaping and paving are included among the direct costs so that the adjustment for entrepreneurial incentive accounts for those improvements. In a cost estimate of an existing building, a separate itemization of site improvements facilitates the consideration of depreciation. Because the quantity survey method usually produces a cost estimate of a duplicate building, Table 28.3 indicates the reproduction cost of the warehouse building as of the effective appraisal date.

To produce a quantity survey estimate, each contractor and subcontractor must provide a breakdown of materials, labor, overhead, and profit. The contractor's profit may depend on the volume of work that the contractor has lined up.

quantity survey method
A cost-estimating method in which the quantity and quality of all materials used and all categories of labor required are estimated and unit cost figures are applied to arrive at a total cost estimate for labor and materials.

Table 28.3 Warehouse Property—Contractor's Breakdown (Quantity Survey Method)

General conditions of contract			$10,000
Excavating and grading			$75,000
Concrete foundation/footings			$35,000
Concrete floor/slab on grade			$60,000
Carpentry (includes OHD and pedestrian doors)			$250,000
CMU walls			$165,000
Structural steel			$140,000
Joist, deck, and deck insulation			$725,000
Roofing			$200,000
Insulation			$12,250
Sash			$10,000
Glazing			$25,000
Painting			$40,000
Acoustical material			$7,500
Flooring			$10,000
Electric			$300,000
HVAC			$115,000
Piping			$40,000
Plumbing and sprinkler system			$125,000
Landscaping/paving			$195,000
Subtotal			$2,539,750
Contingencies	2.5%		$63,494
Contractor's overhead and profit	8%		$203,180
Total contract costs			$2,806,424
Architectural and engineering fees	5%		$140,321
Total direct costs			$2,946,745
Indirect costs before, during, and after construction*	20%		$589,349
Subtotal			$3,536,094
Entrepreneurial incentive	10%		$353,609
Total cost of building and site improvements			$3,889,703
Land value	115,385	@ $3.25	$375,001
Total development cost new			$4,264,704

* For purposes of simplicity, a percentage was applied to account for indirect costs.

Although the quantity survey method produces a complete cost analysis of the improvements being appraised, it is time-consuming as well as costly and frequently requires the services of an experienced cost estimator. For these reasons this method is seldom used in routine appraisal assignments.

Depreciation Estimates

Appraisers have several methods available for estimating depreciation. Each is acceptable and should result in roughly the same value as long as appraisers apply the methods consistently and logically. The method (or methods) used in a particular assignment should reflect how an informed and prudent buyer would react to the condition and quality of the property and the market in which the property is found.

The primary goals in the analysis of depreciation are to identify all forms of depreciation recognized by the market, to treat all these forms of depreciation, and to charge only once for each form of depreciation (i.e., to avoid double-counting items of depreciation).[1] The three principal methods for estimating depreciation are

- the market extraction method
- the economic age-life method
- the breakdown method

The various methods may be combined to solve specific problems, or each method may be applied separately to test the reasonableness of the estimates derived from other methods.

The three methods used to estimate depreciation are the market extraction, economic age-life, and breakdown methods.

1. Additional discussion of the estimation of depreciation and numerous examples can be found in *In Defense of the Cost Approach: A Journey into Commercial Depreciation* (Chicago: Appraisal Institute, 2011) by E. Nelson Bowes.

Most appraisers use market extraction and economic age-life calculations as the primary methods of estimating the total depreciation in a property. The market extraction and economic age-life methods are applied to the whole property and are easier for appraisers and clients to understand. These methods are also easier for appraisers to use than the breakdown method even though the elements of depreciation are implicit, not explicit. Both the market extraction and economic age-life methods are limited in that they require that lump-sum depreciation from all causes be expressed in an overall estimate, which is rarely accurate if obsolescence is present. Also, these methods do not always distinguish between short-lived and long-lived items, and they rely on an appraiser's forecasts of effective age and remaining economic life. The economic age-life and market extraction methods are further limited in that they typically reflect a straight-line pattern of depreciation. Of the two, the market extraction method is better able to demonstrate changes in the rate of depreciation over time.

The breakdown method is a more comprehensive method that identifies specific elements of depreciation and treats each element separately. It enumerates the components of total depreciation–physical deterioration, functional obsolescence, and external obsolescence–and separates physical deterioration into three categories–deferred maintenance, short-lived components, and long-lived components.

Regardless of the methods applied, appraisers must ensure that the final estimate of depreciation reflects the loss in value from all causes and that no form of depreciation has been considered more than once. Double charges for depreciation can produce inappropriately low value indications in the cost approach. Also, the analysis of depreciation must be internally consistent, using either reproduction cost or replacement cost as the cost basis throughout. As explained in Chapter 27, the use of replacement cost eliminates the need to consider certain forms of obsolescence. Switching between reproduction cost and replacement cost within the analysis of depreciation greatly increases the chances of double-counting items of depreciation.

Age and Life Relationships

All three methods of estimating depreciation consider age-life relationships either directly or indirectly. The age and life relationships relate not only to the entire improvement but also to its various components. Depreciation occurs over the life of an improvement or in a single component of the whole. In theory, an improvement or component loses all of its value over the course of its life. For example, suppose that the typical life expectancy of a freestanding retail store in a given market is 40 years. Theoretically, when the building is 40 years old, it will have reached the end of its life expectancy and will have lost all of its value to depreciation, with no contributory value remaining to add to the value of the vacant site. Short-lived building components may go through this cycle several times over the same 40-year period. For example, the life expectancy of a water heater installed in a building will be much shorter than 40 years; some components may have to be replaced several times over the building's 40-year life.

In estimating the total depreciation of an improvement, the concepts most important to market extraction are

- actual age
- total depreciation
- annual rate of depreciation
- the implied total economic life that can be estimated

In the economic age-life method, the most important concepts are

- total economic life
- effective age
- remaining economic life

short-lived item
A building component with an expected remaining economic life that is shorter than the remaining economic life of the entire structure.

long-lived item
A building component with an expected remaining economic life that is the same as the remaining economic life of the entire structure.

In applying the concepts of economic life, effective age, and remaining economic life expectancy, the appraiser considers all elements of depreciation in one calculation. Therefore, the effective age estimate includes not only physical wear and tear but also any loss in value for functional and external considerations. This type of analysis is characteristic of the market extraction and economic age-life depreciation methods. However, the economic age-life method can be modified to reflect the presence of any known items of curable physical deterioration or incurable deterioration in short-lived building components.

In the application of the market extraction method, the actual age is preferred, and it is important to extract life estimates from comparable properties that have the same physical, functional, and external characteristics as the subject property. Typically the market extraction method is not modified to reflect depreciation of short-lived building

Curable or Incurable?

The test of curability is a straightforward comparison:

- Items of physical deterioration or functional obsolescence are *economically feasible to cure* if the cost to cure is equal to or less than the anticipated increase in the value of the property.
- If the cost to cure is more than the anticipated increase in value, the item is *incurable*.

For example, if a poorly maintained warehouse would require $250,000 in repairs for deferred maintenance but the increase in value after making those repairs would only be $150,000 because of a relative surplus of existing warehouse space in the market, then the deferred maintenance is currently incurable. If in six months the demand for warehouse properties changes because a major new manufacturing facility will open in the market area, then the potential rent levels for existing warehouse space might rise and the increase in value might exceed the cost to cure the deferred maintenance. In that case, the changing market conditions would make the deferred maintenance curable at the later date. A marketability study can help support a forecast identifying when value will rise to the point where an item of depreciation becomes curable.

economic life
The period over which improvements to real property contribute to property value.

useful life
The period of time over which a structure or a component of a property may reasonably be expected to perform the function for which it was designed.

components. However, a lump-sum adjustment may be made if the subject property has curable depreciation in the form of deferred maintenance.

In estimating physical deterioration in the breakdown method, the most important concepts are

- actual age
- useful life
- remaining useful life

The use of these terms in the breakdown method emphasizes the separation of physical deterioration from functional and external obsolescence. The economic age-life method employs economic life, which accounts for all three components of depreciation in one calculation. In contrast, the breakdown method employs useful life for physical deterioration, which is separated into short-lived and long-lived building components. The useful life of a building (i.e., the life of structural or long-lived items) is typically longer than its economic life, while the short-lived components have a useful life that is shorter than that of the whole building. (Unless there are no short-lived items, it is logically impossible for the useful life of long-lived components and the economic life of the property as a whole to be the same.) In spite of that difference, the application of useful life in the breakdown method and economic life in the market extraction and economic age-life methods should yield the same approximate estimate of total depreciation.

Actual Age and Effective Age

Actual age, which is sometimes called *historical age* or *chronological age*, is the number of years that have elapsed since building construction was completed. Actual age serves two purposes in depreciation analysis. First, it is the initial element analyzed in the estimation of effective age. Second, in the application of the breakdown method, the actual age is a fundamental consideration in the age-life analysis needed to estimate physical deterioration of the short-lived and long-lived components of an improvement.

Effective age is the age indicated by the condition and utility of a structure, and an estimate of effective age is based on an appraiser's judgment and interpretation of market perceptions. Even in the same market, similar buildings do not necessarily depreciate at the same rate. The maintenance standards of owners or occupants can influence the pace of building depreciation. If one building is better maintained than other buildings in its market area, the effective age of that building may be less than its actual age. If a building is poorly maintained, its effective age may be greater than its actual age. If a building has received typical maintenance, its effective age and actual age may be the same.

As an example, consider a 23-year-old strip retail center that has been redecorated on the inside but has not been modernized. The original roof and HVAC components are still in place. The building would probably have an effective age of about 23 years. (The small amount of work done in redecorating is usually not sufficient to reduce the effective age.) Now suppose that, in addition to the redecorating, the building's roof and HVAC system have been replaced. In this case, the building would probably have an estimated effective age of less than 23 years. If the same 23-year-old building were in poor condition, had not been redecorated, had a defective HVAC system, and had below-average occupancy because of poor maintenance, it would probably have an estimated effective age greater than 23 years. The condition and functional utility of an improvement as well as market and locational factors must be taken into account in the process of estimating an improvement's effective age.

Total Economic Life and Useful Life

An improvement's total economic life begins when that improvement is built. It ends when the improvement no longer contributes value for the use for which it was originally intended and is no longer the highest and best use of the underlying land. This period is usually shorter than the improvement's physical life expectancy.[2] At the end of a building's economic life, a property owner has several options available:

- renovation or conversion to a new use
- rehabilitation
- remodeling
- demolition and replacement with a suitable new structure
- hold until one of the other options is economically feasible

Both economic life and useful life acknowledge that market forces operate in such a way that buildings are either renovated, converted to a new use, rehabilitated, remodeled, or torn down long before they physically wear out.

All aspects of a property and its market, including the quality and condition of the construction, the functional utility of the improvements, and market and locational externalities must be considered in the estimation of a property's economic life. The economic life of an improvement is shaped by a number of factors, including the following:

physical considerations	The rate at which the physical components of an improvement wear out, given the quality of construction, the use of the property, maintenance standards, and the region's climate.
functional considerations	The rate at which construction technology, tastes in architecture, energy efficiency, and building design change. These factors can render an improvement functionally obsolete, regardless of its age or condition.
external considerations	Short-term and long-term influences such as the stage of a neighborhood's life cycle, the availability and affordability of financing, and supply and demand factors (i.e., market conditions).

2. The concept of *physical life* is an outdated term that has persisted because its meaning is self-evident and easier to explain than the concepts of *useful life* and *economic life*. The concept of *useful life* is more complex but more useful than *physical life* in the analysis of depreciation because *useful life* includes a consideration of the economics of the use a structure was originally intended for.

Many functional and external considerations may have no discernible effect on the value of an improvement as recognized by the market on the date of the opinion of value, but those considerations may have a profound effect at some future time–say, in 20, 50, or even 100 years. Changes in market preferences and locational attributes are not typically predictable or, for that matter, curable. Although it is difficult to forecast economic life expectancy, market study and analysis of historical trends and neighborhood life cycles may provide important information.

To estimate an improvement's economic life, an appraiser studies the typical economic life expectancy of similar improvements that have been sold recently in the market area. The techniques used to develop an estimate of total economic life include

- extracting depreciation from comparable sales (i.e., the market extraction method)
- observing real estate cycles and changes in market preferences to establish the length of time that similar properties are in demand and improvements are contributing to market value
- consulting with owners and developers regarding the feasibility of improvements that extend a building's economic life
- considering the investment horizon used by buyers and sellers, to the extent that it might be influenced by their anticipation of remaining economic life
- interviewing property managers, leasing agents, and real estate brokers regarding market preferences
- reviewing published cost services that report average economic lives by property type
- considering the effect that rising or falling land values will have on the remaining economic life of the improvements

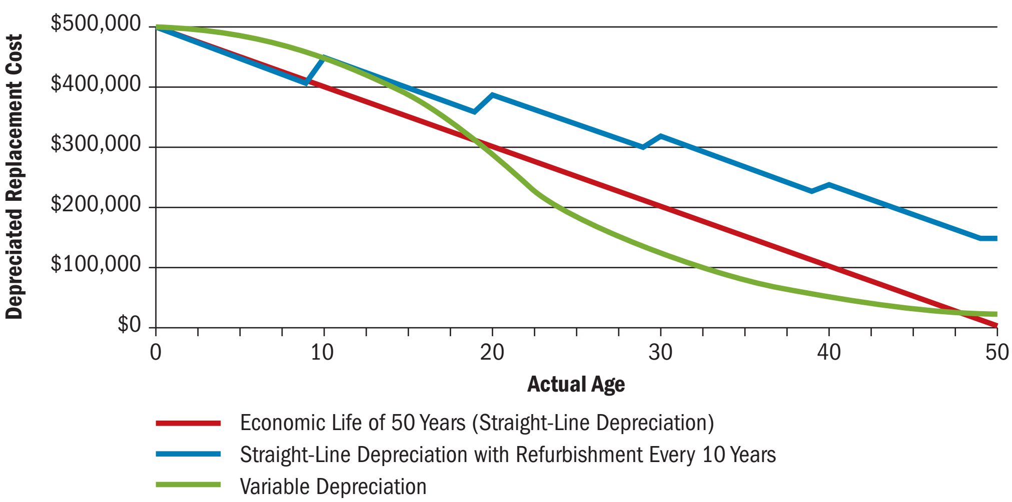
To calculate total economic life expectancy as of the date of sale, an appraiser takes the reciprocal of the average annual depreciation rate. For example, consider a residential subdivision where recent home sales indicate an average annual rate of depreciation of 2% for properties that are very comparable to the subject property (i.e., all homes built in the same phase of the subdivision's development and sold near the time of the sale of the subject property). Calculating the reciprocal of 2% (100%/2%, or 1/0.02) results in a total economic life expectancy for the subject property of 50 years as of the date of the opinion of value. This does not mean that the total economic life expectancy of the subject has always been and will always be 50 years. Rather, at the time the property was sold, its average annual rate of depreciation indicated a total economic life expectancy of 50 years. The total economic life expectancy of 50 years serves as a denominator in calculations that help explain the total depreciation in a property at a given point in time.

Calculating total economic life from an estimate of the average annual rate of depreciation is common, but it is considered overly simplistic by critics who point out the technique's reliance on straight-line depreciation. Accounting for curvilinear patterns of depreciation (e.g., compound rather than simple accrual) requires additional data to support a more detailed, and possibly more realistic, model of the market behavior of a building over its total economic life. Figure 29.1 illustrates various possible trends in depreciation graphed over time.

Renovation and modernization can effectively extend a building's life expectancy by "resetting the clock." For example, consider an improvement with a 50-year economic life expectancy. If at the 10-year mark the improvement was substantially modernized, bringing the physical components up to current market standards for new construction, then the effective age could be reset to zero and the remaining economic life expectancy of 40 years (before the renovation) would be reset to the original 50 years–or to some other figure, depending on the extent of modification to the improvement. Many historic properties have an economic life equal to or greater than the original physical life expectancy of the building materials because of continued renovation and restoration.

Useful life is the period of time over which the components of the improvement may reasonably be expected to perform the functions for which they were designed. In the breakdown method of estimating depreciation, useful life is used in age-life calculations. Although the physical life expectancy of some components, such as structural elements made of concrete and steel, may be hundreds of years, the concept of useful life recognizes the economic influences acting on the improvements that contain these components. In more tangible terms, if a 40-year-old industrial building is being demolished so that its site can be redeveloped, it is probable that all components of the building will be demolished, regardless of their remaining physical utility.

Figure 29.1 Various Depreciation Trends



The useful life of short-lived physical components (e.g., HVAC components, roof covering, interior decorating, floor finishes) is shorter than the life expectancy of the entire building. Conversely, long-lived components (usually the structural components of a building, such as the foundation, framing, and underground piping) have a life expectancy that is longer than the building's economic life expectancy. Distinguishing between short-lived and long-lived components is important when breakdown techniques are applied, and the process of differentiation gives the appraiser flexibility in estimating component depreciation that is not available with the market extraction and economic age-life methods.

Remaining Economic Life and Remaining Useful Life

Remaining economic life is the estimated period over which existing improvements are expected to continue to contribute economically to property value. The concept is applied in the economic age-life method. Usually improvements can be regarded as investments designed to contribute to value over a long period of time. Some depreciation occurs between the date when the improvements begin to contribute to value and the date of the opinion of value. Wear and tear can take their toll even during construction, which is usually a long process. The remaining economic life extends from the date of the opinion of value to the end of the improvement's economic life. The remaining economic life is never more than its total economic life as long as the highest and best use of the property does not change. In the breakdown method, remaining useful life is the estimated period from the construction or installation of a component to the end of its total useful life expectancy. The remaining useful life of any long-lived item is greater than its remaining economic life, unless there are no short-lived components or the short-lived components are already completely depreciated.

The total economic life of similar structures minus the effective age of the improvement will approximate the remaining economic life of the improvements of the subject property. As an example, consider a property with a 15-year-old building. An appraiser searches the market area and finds three sales of properties that are comparable in size, layout, and other physical characteristics:

- Property 1 has an eight-year-old building, an annual depreciation rate of 2.0%, and a total economic life expectancy of 50 years (100%/2%). Its remaining economic life expectancy is therefore 42 years (50 – 8 = 42).
- In contrast, Property 2 has a 19-year-old building, an annual depreciation rate of 1.51%, and a total economic life expectancy of 66 years (1/0.0151). Its remaining economic life expectancy is 47 years (66 – 19 = 47).
- Property 3 has a 14-year-old building, an annual depreciation rate of 1.75%, and a total economic life expectancy of 57 years (1/0.0175). Its remaining economic life expectancy is 43 years (57 – 14 = 43).

A pattern can be observed. As a building ages, the total depreciation increases but the average annual depreciation rate may also change. The remaining economic life expectancy would increase if the effective age decreases over time due to periodic repairs and maintenance. In other words, total economic life and its components do not always remain constant. Reconciliation should be based on the improvement that is most similar in age to the subject property. Of the three sales, the improvement closest to the subject property in age is Property 3. In light of this similar sale and the pattern indicated by the market data, the appraiser could reasonably reconcile the total economic life expectancy for the subject property at 60 years. Using the economic age-life method, which will be discussed in detail later in this chapter, the total depreciation would equal 25% (15/60) of the property's cost.

The age-life relationships used to develop an estimate of total depreciation in the market extraction and economic age-life methods include total economic life, effective age, and remaining economic life. Age-life relationships used to estimate deterioration in individual physical components in the breakdown method include useful life, actual age, and remaining useful life.

Market Extraction Method

The market extraction method of estimating total depreciation relies on the availability of comparable sales from which depreciation can be extracted. It makes use of direct comparisons with sales of comparable properties in the market. While easy to understand and explain, the market extraction method should only be used if sufficient data exists and if the quality of that data is adequate to permit meaningful analysis. By considering all elements in one calculation, market extraction can be an oversimplification of the complex interplay of physical, functional, and external causes of depreciation. The technique is primarily used to extract total depreciation and to establish total economic life expectancy.

The market extraction method includes the following steps:

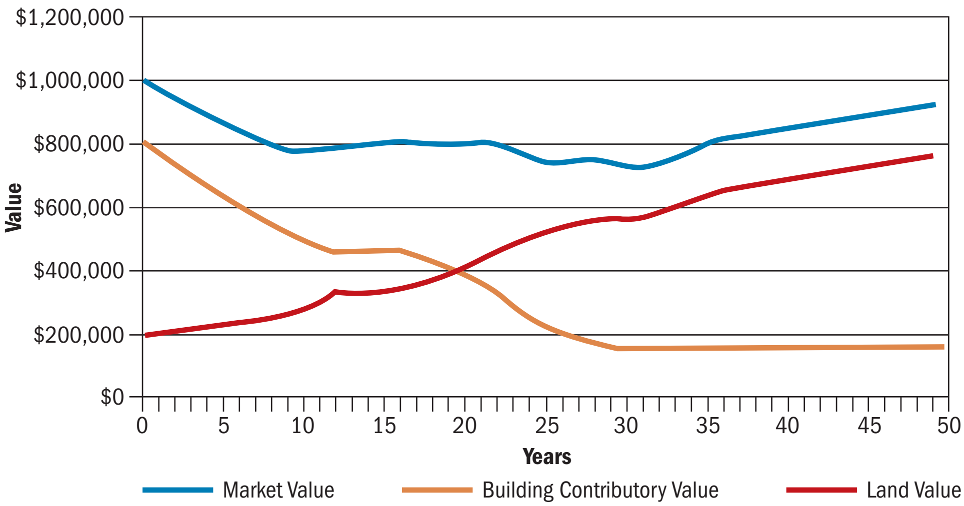
1. Find and verify sales of comparable improved properties that are similar in terms of age and utility to the subject property. Although it is desirable, it is not essential that the comparable sales be current sales or be located in the subject property's area. They can be from a market that is comparable (i.e., with similar tastes, preferences, and external influences).
2. Make appropriate adjustments to the comparable sale prices for certain factors, including property rights conveyed, financing, and conditions of sale. An adjustment for market conditions is not made because the appraiser is estimating cost and depreciation at the time of the sale. No adjustments are made for physical, functional, or external impairments because these factors are the source of the depreciation that is being measured.
3. Subtract the value of the land at the time of sale from the sale price of each comparable property to obtain the contributory value of the improvements.

Patterns of Depreciation

The use of age and life estimates in calculations of depreciation percentages often involves a conclusion that depreciation accrues at a constant rate, i.e., in a straight-line pattern. However, the rate and acceleration of the accrual of depreciation over time can change based on a broad range of influences, resulting in a concave, convex, linear, or other shape when value is graphed over time. A variable pattern of depreciation (e.g., reflecting periodic refurbishment of short-lived building components) is likely the most realistic scenario and does not rely on a straight-line conclusion.

Figure A illustrates a pattern of depreciation that can be exhibited by many types of buildings. As the building ages, the average annual rate of depreciation decreases, resulting in a downward curve, until total depreciation eventually levels off and the value of the improvement stabilizes at its salvage value. The economic life remains relatively stable as routine maintenance occurs and the building continues to be used for its original purpose, unless or until a competing use for the site raises the land value high enough to support demolition and redevelopment of the site. The building might also be converted to another use, supporting the concept that useful life may be extended long after the economic life of the original use has ended. Conversely, the opposite situation could occur in markets that are changing rapidly. As land value increases and as market preferences change to different designs or property types, average annual depreciation accelerates and both economic life and useful life are shortened. Both situations may occur over the life of the same improvement, which is why economic life and useful life estimates apply to a specific point in time. Figure B depicts the depreciation curve in a market that is changing rapidly and exerting upward pressure on land values. In contrast, Figure C illustrates a depreciation curve in a market where a severe downturn affects land values sharply and is then followed by a long, slow recovery.

Figure A Analysis of Variable Depreciation and Value Change Over Time



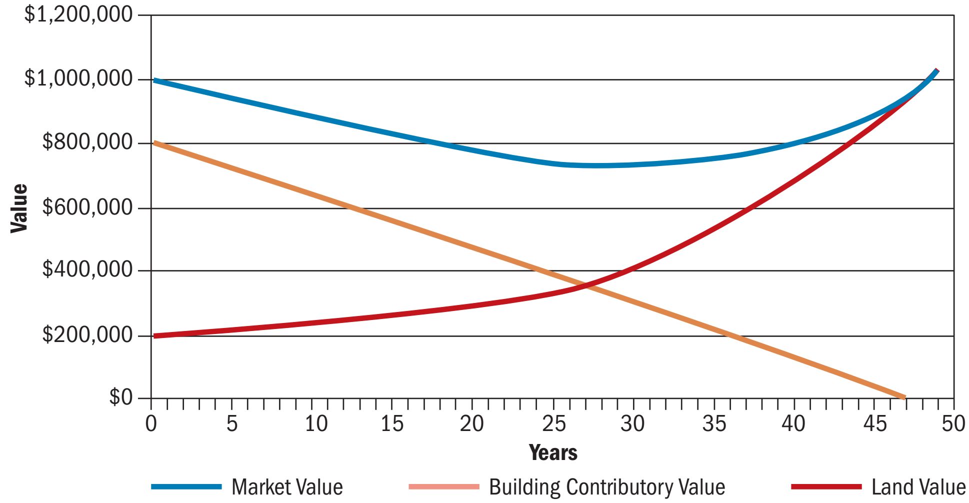
Value change typical of older, stable neighborhoods.

Land value increase is steady but slow.

Value of the building declines and then stabilizes

Market value levels off and remains stable and later increases moderately.

Figure B Analysis of Depreciation and Value Change Over Time—Changing Market Conditions



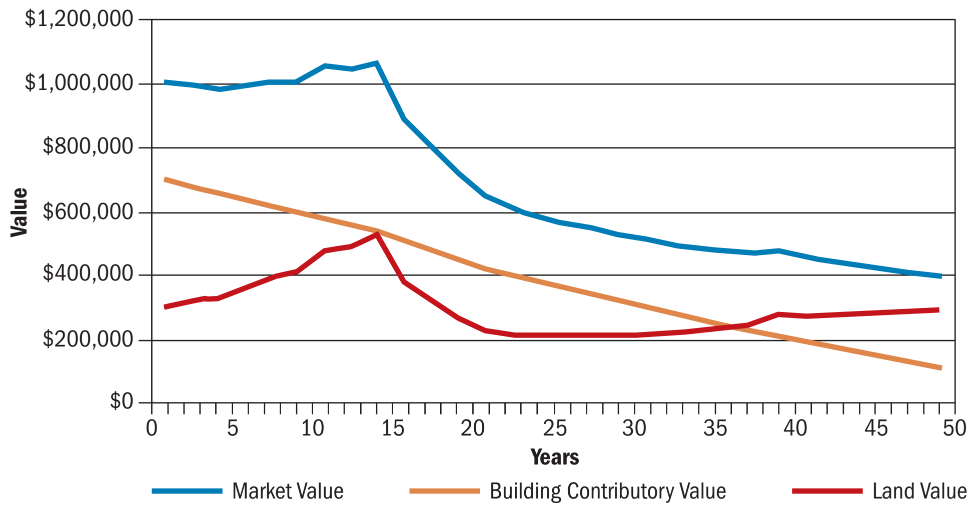
Rate of depreciation of building remains relatively constant while rate of appreciation of land value accelerates significantly around Year 20.

Change in highest and best use around Year 28.

Building contribution declines to $0 around Year 47.

Building is demolished and property is redeveloped in Year 48.

Figure C Analysis of Depreciation and Value Change Over Time—Market Downturn



Land value drops precipitously in Year 14 due to a change in market conditions and does not recover significantly for many years.

Building contribution to value continues to decline steadily, causing market value to continue to decline.

4. Estimate the cost of the improvements for each comparable property at the time of its sale. The cost estimates should have the same basis–i.e., reproduction cost or replacement cost. Typically replacement cost is used because the appraiser may not have sufficient information on all the sales to develop a credible opinion of reproduction cost. Also, the cost estimate should include all direct costs, indirect costs, and entrepreneurial profit for the improvements.
5. Subtract the contributory value of all improvements from the current construction cost to determine the total dollar amount of depreciation of the improvements as of the date the sale occurred. The extracted depreciation includes all forms of depreciation.
6. Convert the dollar estimates of depreciation into percentages by dividing each estimate of total depreciation by the construction cost at the time of sale. If the ages of the sales are relatively similar to the age of the subject property, the percentages of total depreciation can be reconciled into a rate appropriate for the subject property. This rate is applied to the subject's cost to derive an estimate of the subject's total depreciation.
7. If the ages of the comparable properties are different from the age of the subject property, then develop an annual depreciation rate. This step expands the analysis to calculate annual rates of depreciation and to support an estimate of the total economic life expectancy of the subject property.

Consider the sales in Table 29.1. All are of fee simple estates and the ages, function, and external influences of the sale properties are similar to the subject property. In this case, the range of total depreciation percentages is so narrow that it is not necessary to annualize the calculations. The cost of the subject improvements is $240,000 (more than the price of Sale 1 but much less than the price of Sale 3), so the percentage of depreciation can be reconciled to 33% of cost. The total lump-sum dollar depreciation estimate in Example 1 comes to $80,000 ($240,000 × 33%).

If there are differences between the sales (e.g., location, amount of remodeling, functional utility, degree of maintenance), total deprecia-

Table 29.1 Example 1

	Sale 1	Sale 2	Sale 3	Step in Procedure
Sale price	$215,000	$165,000	$365,000	1, 2
Less value of land	– $60,000	– $40,000	– $127,750	3
Depreciated cost of improvements	$155,000	$125,000	$237,250	3
Cost of improvements	$230,000	$195,000	$375,000	4
Less depreciated cost of improvements	– $155,000	– $125,000	– $237,250	5
Total depreciation in dollars	$75,000	$70,000	$137,750	5
Total depreciation percentage	$75,000/$230,000	$70,000/$195,000	$137,500/$375,000	6
	32.61%	35.90%	36.73%	

tion may show greater variation, and further analysis will be needed to understand the total depreciation. The appraiser converts total depreciation into an annual depreciation rate by dividing each percentage by the actual age of the sale property. The use of effective age instead of actual age requires specific knowledge about the quality of construction and physical characteristics of the improvements. Actual age may be preferred because it is a fact that is readily available, whereas effective age is based on an appraiser's judgment. Whether actual or effective age is used, the same age basis must be applied consistently to all sales. Then the appraiser analyzes the calculated depreciation rates and compares the comparable sale properties to the subject property in order to select an appropriate annual depreciation rate for the subject improvements. Finally, the annual depreciation rate is multiplied by the age of the subject property to develop an estimate of total depreciation.

The comparable properties shown in Table 29.2 have a wide range of ages. Again assume that all the sales are of a fee simple interest and that no major functional or external obsolescence is evident.

In Example 2, the range of total percentage depreciation estimates is wide because of the age differences between the comparable sales. In this case, comparing annual depreciation rates provides more credible support for the depreciation estimate. If the subject improvements are 15 years old, which is closest to the actual age of the improvements in Sale 2, a reasonable estimate of annual depreciation would be 1.4% per year, which is within the calculated range of 1.21% to 1.51% for the comparable properties. If this rate is applied to the subject property's age, total depreciation for the subject improvements can be calculated as 21% (15 × 1.4%).

The model can be further expanded to support an estimate of total economic life expectancy for the subject property. The average annual depreciation for the subject improvements equates to a total economic

Table 29.2 Example 2

	Sale 1	Sale 2	Sale 3	Step in Procedure
Actual age of comparable property	8	14	19	
Sale price	$998,000	$605,000	$791,000	1, 2
Less value of land	– $140,000	– $100,000	– $125,000	3
Depreciated cost of improvements	$858,000	$505,000	$666,000	3
Cost of improvements	$950,000	$627,000	$934,000	4
Less depreciated cost of improvements	– $858,000	– $505,000	– $666,000	5
Total depreciation in dollars	$92,000	$122,000	$268,000	5
Total depreciation percentage	9.68%	19.46%	28.69%	6
Actual age of comparable property	8	14	19	
Average annual depreciation rate	1.21%	1.39%	1.51%	7
Total economic life expectancy	100%/1.21%	100%/1.39%	100%/1.51%	
	82.6 years	71.9 years	66.2 years	

life of 71.4 years (100%/1.4%). This falls within the range of the total economic life expectancies of the comparables properties, 66.2 to 82.6 years, and appears reasonable for the subject property.

Applicability and Limitations

When sales data is plentiful, the market extraction method provides a reliable and convincing estimate of depreciation. However, appraisers must be able to develop an accurate site value estimate and a defensible estimate of replacement cost for each comparable property. Additionally, the comparable properties should ideally have physical, functional, and external characteristics similar to the subject property, and they should have incurred similar amounts and types of depreciation.

When the comparable properties differ in design, quality, or construction, appraisers can find it difficult to judge whether differences in value are attributable to these characteristics or to a difference in age, and thus depreciation. The market extraction method is difficult to apply when the type or extent of depreciation varies greatly among the comparable properties due to characteristics other than age. Locational differences are usually removed with the subtraction of land value. However, external conditions may affect building values as well, which is why it is important to select sales that are subject to the same (or similar) market influences. If the sales analyzed are affected by special financing or unusual motivation, the problem is further complicated.

The usefulness of the market extraction method depends on the accuracy of the site value estimates and the cost estimates for the comparable properties. If the sales are located in market areas that are not comparable to the subject property's, the method may not be appropriate. Market extraction considers all types of depreciation in a lump sum and does not break down the estimate into the various components of depreciation. However, this depreciation method is market-based and easy to understand, and for these reasons should be considered when it can be appropriately supported.

Economic Age-Life Method

The effective age and total economic life expectancy of a structure are the primary concepts used by appraisers to measure depreciation with age-life relationships. In the economic age-life method, total depreciation is estimated by calculating the ratio of the effective age of the property to its economic life expectancy and applying this ratio to the property's total cost. The formula is

$$\frac{\text{Effective Age}}{\text{Total Economic Life}} \times \text{Total Cost} = \text{Depreciation}$$

Although the economic age-life method is not always as accurate as other techniques, it is the simplest way to estimate depreciation. The method is applied in the following steps:

1. Conduct research to identify the anticipated total economic life of similar structures in the market area and estimate the effective

age of the subject building. The data used in the market extraction method would also be applicable in the economic age-life method.

2. Divide the estimated effective age of the subject by the anticipated total economic life of similar structures. The resulting ratio is then applied to the subject's cost to estimate total lump-sum depreciation.
3. Subtract the lump-sum estimate of depreciation from the cost of the subject improvement to arrive at the improvement's contribution to property value.

As an example, market research (Step 1) yields the following information about a subject and comparable properties:

Total cost of subject property	$668,175
Land value of subject property	$180,000
Estimated effective age of subject property	18 years
Total economic life expectancy of comparable properties	50 years

The total percentage of depreciation is determined by dividing the estimated effective age of 18 years by the total economic life expectancy of 50 years (Step 2). Thus, the economic age-life formula indicates total depreciation of 36% (18/50). When this rate is applied to the cost of $668,175, the total depreciation indicated is $240,543 (Step 3). The cost approach calculations are applied as follows:

Total Cost	$668,175
Less Total Depreciation	– $240,543
Depreciated Cost	$427,632
Plus Land Value	+ $180,000
Indicated Value by the Cost Approach	$607,632

Applicability and Limitations

The economic age-life method is simple, easy to apply, and easy to understand. It allows appraisers to estimate total depreciation, which can subsequently be allocated among its various causes using breakdown procedures. Although this method is usually the simplest way to estimate depreciation, it does have limitations.

First, because the percentage of depreciation is represented by the ratio of effective age to total economic life, this method measures depreciation on a straight-line basis over the course of an improvement's economic life. The straight-line pattern of depreciation is only an approximation of the total depreciation of a property at a specific point in time.

Second, the economic age-life method, like the market extraction method, does not divide depreciation into its various categories–physical deterioration and functional and external obsolescence. In other words, obsolescence must be included in the estimate of effective age or economic life. In market areas where comparable properties incur types and amounts of depreciation that differ from the subject property, the economic age-life method is difficult to justify.

Finally, the economic age-life method, like the market extraction method, does not recognize the difference between short-lived and long-lived items of physical deterioration. Because a single figure reflects all the depreciation in the structure as a whole, varying amounts of deterioration in short-lived items are not directly indicated in the age-life method. For example, a structure as a whole may be 20% depreciated except for the roof, which, unlike the roofs of other properties in the neighborhood, is 90% depreciated. In this situation, the breakdown method allows appraisers to make more refined analyses.

Variations of the Economic Age-Life Method

In some situations, the effect of certain items of depreciation on value is known or can be easily and accurately estimated, and in those situations appraisers can apply a variation of the economic age-life method that involves deducting those items from the total cost before applying the age-life ratio. This type of variation of the economic age-life method combines techniques from the market extraction and breakdown methods with the traditional economic age-life method.

In the most common variation of the economic age-life method, known as the *modified economic age-life method*, the cost to cure the curable items of depreciation (both physical and functional) is known. Deducting curable items of depreciation from the cost of improvements before the age-life ratio is applied mirrors what typical purchasers consider when deciding on whether to invest in a property. That is, a potential buyer will first consider what items need to be fixed (and their cost) before judging the price he or she would be willing to pay given the wear and tear on the long-lived items. This procedure is most meaningful when the subject property has curable depreciation not typically found in the market at the time of appraisal. If the cost to cure is known, it can simply be deducted from the total cost. When the curable items are dealt with first, the appraiser may need to use a lower effective age or a longer remaining economic life expectancy in calculating the modified economic age-life ratio.

For example, consider a 20-year-old property with a total cost of $892,000. The interior needs to be completely refurbished at a documented cost of $82,500. Sales of similar buildings that were sold after being refurbished are used to extract a total economic life expectancy of 50 years. In deriving a total economic life expectancy for each comparable building, the appraiser uses an effective age that is 25% lower than the building's actual age because investors in the market report that they think the effective age of a building will be lower than its actual age once the interior has been refurbished. This avoids any double-counting of depreciation. If the effective age is 15 years *after* the refurbishment, then value would be calculated as follows:

Replacement Cost	$892,000
Less Depreciation (15/50 = 30%)	– $267,600
Value Refurbished	$624,400
Less Cost to Refurbish Interior	– $82,500
Cost As Is	$541,900
Plus Land Value	+ $100,000
Indicated Value by Cost Approach	$641,900

If the refurbished portion will be brand new but the remaining portion of the improvements has an effective (and actual) age of 20 years, then the value would be calculated as follows:

Replacement Cost	$892,000
Less Cost to Refurbish Interior	− $82,500
Remaining Cost	$809,500
Less Depreciation (20/50 = 40%)	− $323,800
Value As Is	$485,700
Plus Land Value	+ $100,000
Indicated Value by Cost Approach	$585,700

In situations where external obsolescence is present, another variation of the economic age-life method can be applied. If external obsolescence is affecting the subject property and sales of properties in the subject market have incurred the same external obsolescence, the appraiser should use the total economic life extracted from these sales in the economic age-life ratio. However, if external obsolescence is affecting the subject property but there are no sales in the subject market similarly affected, an appraiser can estimate total depreciation and economic life without the external obsolescence using the market extraction or economic age-life method and then estimate external obsolescence using techniques from another approach (e.g., the income capitalization approach). The estimated depreciation from the economic age-life method and the estimated external obsolescence from the breakdown method would be added together to arrive at an estimate of total depreciation.

As an example, consider a property in a district where there is an oversupply of competitive properties. This glut of competitive space has resulted in a reduction in rents, which the appraiser estimates to be a 10% loss to the value indication of the building as a result of external influences. Until the oversupply is corrected through the natural interaction of supply and demand, the property will continue to be affected. The cost of the 10-year-old building improvement is $696,000, and the land value is $200,000. The market extraction method, applied to comparable properties in the subject property's market a year earlier when there was no oversupply, indicated a total economic life expectancy of 50 years. Using the economic age-life method, depreciation is thus estimated at 20% (10/50).

The physical and functional depreciation estimated for the subject improvements by the economic age-life method is $139,200 and the additional external obsolescence for the building is estimated at $69,600. Total depreciation, therefore, is allocated as follows:

Depreciation Attributable to All Causes except External Obsolescence	
$696,000 × 20%	$139,200
Depreciation Attributable to the External Obsolescence	
$696,000 × 10%	+ $69,600
Total Depreciation	$208,800
	or 30% of $696,000

If the 30% figure were derived from a single calculation, the effective age would have to be 15 years:

$$15/50 = 30\%$$

Or the economic life would have to be 33.33 years:

$$10/33.33 = 30\%$$

There would be no justification for either number.

Note that the external obsolescence is caused by an oversupply in the market, and it is unlikely that such a situation will be permanent. As supply and demand again approach equilibrium, the oversupply should disappear.

Now suppose that the 10% loss in value due to external influences includes a decline in land value estimated at $25,000. The losses in value to the land and the improvements would be accounted for as follows:

Total Losses Due to External Influences	$69,600
Less Loss in Land Value	– $25,000
External Obsolescence	$44,600
Replacement Cost	$696,000
Less Physical Deterioration	– $139,200
Less External Obsolescence	– $44,600
Value of Improvements	$512,200
Plus Land Value	+ $175,000
Indicated Value by Cost Approach	$687,200

The modified economic age-life techniques work best when relatively few adjustments need to be made to the economic age-life method of estimating total depreciation. Usually, relatively nominal adjustments are made for curable physical items or for a functional or external influence. If more than one atypical element exists in a property, it may be advisable to use the more detailed breakdown method.

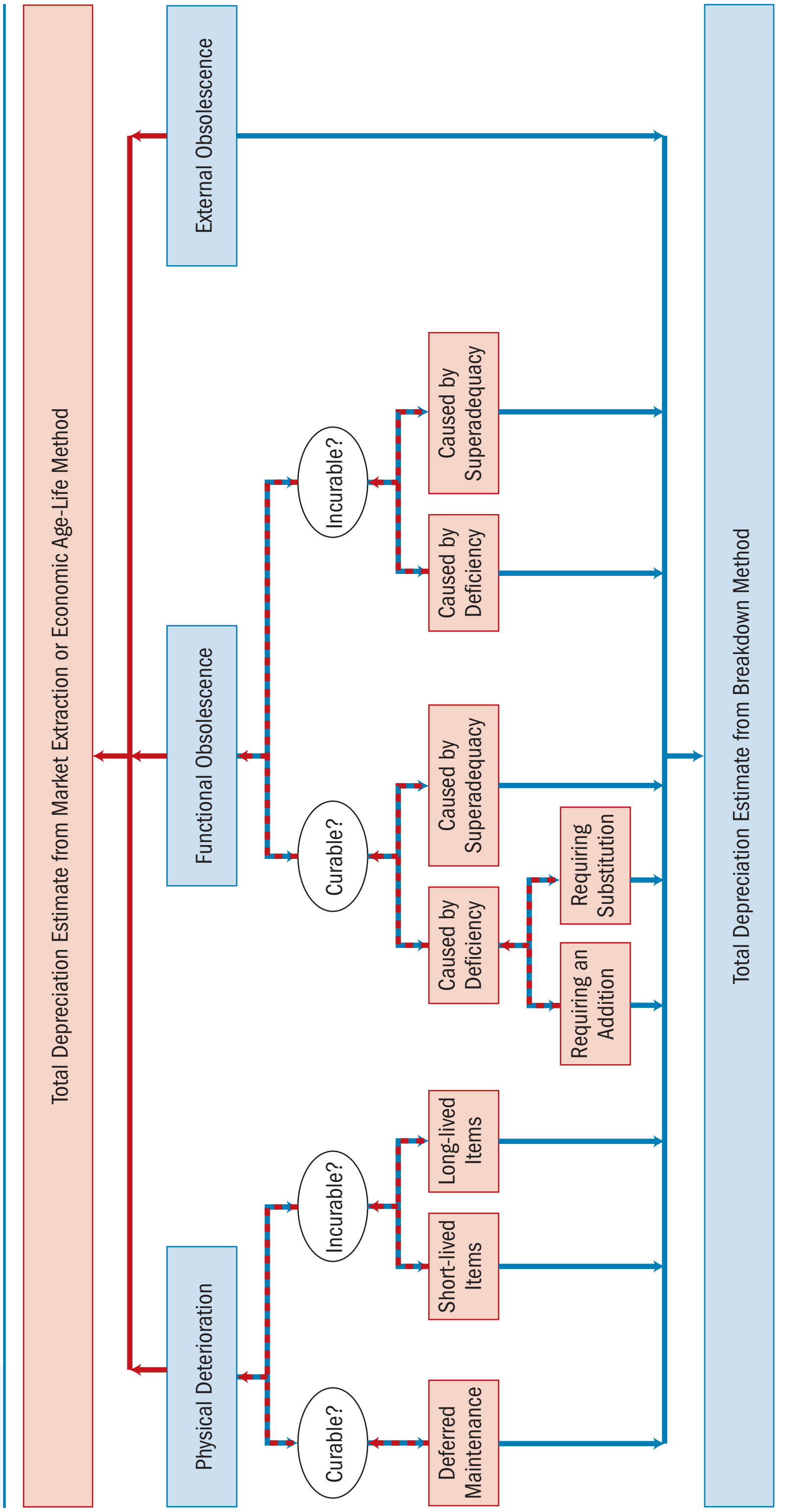
Breakdown Method

The breakdown method is the most comprehensive and detailed way to measure depreciation because it segregates total depreciation into individual component parts:

- physical deterioration
- functional obsolescence
- external obsolescence

Each step of the breakdown method calculates one type of depreciation. The process is cumulative, with each step building on the results of the prior step until all forms of depreciation have been considered. Alternatively, the depreciation calculation may begin with the estimation of total depreciation by the market extraction or economic age-life method and then apply the breakdown method to allocate total depreciation into more precise components. In other words, appraisers can start from either the top or the bottom of the flowchart shown in Figure 29.2 and use the breakdown method to work toward the other end for a more complete understanding of all the forms of depreciation present in a property.

Figure 29.2 Components of Depreciation



The primary techniques used to calculate the different types of depreciation include

- estimation of cost to cure, which is a measure used for curable physical deterioration (deferred maintenance) and curable functional obsolescence
- application of an age-life ratio to measure incurable physical deterioration for both short-lived and long-lived components
- application of the functional obsolescence procedure to estimate all types of functional obsolescence
- analysis of market data (paired data analysis, statistical analysis, or other techniques), which may be used to identify and estimate functional obsolescence caused by a deficiency or superadequacy as well as external obsolescence
- capitalization of income loss[3] or excess operating costs, which may be used to estimate incurable functional obsolescence as well as external obsolescence

Table 29.3 shows how the breakdown method can be applied to allocate an estimate of total depreciation among its various components *or* to develop a conclusion of total depreciation by adding together estimates of each item of depreciation.

Table 29.3 Procedures for Applying the Breakdown Method

Purpose	To allocate a known estimate of total depreciation, developed with the market extraction or economic age-life methods, among its various components
Procedure	1. Estimate total depreciation using the market extraction or economic age-life method.
	2. Calculate all items of physical deterioration, add them up, and subtract the total from the lump-sum depreciation estimate. The residual amount, if any, represents depreciation attributable to functional and external obsolescence.
	3. Calculate all items of functional obsolescence, add them up, and subtract that total from the total amount of obsolescence.
	4. Any residual represents the depreciation attributable to external obsolescence.
Purpose	To develop an estimate of total depreciation one item at a time
Procedure	1. Calculate all items of physical deterioration, including deferred maintenance if present, using the appropriate techniques and then add up all the estimates to arrive at total physical deterioration.
	2. Calculate all items of functional obsolescence, again using appropriate techniques, and add these estimates together to arrive at total functional obsolescence.
	3. Calculate external obsolescence. When external obsolescence cannot be allocated from a lump-sum estimate, it is calculated either through analysis of market data or by capitalization of income loss. Sometimes part of the loss in property value is due to a decline in land value.
	4. Add together all physical deterioration (including the cost to cure deferred maintenance), functional obsolescence, and external obsolescence to arrive at an estimate of total depreciation.

3. In earlier editions of *The Appraisal of Real Estate*, the term *rent loss* had been used to denote the loss of income from rent. The term *income loss*, which has been used in more recent editions, denotes lost rent as well as other income that may be lost to depreciation.

Applicability and Limitations

The breakdown method is primarily used when the scope of work of an appraisal assignment requires that each form of depreciation be accounted for in the appraisal. In addition to allocating lump-sum estimates of total depreciation among their various components, the breakdown method is used when the market extraction and economic age-life methods cannot be applied. This usually occurs when the multiple elements of depreciation that exist in the subject property are not accurately reflected in available sales data and a closer analysis of these elements of depreciation is required. The breakdown method may also be used when the economic age-life method is too simplistic to account for the varied forms of depreciation present.

When using the breakdown method, appraisers should keep several cautions and considerations in mind:

1. If the sum of all items of physical deterioration estimated using the breakdown method is equivalent to the total depreciation derived from the market extraction or economic age-life methods, then no functional obsolescence or external obsolescence is present.
2. If the sum of all items of physical deterioration and all items of functional obsolescence estimated with breakdown techniques is equivalent to the total depreciation derived from the market extraction or economic age-life methods, then no external obsolescence is present.
3. If the sum of the items of depreciation estimated by the breakdown method substantially differs from the total depreciation derived from the market extraction or economic age-life methods, all the methods applied should be reviewed as a test of reasonableness.

The results obtained from the breakdown method and from the market extraction or economic age-life methods may differ for a variety of reasons. The total depreciation derived using the market extraction or economic age-life methods might not accurately reflect the characteristics of the depreciation in the subject property. For example, the subject property may have an element of depreciation that is indicated in the breakdown method but not in the market extraction or economic age-life methods due to dissimilarities in the comparable data. Conversely, the breakdown method may not be as accurate as the simpler methods of estimating depreciation if certain breakdown techniques are applied incorrectly, resulting in double-counting some element of depreciation. As another example, selecting a useful life for the long-lived components that is the same as the economic life of the property overall would be inappropriate in the breakdown method unless the property had no short-lived components.

Physical Deterioration

In the breakdown method, all physical depreciation of improvements falls into one of three categories:

- deferred maintenance

Components of physical deterioration include items of deferred maintenance, short-lived items, and long-lived items.

- short-lived physical deterioration
- long-lived physical deterioration

Deferred maintenance is curable, whereas short-lived and long-lived items of physical deterioration are not curable, usually because it is not physically possible or economically feasible to cure them. Elements of total depreciation that are not physical deterioration must be some form of obsolescence (either functional or external).

Curable Physical Deterioration—Deferred Maintenance

Curable physical deterioration, also known as *deferred maintenance*, applies to items in need of immediate repair on the effective date of the appraisal. Some examples include broken windows, a broken or inoperable HVAC system, carpet in need of immediate replacement, a leaking roof, and inoperable restrooms. For most properties, deferred maintenance involves relatively minor items that are 100% physically deteriorated (i.e., broken). The item must be replaced or repaired for the building to continue to function as it should and to be marketable to potential buyers. Because these repairs must be performed for the building to continue to function, they are curable items.

Deferred maintenance is measured as the cost to cure the item or the cost to restore it to a new or reasonably new condition. The cost to cure may exceed the item's cost when it was installed new. Cost to cure is analogous to an age-life procedure because the age of a curable item equals (or exceeds) its total useful life expectancy, resulting in 100% deterioration. All deferred maintenance items are completely deteriorated, and therefore they may all be treated together in the breakdown method.

For example, suppose that during a site visit to a small office building an appraiser notes that the exterior walls need to be scraped, primed, and painted, and one inoperable window needs to be replaced. A painting contractor quotes a price of $5,000 to do the work. However, according to the appraiser's cost manual, a similar job performed at the present time–i.e., as part of an original construction project–should only cost $3,500. In this instance the correct measure of the cost to cure is $5,000. If the painting were done during the original construction, the walls would not have had to be scraped. The contractor could have just primed and painted them. Similarly, the cost of installing one window at the time of construction would be $500, but the cost to replace the broken window is higher, $750 in this case, because of the additional labor involved in removing and disposing of the existing window. The higher amounts should be used by the appraiser as the cost to cure and the appropriate measure of curable physical deterioration for these building components:

	Current Construction Cost	Cost to Cure
Painting	$3,500	$5,000
Window	+ $500	+ $750
Total	$4,000	$5,750
Curable physical deterioration:		$5,750

Repainting essentially resets the clock on the useful life of the paint, but the repair of the broken window only affects the useful life of one of the building's windows. The other windows may have depreciated by a certain percentage due to age, but replacing those other windows is not yet considered curable because those improvements still contribute more value than new replacements windows would after considering the cost to cure. The depreciation of the other windows would not be deferred maintenance but rather incurable physical deterioration.

Appraisers should note also that substantial deferred maintenance items typically require lump-sum adjustments in the sales comparison and income capitalization approaches because these problems are specific to the subject property and would not be reflected in the values provided by comparable sale or comparable rental properties with routine maintenance. In other words, significant deferred maintenance items are usually atypical expenses that require a capital decision by a property owner rather than a routine repair handled by a property manager.

Incurable Physical Deterioration—Short-lived Items

Once any curable physical deterioration is estimated, the remaining physical deterioration is allocated to either short-lived or long-lived building components. Short-lived items are those that are not ready to be replaced on the date of the opinion of value but will probably have to be replaced in the foreseeable (i.e., whatever is considered short-term) future. Examples include the roof covering, interior floor finish, furnaces, and water heaters. At the current time, a short-lived item is not 100% physically deteriorated, so it does not yet need to be cured. However, an appraiser should draw the same conclusions that market participants do–i.e., that the items will be 100% deteriorated before the end of the building's remaining useful life expectancy and will have to be replaced. When those items reach the point of 100% physical deterioration, they become curable items. Unlike items of deferred maintenance, which have lasted beyond their useful life expectancy and need to be replaced immediately, short-lived items have not reached the end of their total useful life expectancy and are not completely deteriorated, but they are substantially depreciated in comparison with the overall structure.

The deterioration in short-lived items is measured by estimating a separate age-life ratio and applying it to the current cost of each short-lived item. Because each short-lived item usually has a different age and a different total useful life expectancy, a separate age-life ratio or schedule must be calculated for each item. Age-life ratios for individual components are generally easier to estimate and support with market data than the age-life ratio for the property as whole used in the economic age-life method.

As an example, consider a 20-year-old boiler in an apartment building. According to a boiler contractor, the total useful life expectancy of a boiler such as this is 25 years. On the date of the opinion of value, the boiler is operational and there is no need to replace it. However, a prudent purchaser or owner would anticipate that the boiler will have to be replaced within a few years. The replacement cost of the boiler is $30,000. The age-life ratio is used to estimate a depreciation rate of 80% (20/25 = 0.80). When this ratio is applied to the cost to replace the boiler ($30,000), the deterioration indicated is $24,000 ($30,000 × 0.80). The boiler would not be a short-lived item if its remaining useful life were equal to or greater than the remaining economic life of the overall property.

The age of short-lived items may be the actual age or the effective age. In some circumstances effective age could be more appropriate depending on the degree of maintenance or amount of wear and tear. The useful life may be developed from a variety of sources, including observation, historical data, published cost surveys, manufacturer's warranties, and discussions with builders, property managers, and others.

Many lenders and investors rely on property condition surveys to help them plan for future replacements of building components. These surveys can be useful to appraisers as well because they are usually prepared by an engineer and provide all of the detail required to complete a breakdown depreciation analysis, including identification and allocation of long- and short-lived components and the calculation of their current age and remaining useful life. Property condition surveys include replacement cost estimates and a 10- to 20-year schedule that indicates exactly when replacements will be required. They tell the property owner what expenditures are needed immediately, what replacements will be needed in future years, and how much they will cost.

Incurable Physical Deterioration—Long-lived Items

Long-lived items include all items that were not treated as items of deferred maintenance or as short-lived items. Long-lived items have the same age and life expectancy and, therefore, they are all treated together. Examples of long-lived items include exterior walls, structural framing, the roof structure, underground piping, foundation walls, and insulation. Unless a property has reached the end of its useful life, long-lived items are not 100% physically deteriorated and therefore do not need to be cured. In addition, long-lived items are not normally replaced except under extraordinary circumstances—e.g., if a foundation wall is damaged. In that case, the long-lived component becomes an element of curable physical deterioration. The deterioration of long-lived items is measured by estimating an age-life ratio and applying it to all components of cost that have not already been treated for physical deterioration.

As an example, consider a small industrial building with a total cost of $700,000. It is 35 years old and has a total useful life expectancy of 100 years. The cost to cure the curable items (deferred maintenance) is $10,000. Short-lived building components include the boiler, roof cover, and floor covering. The cost to replace the boiler is $40,000, the cost to replace the roof covering is $60,000, and the cost to replace the floor finish is $20,000. There are no other short-lived items. The age-life ratio is calculated to be 35% (35-year actual age/100-year useful life). The replacement cost of the long-lived items is estimated by deducting the cost to cure the curable items and the sum of the costs to replace the short-lived items from the cost of the structure:

Total Replacement Cost—Long- and Short-Lived Items		$700,000
Deferred Maintenance		– $10,000
Short-Lived Items	**Replacement Cost**	
Boiler	40,000	
Roof Covering	60,000	
Floor Finish	+ 20,000	
Subtotal—Replacement Cost of Short-Lived Items		– $120,000
Remaining Replacement Cost Attributed to Long-Lived Items		$570,000

The age-life ratio is then applied to the untreated costs (35% × $570,000), and the resulting amount of deterioration attributable to the long-lived items is calculated to be $199,500.

Note that each cost should include its share of entrepreneurial incentive and soft costs. Appraisers should also be careful to avoid deducting the depreciation of short-lived components, rather than their cost, in developing the replacement cost of the long-lived components. Although the deferred maintenance shown in the preceding table will appear as depreciation on the cost approach summary, it is also most often calculated as the replacement cost of a fully depreciated item and in that case must be included with the short-lived replacement costs before it can be deducted from the total replacement cost as depreciation.

Understanding Age-Life Relationships and the Breakdown Method

Figure 29.3 illustrates a procedure that can be used to estimate all forms of physical deterioration, both curable and incurable. In addition to showing the correct relationship between all items of physical deterioration, the diagram is designed to ensure that all types of physical deterioration are considered and that no items of physical deterioration are treated more than once. This age-life procedure works whether the breakdown method is being used to allocate a known total depreciation amount among its components or to develop an estimate of total depreciation.

Figure 29.3 Age-Life Procedure for Estimating All Items of Physical Deterioration

A			Overall Cost		
B	Curables	Short-lived Item 1	Short-lived Item 2	Short-lived Item *n*	Long-lived Items
C	Cost to Cure	Cost to Replace	Cost to Replace	Cost to Replace	Untreated Costs
	×	×	×	×	×
D	100%	Age-Life Ratio	Age-Life Ratio	Age-Life Ratio	Age-Life Ratio
	=	=	=	=	=
E	Deterioration	Deterioration	Deterioration	Deterioration	Deterioration
F			Total Physical Deterioration		

The age-life procedure is a useful model for ensuring that all forms of physical deterioration are correctly estimated and dealt with only once.

The procedure has four steps. First, the total cost is allocated among the curable items, the incurable short-lived items, and the incurable long-lived items (Row C of Figure 29.3). Second, an age-life ratio is calculated for each allocated cost item (Row D). Third, the appropriate age-life ratio is applied to the estimated cost of each item (Row E). Finally, the individual items of physical deterioration are added together to develop an estimate of total physical deterioration (Row F).

As an example of these calculations, consider a 25-year-old industrial building in average condition (see Figure 29.4). Its overall cost is \$800,000. On the date of the site visit, the appraiser found one overhead door damaged beyond repair, which will cost \$5,000 to replace. (In this case, the \$5,000 cost to cure is the original cost of the installation of the door, i.e., there is no excess cost to cure.) The roof was replaced five years ago and has a 20-year guarantee, which indicates that it is 25% depreciated. The cost to replace it is \$60,000. The original HVAC components should last another five years, which indicates they are 83⅓% deteriorated (25/30). The cost to replace the HVAC components is \$72,000. The offices were just completely redecorated at a cost of \$10,000. The appraiser estimates that the offices will not have to be redecorated for another five years. Based on an analysis of demolition permits, the appraiser concludes that the total useful life expectancy of the long-lived items is 100 years.

In this example, the total physical deterioration is the sum of the individual deterioration calculations, or \$243,250. On an age-life basis, the total depreciation is about 30%. The average annual depreciation is 1.2% per year and the economic life is 83 years. The total depreciation of short-lived items is \$80,000 and the current cost of these items is \$147,000.

Figure 29.4 Age-Life Estimation of Physical Deterioration

A			\$800,000		
B	Curables	Roof Cover	HVAC Components	Decorating	Long-lived Items
C	\$5,000	\$60,000	\$72,000	\$10,000	\$653,000
	×	×	×	×	×
D	100%	25%	83⅓%	0%	25%
	=	=	=	=	=
E	\$5,000	\$15,000	\$60,000	\$0	\$163,250
F			\$243,250		

Damage or Vandalism

Damage or vandalism requires special treatment in the estimation of depreciation. The measure of damage is the cost to cure, but damage or vandalism must be treated separately from other forms of physical deterioration because, unlike deferred maintenance, damage is not considered in the estimate of cost new. When damage or vandalism is cured, the life of the damaged component is neither renewed nor prolonged. It is simply restored to its condition prior to the damage.

As an example, consider a brick wall that has been spray-painted with graffiti. The cost of sandblasting the wall to remove the graffiti is $5,000. Nowhere in the overall cost new of the original construction is there a provision for the removal of graffiti. The measure of damage in this instance would be $5,000, the full cost to cure.

Typically, the cost to cure damage is added to the curable physical deterioration and included among the items of physical deterioration in the breakdown method. However, the $5,000 cost to cure is not subtracted from cost when calculating long-lived physical deterioration.

A summary of the depreciated cost of the improvements is shown below:

Total Current Cost of All Improvements		$800,000
Less Depreciation		
Short-Lived Components	$80,000	
Long-Lived Components	+ $163,250	
Total Depreciation		– $243,250
Depreciated Value of Building Improvements		$556,750

Functional Obsolescence

Functional obsolescence is caused by a flaw in the structure, materials, or design of an improvement when the improvement is compared with the highest and best use and the most cost-effective functional design requirements at the time of the appraisal. A building that was functionally adequate at the time of construction can become inadequate or less appealing as design standards, mechanical systems, and construction materials evolve.

Functional obsolescence is attributable to defects within the property lines, in contrast to external obsolescence, which involves conditions outside the property lines and therefore outside the control of the owner and occupants. Functional obsolescence, which may be curable or incurable, can be caused by a deficiency–that is, some aspect of the subject property is below standard in respect to market norms. It can also be caused by a superadequacy–that is, some aspect of the subject property exceeds market norms.

In some cases, a developer or property owner creates functional obsolescence by incorporating special features at the request of the occupant that would not appeal to the market in general. An example of a superadequacy is an expensive, in-ground swimming pool in a neighborhood of relatively low-cost homes. Equally common is functional obsolescence that occurs as a result of changing tastes or market preferences. Too few bathrooms in a residence or warehouse ceiling heights that are below current standards are examples of functional obsolescence due to deficiencies.

Characteristics of the different types of functional obsolescence are illustrated in Table 29.4. Elements of depreciation not identified as physical deterioration or functional obsolescence must be external obsolescence, which is discussed later in this chapter.

Like the curability of physical deterioration, there are two major tests of curability for functional obsolescence caused by a deficiency or superadequacy:

- If spending the money to cure the item will result in a value increment equal to or greater than the expenditure, the item is normally curable.
- If spending the money to cure the item will not result in a value increment equal to or greater than the expenditure but will allow existing items to maintain their value, the item is again curable.

Table 29.4 Types of Functional Obsolescence

Type	Characteristics/Measure
Curable deficiency requiring an addition	The subject property has functional obsolescence because it does not have something that other properties in the market do have. Because the item is not present, the property cannot be penalized for any deterioration that the item would have incurred if it had been included in the original construction. However, because it usually costs more to add an item to an existing property than to include it when the property was originally built, the excess cost to cure is the appropriate measure of functional obsolescence.
Curable deficiency requiring substitution or modernization	A curable deficiency requiring substitution or modernization is caused by something that is present in the subject property but is either substandard compared to other properties on the market or is defective and thereby prevents some other component or system in the property from working properly. The measure is the excess cost to cure. In addition, the depreciated or remaining cost of the existing item, which is now worthless, must be deducted.
Curable superadequacy	A superadequacy is a type of functional obsolescence caused by something in the subject property that exceeds market requirements but does not contribute to value an amount equal to its cost. The superadequacy may have a cost to carry (i.e., higher operating costs) that must be considered. A superadequacy is only curable if it can be removed and value is added (or costs reduced) to the property—including any salvage value—by its removal.
Incurable deficiency	The subject property has functional obsolescence because it is missing a building component or design feature (e.g., a warehouse with unusually low ceilings) that is not economically feasible to correct.
Incurable superadequacy	An item of incurable functional obsolescence caused by a superadequacy is a property component that exceeds market requirements. It represents a cost without any corresponding increment in value or a cost that the increment in value does not meet. Note that in some applications of the cost approach, the need to estimate the functional obsolescence attributable to an incurable superadequacy is eliminated by using replacement cost instead of reproduction cost because superadequacies are not replicated in a replacement cost estimate. Nevertheless, whether replacement or reproduction cost is used, any extraordinary expense of ownership associated with the superadequacy is quantified and deducted as a penalty from the value of the property. Essentially, the property loses value through the added costs of ownership over time because the component is incurable. However, if the cost of ownership increases over time, the obsolescence may become curable.

If the cost to cure the item will not result in a value increment greater than the loss in value caused by the item or building component, then the item is incurable. Functional obsolescence can be corrected in two ways:

- The functional obsolescence is cured by the property owner when this is economically feasible.

or

- Market norms change, eliminating the cause of the functional obsolescence. In other words, the functional obsolescence no longer exists.

Problem-Solving for Functional Obsolescence

Estimating the effect of functional obsolescence is rarely as straightforward as estimating the effect of physical deterioration because judging the relative utility of building improvements is more difficult

The Curability and Incurability of Functional Issues

The test of curability is simply a comparison of the value added to the improvement if the functional problem is corrected with the cost to cure the functional problem of that improvement. If the value added is greater than the cost to cure, the functional problem is curable. If the value added is less than the cost to cure, the functional problem is incurable.

In the simplest terms, the value added is the amount that the market value of the real estate increases if a specific item is fixed. The value added is not the value of the item but rather the value that will be added to the property if the functional problem is fixed. As an example, suppose a recently built home was designed with a standard forced-air heating system with a natural gas furnace. In the five years since the house was built, high-efficiency gas furnaces have begun to replace less-efficient standard models in new homes in the subject property's neighborhood. Paired data analysis of a large pool of data comparing the recent sale prices of houses with high-efficiency furnaces and those with standard heating systems indicates a $3,000 premium for houses with a high-efficiency heating system in place. That $3,000 premium would be the value added for the subject property if the standard heating system were to be replaced with a more modern system.

The cost to cure is the amount that must be spent to correct the functional problem. In this case, estimates for the removal of a slightly depreciated heating system and replacement with a high-efficiency system average around $3,500, including all direct costs, indirect costs, and profit. The cost to cure of $3,500 is greater than the $3,000 value added, so the functional issue would be incurable. However, suppose that the existing heating system had a salvage value of $500 and a governmental incentive program promoting the installation of high-efficiency heating systems offered a $500 rebate on the installation cost of a new system. Then the total cost to cure would be $2,500 ($3,500 – $500 – $500), which would be less than the value added, making the functional problem curable.

Most curable functional obsolescence is caused by some form of deficiency like the heating system of the house that is currently below the emerging standard for energy efficiency, but some superadequacies can be treated as curable depreciation. As an example, suppose that the presence of a swimming pool in an apartment building does not add any rental value to the units. The swimming pool would be an overimprovement and thus an item of functional obsolescence. If this swimming pool costs $5,000 per year to operate, that $5,000 would be an expense deducted from the income generated by the property. At a market-derived overall capitalization rate of 8%, the loss of $5,000 in net income results in a $62,500 ($5,000/0.08) penalty to the value of the property. In other words, curing the functional problem of the unnecessary swimming pool would increase the market value of the apartment building by $62,500.

Now assume the problem of the unwanted swimming pool can be corrected for $10,000 by filling the pool and landscaping the area, with maintenance expenses reduced from the $5,000 to $500. The $500 loss in net income would only penalize the value of the property $6,250 (at the same 8% capitalization rate), so the total benefit to the property of removing the swimming pool would be $56,250 ($62,500 - $6,250). Clearly, the value added of $56,250 is greater than the cost to cure of $10,000, so the functional problem of a swimming pool amenity that does not make apartment units more desirable to potential tenants is a curable issue.

than accounting for immediately apparent physical losses. However, the process of identifying and selecting an appropriate treatment for a functional problem is simplified when the problem is broken down into manageable tasks using the framework illustrated in Figure 29.5. The first step is to identify the functional problem. In many cases this is readily apparent from the appraiser's site visit and information from the highest and best use analysis or other analyses in the valuation process. Once the functional problem has been identified, the next step is to determine which building components are causing the problem and identify possible corrective measures (and the associated costs to cure).

Figure 29.5 Analyzing a Functional Problem

1. Identify the functional problem.
2. Identify the component (or components) in the facility, or the lack of a component (or components), associated with the problem.
3. Identify possible corrective measures and the related costs to cure.
4. Select the most appropriate corrective measure.
5. Quantify the loss caused by the functional problem, which results in added value if the problem is corrected.
6. Determine if the item is curable or incurable. (If the value added is equal to or greater than the cost to cure, the functional problem is curable.)
7. Apply the functional obsolescence procedure to calculate the amount of depreciation caused by the functional problem.

In many cases, only one cost-to-cure program will clearly identify the course of action to fix or improve a functional problem. Often there may be no economically feasible or practical method to cure the problem. (This is true especially for superadequate components.) In these cases the component is incurable and the property must endure the loss in value. If there are multiple cost-to-cure alternatives to fix a particular problem, an appraiser should select the most appropriate and cost-effective measure.

The cost to cure must account for the cost to tear out or replace the existing component, the cost of the correct replacement component, any other costs above and beyond the total cost if the component had been included in the initial construction, and any salvage value. Essentially, the final measure is the total cost to cure offset by any salvage value:

Cost to Tear Out or Remove Existing Component
+ Cost of Correct Replacement Component (including Entrepreneurial Incentive)
+ Any Costs Above and Beyond Total Cost if Included in Initial Construction
– Salvage Value (if any)
= Cost to Cure

The next step is to quantify the loss caused by the functional problem associated with the building component. The value loss could be caused by a loss in income, an increase in expenses or operating costs, or a combination of both. Alternatively, the value loss might be quantified by market evidence such as paired data analysis. By definition, the loss cured will equal the value added once the cure is accomplished. Note that the *value added* is not the same as the value referred to in the fourth step of the functional obsolescence procedure (Figure 29.6).

Now the cost to cure is compared with the quantified loss. If the value added (once the cure is accomplished) is greater than the cost to cure, then the functional problem is curable. Otherwise, the functional problem is incurable. The next step is to solve for the dollar amount of depreciation using the functional obsolescence procedure.

Using the Functional Obsolescence Procedure

Figure 29.6 diagrams a systematic procedure that can be used to calculate all forms of functional obsolescence caused by a deficiency or a superadequacy, whether the functional issue is curable or incurable. Use of this model helps ensure that all components of functional obsolescence will be treated in a consistent manner, that none of the items will be treated more than once, and that no double charges will be made for items that have already been depreciated (i.e., charged under physical deterioration), which is particularly important for superadequacies.

First, the cost of the existing item is identified. If the item is a form of functional obsolescence caused by a deficiency requiring an addition, there will be no cost for the item and zero will be entered on this line. If the item is a deficiency requiring rehabilitation or retrofit, there will be a cost for the item. Also, when replacement cost, rather than reproduction cost, is used as the cost basis, typically there will be no cost allotted for any superadequate items. As stated earlier in the text, all forms of functional obsolescence present in the subject property would be included in a reproduction of that property, whereas a replacement structure is built to contemporary standards and would not have certain forms of obsolescence present in the subject improvement.

In the second step, any depreciation that has already been charged for the item is deducted. In nearly

> The functional obsolescence procedure ensures that all items of functional obsolescence will be treated consistently, that none will be considered more than once, and that double depreciation charges will not be made.

Figure 29.6 Procedure for Estimating All Forms of Functional Obsolescence

Step 1.	*Estimate* Cost of Existing Item	\$xxx,xxx
Step 2.	*Subtract* Depreciation Previously Charged	– \$xxx,xxx
Step 3.	*If curable, add* Cost to Cure (All Costs)	+ \$xxx,xxx
	or	
	If incurable, add Value of the Loss	+ \$xxx,xxx
Step 4.	*If curable, subtract* Cost of the Proper Item if Included in New Construction	– \$xxx,xxx
	or	
	If incurable, subtract Depreciated Cost of the Proper Item if Included in New Construction	– \$xxx,xxx
	or subtract Depreciated Value*	– \$xxx,xxx
Step 5.	*Equals* Depreciation for Functional Obsolescence	\$xxx,xxx

* Sometimes an existing item has value unrelated to cost.

all instances, this depreciation will be physical deterioration. As in the first step, if the item does not already exist in the building, no depreciation will have been charged and zero will be entered on this line.

Regardless of the type of functional obsolescence, appraisers always investigate a cost to cure to determine whether an item is curable or not. If the functional obsolescence is curable, the third step is to add up all the costs associated with curing the item. This includes the cost of purchasing and installing a new item (including entrepreneurial incentive) and the cost of removing the old item, less any salvage value. If the functional obsolescence is incurable, the third step is to add the value of the loss attributable to the obsolescence. This value can be obtained by capitalizing an income loss (using an income multiplier or a capitalization rate) or through analysis of market data such as paired sales.

The fourth step involves the cost of the item if it were included as part of new construction, i.e., the proper item's contribution to the replacement cost (or reproduction cost) if it had been part of the original design rather than being the source of a functional problem. That cost is essentially deducted from the cost to cure in the third step to calculate the excess cost to cure a curable item. If the item is incurable, the depreciated cost listed in the fourth step is deducted from the value of the loss in the third step to yield the value of the loss over and above the cost of the item if installed in new construction.

In the final step, the appraiser adds up all of the entries to derive the total functional obsolescence attributable to each factor. The model described here works for all types of functional obsolescence.

Examples of a Deficiency

Some examples of deficiencies include

- inadequate HVAC
- interior finish that is lower quality than the exterior
- no landscaping where the market requires it
- hallways that are too narrow
- access points that are not ADA-compliant

Consider a small office building without air-conditioning in a market where this feature is standard. Because of retrofit requirements, it is more costly to install the air-conditioning now than it would have been as a part of the original construction. The current cost to install the air-conditioning is $12,000. If the work had been done as a part of new construction, the cost would have been only $10,000. Installing air-conditioning would allow the property owner to raise rents, and effective gross income would increase an estimated $2,000 per year. The current effective gross income multiplier (EGIM) is 7.0. The functional obsolescence is *curable* because the value increase ($2,000 × 7.0 = $14,000) is greater than the cost to cure ($12,000).

1. Cost of Existing Item	$0
2. *Less* Depreciation Previously Charged	$0
3. *Plus* Cost to Cure (All Costs)	$12,000
4. *Less* Depreciated Cost of the Proper Item if Included in New Construction	– $10,000
5. *Equals* Depreciation for Functional Obsolescence	$2,000

Note that because the air-conditioning is not present in the existing improvement, no cost is shown as the cost of the existing item and no depreciation was charged (Steps 1 and 2). The cost to install the air-conditioning as a part of new construction on the date of the opinion of value is $10,000 (Step 4), but the actual cost to retrofit and install the air-conditioning is $12,000 (Step 3). The curable functional obsolescence is the excess cost to cure, or $2,000 (Step 5).

Now suppose that installing an air-conditioning system in the office is not economically feasible—e.g., the current cost of the necessary renovations (say, $20,000) is greater than the value gained by adding the item ($14,000). In the analysis of functional obsolescence, two elements must be identified for each building component:

- the cost to cure
- the amount of loss caused by the component or the lack of the component

When the loss is cured, the amount of the loss essentially becomes the value added. In this case, the cost to cure is $20,000. If the item is cured, the value added (or reduction in loss) is only $14,000, which means the item is incurable. The depreciation charged is the amount of the loss, over and above the cost if installed new. In the previous example, the item was curable and the measure of depreciation was the excess cost to cure.

1. Cost of Existing Item	$0
2. *Less* Depreciation Previously Charged	$0
3. *Plus* Value of Loss	$14,000
4. *Less* Depreciated Cost of the Proper Item if Included in New Construction	– $10,000
5. *Equals* Depreciation for Incurable Functional Obsolescence	$4,000

Again, because the air-conditioning is not present in the existing improvement, no deterioration was charged. The value of the loss is equivalent to the lost income attributable to the deficiency. The effect of this loss is partially offset by the $10,000 that would have been expended to install air-conditioning as part of new construction. In other words, this building is losing $14,000 but it saved the $10,000 expense. The incurable functional obsolescence is $4,000.

Now suppose that the value added is $7,000 instead of $14,000. The item is still incurable.

1. Cost of Existing Item	$0
2. *Less* Depreciation Previously Charged	$0
3. *Plus* Value of Loss	$7,000
4. *Less* Depreciated Cost of the Proper Item if Included in New Construction	– $10,000
5. *Equals* Depreciation for Functional Obsolescence	-$3,000

The inclusion of air-conditioning is not financially feasible in this case.

Costs to cure and losses sustained by a component can and do change over time. Items identified as incurable at one point in time can become curable and vice versa over the life of the property.

Now suppose that the office building has an outdated air-conditioning system that does not meet market standards and needs to be retrofitted. The reproduction cost of the existing air-conditioning system is $8,000, and the item is 25% physically deteriorated ($8,000 × 0.25 = $2,000). The cost to remove the existing air-conditioning is $4,500, the salvage value of that equipment is $3,000, and the current cost of installing an appropriate air-conditioning system is $12,000 ($10,000 to install the correct component plus $2,000 to retrofit the space). The property can still be expected to increase effective gross income by $2,000 per year (with an *EGIM* of 7.0) if an appropriate air-conditioning system is installed, so the extra income generated ($14,000) would exceed the cost to cure ($4,500 – $3,000 + $12,000 = $13,500) and the item is therefore *curable*. If the correct air-conditioning system had been installed as part of new construction, the cost would have been $10,000 and it would be 25% depreciated. The depreciated cost is $7,500.

1. Cost of Existing Item	$8,000
2. *Less* Depreciation Previously Charged	– $2,000
3. *Plus* Cost to Cure (All Costs)	+ $13,500
4. *Less* Depreciated Cost of the Proper Item if Included in New Construction	– $10,000
5. *Equals* Depreciation for Incurable Functional Obsolescence	$9,500

In this case, application of the formula essentially removes the existing component from cost (the $8,000 cost of the existing equipment less physical depreciation of $2,000 already charged) in the first two steps and penalizes cost by the excess cost to cure of $3,500 ($13,500 – $10,000) in the third and fourth steps.

Suppose that the existing equipment had no salvage value. The cost to cure the deficiency ($4,500 for removal of existing equipment plus $12,000 for installation of the new system, or $16,500) would exceed the value gained by replacing the air-conditioning system ($14,000), and the item of functional obsolescence would be *incurable*. If the $10,000 item had been installed originally, it would be 25% depreciated, i.e., with a current depreciated cost of $7,500.

1. Cost of Existing Item	$8,000
2. *Less* Depreciation Previously Charged	– $2,000
3. *Plus* Value of Loss	+ $14,000
4. *Less* Depreciated Cost of the Proper Item if Included in New Construction	– $7,500
5. *Equals* Depreciation for Incurable Functional Obsolescence	$12,500

Examples of a Superadequacy

Some examples of superadequacies include

- excess ceiling height
- high-end finish in a Class C office building

- a warehouse with 60% office space in a market that prefers 25% office space

A superadequacy is often difficult to cure. Consider an industrial building with 24-ft. ceiling heights where the market norm is 18-ft. ceilings. The cost of a building with 24-ft. ceilings is $1.2 million, whereas the cost of a building with 18-ft. ceilings is $1.0 million. The subject building costs $5,000 more per year to heat and cool than comparable properties with 18-ft. ceilings in the subject's market. The extra $200,000 spent in the original construction on the extra six feet of ceiling height adds no value to the property and there is no reasonable cost to cure, so the superadequacy is incurable.

In this instance, the higher ceiling has no value to be recorded in Step 4. In the calculation of functional obsolescence, the amount entered as cost if installed new is zero. Note also that if replacement cost is used, the $200,000 cost of the superadequacy will be eliminated and the measure of functional obsolescence would be only the capitalized additional costs of ownership. The extra ceiling height costs the subject property $5,000 more per year than the costs incurred by competitive buildings, and analysis of income and expense data for comparable buildings yields a building capitalization rate of 12.5% in this market. The incurable functional obsolescence is $40,000 ($5,000/0.125). Because the item is superadequate, it does not belong in the structure and there is no correct replacement component, so there is no entry in Step 4. The replacement cost calculation is as follows:

1. Replacement Cost of Existing Item	$0
2. *Less* Depreciation Previously Charged	$0
3. *Plus* Value of the Loss	+ $40,000
4. *Less* Depreciated Value	$0
5. *Equals* Depreciation from Functional Obsolescence	$40,000

If reproduction cost is used, the additional $200,000 cost of the superadequacy will not be eliminated, and $200,000 would be entered in Step 1 and the 10% depreciation already charged in Step 2.

1. Reproduction Cost of Existing Item	$200,000
2. *Less* Depreciation Previously Charged	– $20,000
3. *Plus* Value of the Loss	+ $40,000
4. *Less* Depreciated Value	$0
5. *Equals* Depreciation from Functional Obsolescence	$220,000

If the extra ceiling height does earn some income in the market, the calculations would be affected by that value increment unrelated to cost. Suppose the six feet of extra ceiling height yields an extra $7,000 in income. At the 12.5% building capitalization rate, the value attributable to the extra ceiling height would be $56,000 ($7,000/0.125), which would be accounted for in Step 4 of the calculations:

1. Reproduction Cost of Existing Item	$200,000
2. *Less* Depreciation Previously Charged	– $20,000
3. *Plus* Value of the Loss	+ $40,000
4. *Less* Depreciated Value	– $56,000
5. *Equals* Depreciation from Incurable Functional Obsolescence	$164,000

In this case, the extra ceiling height still costs too much and creates additional operating expenses, but it does add $56,000 in value and thus reduces the functional obsolescence charged to that functional problem.

Now suppose that market research supports an income increase of $27,500 for the extra 6 feet of ceiling height. At the 12.5% building capitalization rate, the 6-ft. height advantage has a value of $220,000 ($27,500/0.125).

1. Reproduction Cost of Existing Item	$200,000
2. *Less* Depreciation Previously Charged	– $20,000
3. *Plus* Value of the Loss	+ $40,000
4. *Less* Depreciated Value	– $220,000
5. *Equals* Depreciation from Functional Obsolescence	$0

The market norm may be 18 feet, but according to the data this market wants, and will pay for, 24 feet.

When estimating functional obsolescence caused by a superadequacy, the appraiser must remember whether the cost basis in the calculations is reproduction cost or replacement cost. A superadequacy in an existing improvement would not be installed in a replacement structure, so the cost of that item would not be included in the estimation of functional obsolescence when replacement cost figures are used.

External Obsolescence

External obsolescence is a loss in value caused by negative externalities, i.e., factors outside a property. It is almost always incurable. External obsolescence can be temporary or permanent. For example, value loss due to an oversupplied market may be regained when the excess supply is absorbed and the market works its way back to equilibrium. In contrast, the value loss due to proximity to an environmental disaster may be permanent.

In the aftermath of the financial crisis of 2008, external obsolescence in oversupplied real estate markets was significant, but those losses in value were not expected to be permanent in areas where the economic base was sufficiently diverse to eventually recover. External obsolescence is sometimes called *economic obsolescence* because economic factors outside the control of property owners, like mortgage interest rates and changing employment levels, can have large effects on the value of real estate.

External obsolescence usually has a marketwide effect and influences a whole class of properties, rather than just a single property. However, external obsolescence may affect only one property when its cause is location–e.g., proximity to negative environmental factors or the absence of zoning and land use controls. In fact, the causes of external obsolescence can be broadly characterized as either *market obsolescence* or *locational obsolescence*. Most properties experience market obsolescence from time to time as a result of the natural expansion and contraction of the real estate market. In contrast, locational obsolescence is caused by proximity to some detrimental influence on value such as heavy traffic, a landfill, or other undesirable land use outside the property being appraised. For both market and locational obsolescence, the value-influencing factor is outside the property and outside the control of the property owner and occupant.

External obsolescence may be caused by economic or locational factors. It may be temporary or permanent, but it is not usually curable on the part of the owner, landlord, or tenants.

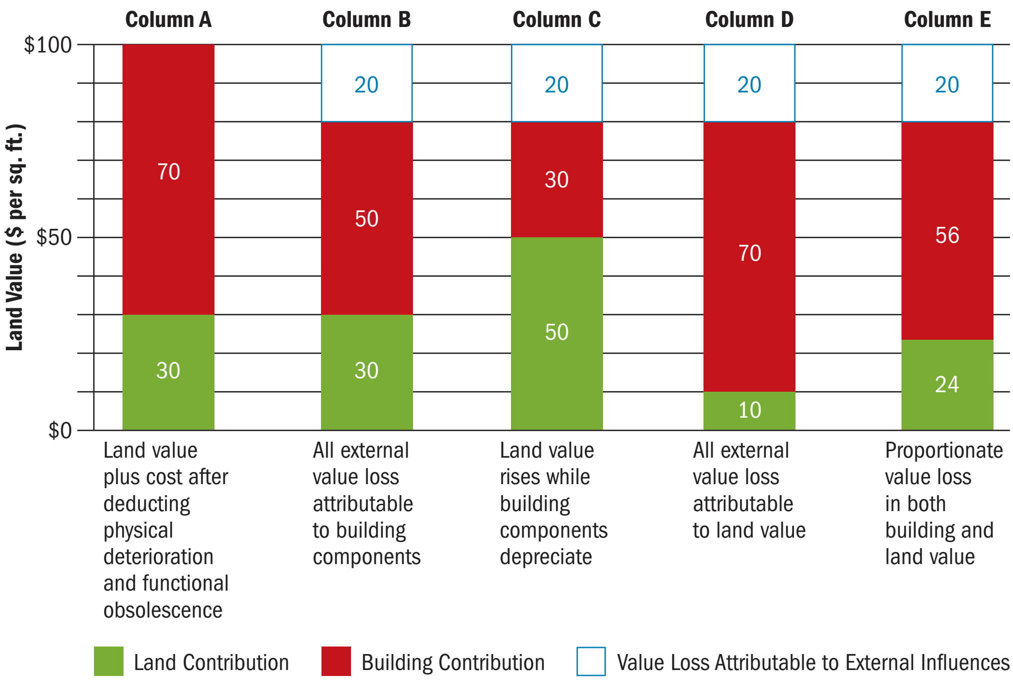
External factors frequently affect the value of both the land and building components of a property, but land is not affected by any of the forms of depreciation (i.e., physical deterioration, functional obsolescence, or external obsolescence). The effect of external factors on the current land value is not external obsolescence in the strictest sense but rather simply the operation of market forces on the value of the land. External obsolescence, therefore, is specifically the loss in value attributed to external influences allocated to the building improvements. Even though a loss in land value due to external factors is not depreciation, that loss in value will still be accounted for in the final value indication of the cost approach through the estimate of site value.

Figure 29.7 illustrates various ways in which loss in value due to external influences on a property could be allocated between the land and building components. In the figure, Column A represents the total value of the building improvements after deducting physical deterioration and functional obsolescence ($70 per square foot of building area) and the current land value ($30 per square foot of building area) without yet considering the external influences on value. This would be market value when the market is in balance or the market value of a property in a location away from the external influence of a nuisance like a landfill. The value indication at this point in the cost analysis would be $100 per square foot.

Column B illustrates a value loss of 20%. The appraiser has demonstrated that the value is now $80. The land value is still unchanged at $30. Therefore, the $20 loss in value is taken from the value of the building and is all external obsolescence.

In Column C, the value is still $80, but the land value *increases* from $30 to $50. In this case, the building is worth $30, i.e., the loss to the building is $40, which is more than the $20 loss in value to the property as a whole. This sort of loss is often an indication of a change in highest and best use, with part of the $40 loss in building value being additional functional obsolescence. Column C could represent the change in value of a single property over time (with the land value rising as building value drops), or it could represent a comparison between one property

Figure 29.7 Value Loss due to External Factors Allocated between Land and Building Components



with no value loss due to external factors and a comparable property with a higher land value but some other external issue causing depreciation of the building improvements.

Column D illustrates loss in value due exclusively to a drop in land value. In that case, the improvements do not have external obsolescence because the effect of the negative externality is completely accounted for in the $20 drop in land value.

Column E illustrates a 20% loss in value that is shared proportionately by both the land and building components of the property. In this example, both the building and the land are affected in the same way, but only the 20% loss in value to the building is external obsolescence. The 20% loss in land value is simply a loss in value due to supply and demand for sites that compete with the land being appraised, and in the cost approach the influence of the negative externality on the land is accounted for in the estimate of land value.

Note that in this case the 20% loss in land value does not double-count the 20% external obsolescence of the building because the negative externality is affecting both the land and the building. It is important not to allocate the influence of an externality incorrectly.

Direct comparison of similar properties with and without external obsolescence can be the most persuasive measurement of the effect of negative externalities on value when enough data is available for that sort of analysis. As an example of the use of paired data analysis, consider a 12-unit apartment building located downwind of a relatively new asphalt batching plant. The comparable data is summarized in Table 29.5. Sale A is a vacant lot adjacent to the subject that is zoned for a 12-unit apartment building and was just sold for $360,000 ($30,000 per unit). Sale B is a vacant site on the other side of town that is also zoned for a 12-unit apartment building and was recently sold for $480,000 ($40,000 per unit). Sale C is a 9-unit apartment building in the subject's neighborhood that was recently sold for $459,000 ($51,000 per unit). Sale D is a 10-unit apartment building on the other side of town that was sold for $540,000 ($54,000 per unit). Using Sales C and D, an appraiser could estimate the external obsolescence attributable to the property as a whole at $30,000 per unit. The subject property would thus incur $360,000 in external obsolescence (12 units × $30,000). Sales A and B indicate that $120,000 of this external obsolescence ($10,000 per unit) is recognized in the land value. The remaining $240,000, therefore, is attributable to the building.

An alternative to direct comparison of properties with and without external obsolescence is the capitalization of income lost due to the effect of the externality and, if necessary, allocating that estimate of loss in total property value between the land and building components. This procedure is applied in two steps. First, the market is analyzed to quantify the income loss. Next, the income loss is capitalized to obtain the value loss affecting the property as a whole. If the income loss is anticipated to last for the economic life of the improvements, it can be capitalized

Table 29.5 Direct Comparison of Sales Affected by Externality

	Subject Property	Sale A	Sale B	Sale C	Sale D
Property type	Apartment building	Vacant site zoned for apartment use	Vacant site zoned for apartment use	Apartment building in subject's neighborhood	Apartment building across town
No. of units (or units allowed by zoning)	12	12	12	9	10
Sale price	–	$360,000	$480,000	$459,000	$540,000
Price per unit	–	$30,000	$40,000	$51,000	$54,000
Location	Downwind of asphalt batching plant	Adjacent to subject property (affected by externality)	Across town from subject property	In subject property's neighborhood (affected by externality)	Across town from subject property
Locational effect (total property)	$360,000 ($30,000 × 12)			-$3,000 per unit	Unaffected by externality
Loss in land value (land)	$120,000 ($10,000 × 12)	-$1,000 per unit	Unaffected by externality		
Locational obsolescence (building)	$240,000 ($360,000 – $120,000)				

equilibrium rent

The amount of rent a property would be expected to bring in a market at equilibrium, contrasted with market rent that is affected by market conditions not at equilibrium.

by applying either a gross income multiplier to a gross income loss or an overall capitalization rate to a net income loss. If the income loss is not anticipated to be long-term, it can be estimated using discounted cash flow analysis.

An important concept in the capitalization of income loss is equilibrium rent, which is the market-derived rental rate that would be expected in the market at equilibrium. The equilibrium rent is compared with the actual rent affected by the external factor in the current market, e.g., the lower rents that result from the oversupply of competitive properties in the market. There are two methods of estimating the equilibrium rent:

1. Base the estimate on market rent during a recent period of equilibrium adjusted for inflation.
2. Base the estimate on depreciated replacement cost, similar to feasibility rent but substituting depreciated replacement cost for full replacement cost.

As a simple example of capitalizing income loss, consider a 7,500-sq.-ft. strip retail center in a market that has been hurt by a sudden, and likely long-term, population loss and demographic shift in the neighborhood. In the property's first five years of operation, the average rent was around \$9.00 per square foot, with frictional vacancy of 10% and a net income ratio of 67%. Current rent levels have fallen to around \$6.75 per square foot. The overall capitalization rate is 7.0%. Inflation has been nominal since the construction of the shopping center, so the equilibrium rent for the property is \$67,600 (\$9.00 per square foot × 7,500 square feet = \$67,500). To calculate income loss, the net operating income at equilibrium rent and at the prevailing rent are both calculated:

	At Equilibrium Rent	At Current Rent
Potential Gross Income	\$67,500	\$50,625
Less Vacancy and Collection Loss	– \$6,750	– \$5,063
Effective Gross Income	\$60,750	\$45,562
Net Income Ratio	× 0.6667	× 0.6667
Net Operating Income	\$40,500	\$30,375

The income loss of \$10,125 (\$40,500 – \$30,375) is then capitalized at the overall capitalization rate of 7% to calculate the external obsolescence, \$144,643.

As an alternative, an equilibrium rent can be calculated from depreciated replacement cost. Suppose the total replacement cost of the retail center is \$500,000 and entrepreneurial incentive is 10% of total cost. The shopping center has \$45,000 in deferred maintenance and the remaining physical deterioration is 12.5%, based on an effective age of 5 years and a useful life of 40 years. The shopping center has no functional obsolescence, and the land value is $150,000. Equilibrium net operating income would be calculated as follows:

Replacement Cost	$500,000
Entrepreneurial Incentive	+ $50,000
Total Cost	$550,000
Less Deferred Maintenance	− $45,000
Remaining Cost	$505,000
Less Remaining Physical Deterioration (12.5%)	− $63,125
Cost of Physically Depreciated Improvements	$441,875
Plus Land Value	+ $150,000
Total Depreciated Cost without External Obsolescence	$591,875
Multiplied by Capitalization Rate (7%)	× 0.07
Equilibrium *NOI*	$41,431

The income loss and corresponding amount of external obsolescence can then be calculated using the new equilibrium net operating income.

Equilibrium *NOI*	$41,431
Less Actual *NOI*	− $30,375
Income Loss	$11,056
Capitalized at 7%	÷ 0.07
External Obsolescence	$157,943

Finally, the indicated value by the cost approach can be calculated by adjusting the previously calculated depreciated cost for all sources of depreciation other than external obsolescence.

Total Depreciated Cost without External Obsolescence	$591,875
Less External Obsolescence	− $157,943
Indicated Value by Cost Approach	$433,932

Note that the two estimates of obsolescence, $144,643 and $157,943, are completely attributed to the improvements. The land value is the same in both the actual net operating income and the equilibrium net operating income calculations. There is no loss allocated to the land. Also note that when the equilibrium net operating income is calculated from cost, the value indicated by the cost approach will be the same as the value indicated by the income capitalization approach:

Actual *NOI*	$30,375
Capitalized at 7%	÷ 0.07
Indicated Value by Income Capitalization Approach	$433,929
Indicated Value by Cost Approach	$433, 932

In this case, the $3 difference is a result of rounding. Otherwise the value indications would be identical.

If the income loss of the retail center were the result of a temporary oversupply of competitive properties in the market rather than some long-term phenomenon, the value loss could be calculated using discounted cash flow analysis rather than direct capitalization. In that case, two cash flow projections could be prepared, one based on forecasted rent and occupancy and another at equilibrium rent and stabilized occupancy. The sum of the present values of the income shortfalls over the projection period would be the value loss due to the externality.

Property Rights Adjustments

The application of the cost approach produces a value indication of the fee simple estate of a property at market rent and stabilized occupancy. If a property is not at market occupancy or not at market rent, then an adjustment may need to be made to the indicated value in the cost approach. This is usually called a *property rights adjustment*. Typical property rights adjustments include a leasehold or leased fee adjustment or an adjustment for an empty or partially empty building that is not yet at stabilization or has not yet achieved market rental rates.

If the interest being appraised is the leased fee estate, a property rights adjustment may be required. A leasehold or leased fee adjustment is also necessary when a tenant pays more or less than the market rent, resulting in a negative or positive leasehold value. The value indication in the cost approach would have to be adjusted upward for an above-market lease or downward for a below-market lease. When contract rent is equal to market rent, the leasehold estate has no value so the property rights adjustment would be $0.

The lease-up period for a new rental property typically requires an investment of time and money, so the market value of the property when it is empty is less than the value of the property when it is full. Suppose an empty office building would be worth $5 million fully occupied but the fill-up costs would be $1 million. The value indication in the cost approach would be adjusted by the cost to cure the occupancy problem (i.e., $1 million) including entrepreneurial incentive.

On the other hand, in some situations a property can be worth more, or can sell for more, when it is empty than when it is full. For example, in a market with rapidly rising rents, a building with empty space may be better able to take advantage of rent appreciation than a building with long-term leases in place, requiring an upward adjustment for the value of the leasehold estate. However, volatility in rental rates can be a sign of weakness in market fundamentals, so market analysis would be important in forecasting demand for the empty space and the accompanying risk of that space not being rented at all.

Methods for calculating a property rights adjustment include the following:

1. Use discounted cash flow analysis to calculate V_O and V_{LH}. The value of the leasehold estate would be the difference between the values of the complete bundle of rights and the leased fee estate (i.e., $V_{LH} = V_O - V_{LF}$).
2. Discount the excess rent (or deficit rent) at a supportable rate.
3. Given appropriate data on comparable transactions, use paired data analysis to determine an adjustment amount by direct comparison.

Direct comparisons of the price of a leased fee estate with the price of the fee simple estate of comparable properties may reveal that the calculation of a property rights adjustment with income capitalization techniques understates the actual effect on the value of a leased fee estate. Real estate markets are not perfectly efficient, and risk may not always be distributed efficiently to the various legal interests, i.e., the value of the whole may not equal the sum of the parts.

property rights adjustment

1. An adjustment representing the impact on the leased fee value of a property by leases that are not at market rent.
2. An adjustment for any issue involving property rights.

In a balanced market, feasibility rent will be the same as market rent. For example, if a property costs $100 per square foot, then the feasibility rent in a market where capitalization rates for similar properties average 10% would be $10 per square foot. In a poorly performing market, new construction should not resume until the level of market rent rises to meet the feasibility rent. Similarly, the feasibility of adding new improvements or renovating existing improvements can be tested by comparing market rent with the feasibility rent after adjustments for the additional cost of the proposed changes. For example, suppose a 50,000-sq.-ft. expansion of an office-warehouse would increase the replacement cost of the building from the $100 per square foot figure for the original building to $105 per square foot for the expanded building. If the capitalization rate remained 10%, then the market rent would have to increase to $10.50 per square foot before the expansion would make economic sense.

If contract rent is greater than market rent, a negative leasehold benefit is created. In that case, the landlord is collecting more rent than would be achievable in the market at that time. In contrast, when feasibility rent is greater than current market rent, no one receives a benefit from that difference.

Reconciling Value Indications

In the valuation process, more than one approach to value is usually applied, and each approach typically provides a different indication of value. If two or more approaches are used, the appraiser must reconcile the value indications. Moreover, several value indications may be derived in a single approach. In the sales comparison approach, for example, the analysis of each comparable sale produces an adjusted sale price, which is an indication of value for the subject property. The various units of comparison applied to sales may also produce different value indications–e.g., apartment properties may be analyzed in terms of price per unit or price per room, and office buildings in terms of price per square foot of gross building area or price per square foot of rentable area. In an analysis of income, different indications of value can result from applying income multipliers to specific types of income, directly capitalizing net income, and discounting cash flows.

The appraiser resolves multiple value indications derived within a single approach as part of the application of that approach. Furthermore, after resolving multiple value indications within a single approach, the appraiser applies the same process to the value indications of multiple approaches, providing the client with clear analyses of why the results of one (or more) of the approaches to value is given more weight than the results of the others. Resolving the differences among various value indications is called *reconciliation.* Although the result of the final reconciliation process is usually the ultimate value conclusion, the rec-

final opinion of value
The range of values or single dollar figure derived from the reconciliation of value indications and stated in the appraisal report.

onciliation analysis may indicate that more research is needed or that new analyses must be performed to resolve conflicts or answer questions. Thus, reconciliation provides an integral quality control assessment of the valuation process prior to the final opinion of value and also helps identify key factors that must be clearly cited and explained, or explained further, in the appraisal report.

The final value opinion is not the average of the different value indications derived. No mechanical formula is used to select one indication over the others. The strengths and weaknesses of each of the approaches used must be discussed, and the appraiser must explain why one approach may be relied upon more than another in a particular assignment. Final reconciliation relies on the proper application of appraisal techniques and the appraiser's judgment. Table 30.1 illustrates the types of questions an appraiser asks when reconciling value indications within the approaches to value.

In summary, reconciliation has a defined purpose and is an essential step in the valuation process, but it also provides appraisers with an opportunity to smooth out the bumps. For example, reconciliation is the stage of the valuation process in which an appraiser could explain that the sale across the street from the subject property, which appeared comparable, was not considered because it was not an arm's-length transaction. Or, as another example, in final reconciliation an appraiser could explain that even though the client insisted on the application of the cost approach, the results of that approach were not given any weight because the appraiser believed the approach did not provide a credible value indication.

Final Reconciliation

In the final reconciliation the appraiser reconsiders the entire appraisal, making sure that the data available and the analytical techniques and logic applied have led to consistent judgments. The appraiser checks the data to ensure that it is verified, applicable to the assignment, and sufficient to support a credible opinion of value. The value definition, the identified property rights, and the qualifying conditions imposed are carefully reconsidered to make sure the procedures used in the analysis specifically address each of these items. The appraiser examines the differences in the conclusions derived from the various approaches, applies tests of reasonableness to these primary conclusions, and resolves any inconsistencies.

At this stage of the valuation process, the appraiser asks a variety of questions:

- Is the same physical condition assumed in making adjustments to rent comparables, expense comparables, and sales comparables in the income capitalization and sales comparison approaches?

Table 30.1 Questions Asked in Reconciling Value Indications

Regarding identification of the problem and the subject property:
- Is the building area listed in the description of improvements the same in all the approaches used in the valuation?
- Are the property features listed in the description of improvements the same in all the approaches to value?
- Is the effective date of appraisal consistent with the data presented?
- Have the highest and best uses of the land as thought vacant and the property as improved been properly analyzed?

Regarding the sales comparison approach:
- Is the approach relevant to the appraisal assignment?
- Is there an adequate number of sales?
- Are the sales comparable?
- Are they current, verified sales?
- Would market participants consider them to be reasonable substitutes?
- Are there prior sales of the subject property that need to be analyzed?
- Is there market support for the adjustments that were made?
- Were those factors that could not be supported by quantitative adjustment dealt with adequately using qualitative analysis in the reconciliation?
- Is the range of adjusted sale or unit prices within the range exhibited in the market?
- Are the conclusions of the approach consistent with the conclusions in the other approaches?

Regarding land valuation:
- How was land value estimated—e.g., by sales comparison, extraction, or allocation?
- Is there an adequate number of sales?
- Are the sales comparable?
- Is there market support for the adjustments that were made?
- Were those factors that could not be supported by quantitative adjustment dealt with adequately using qualitative analysis in the reconciliation?
- Is the range of adjusted sale or unit prices within the range exhibited in the market?

Regarding the cost approach:
- Is the approach relevant to the appraisal assignment?
- Is the land value well supported?
- Was replacement or reproduction cost estimated?
- Is the effective age of the property used in the cost approach consistent with the physical condition reported?
- Are the cost estimates reliable and market-based?
- Do the cost estimates account for all of the costs?
- Are the sales used to extract depreciation from the market reliable?
- What method was used to support depreciation estimates?
- Were physical, functional, and external depreciation estimated accurately?
- Are the conclusions of the approach consistent with the conclusions in the other approaches?

Regarding the income capitalization approach:
- Is the approach relevant to the appraisal assignment?
- Is there an adequate number of rental comparables?
- Are the rental properties comparable?
- Is there market support for the adjustments that were made?
- Is historical expense information available? If so, how reliable is it?
- Do the owner's income and expense statements include all income?
- Do the owner's income and expense statements include all expenses?
- Do the owner's income and expense statements include any expenses that are not typical?
- Are the expense projections in line with market estimates?
- Is there market support for the capitalization method?
- Is there market support for the capitalization or discount rate?
- Does the method of capitalizing income reflect market patterns?
- Are the conclusions of the approach consistent with the conclusions reached in the other approaches or, if not, can inconsistencies be explained?

- Are the results of all the approaches consistent with the appraiser's conclusion of highest and best use?
- Do the indications derived from the approaches applied reflect the same defined value? For example, a value indication derived from income capitalization that is higher than an indication based on the cost approach may or may not include a non-realty value component.
- Are the property rights appraised consistent throughout the appraisal? If the subject is the leased fee interest and the income capitalization approach is based on leased fee income, do the values indicated by the sales comparison and cost approaches also reflect the value of the leased fee interest?
- Is the market area analysis consistent with the sales comparison, income capitalization, and cost approaches? If values are increasing and there is good demand indicated in the neighborhood description section of the report, is that description consistent with the market conditions illustrated in the application of the approaches to value?

All mathematical calculations should be checked, preferably by someone other than the person who performed them originally. Significant errors can lead to incorrect value indications, but even minor errors can diminish the client's confidence in the appraisal. Finally, the logic employed throughout the valuation process should be scrutinized, and the appraiser should ask these additional questions:

- Do the approaches and methods applied consider all the available data and systematically lead to meaningful conclusions that relate directly to the intended use of the appraisal?
- Does the appraisal provide the information required to solve the client's problem? For example, if the client wants to establish a depreciation basis to compute federal income tax, does the appraisal allocate separate values to the improvements and the land? A client who contemplates remodeling will want information on the costs and benefits of this plan. If the client is considering whether to accept an offer to purchase, the appraiser must adequately analyze the terms of the proposed contract.

Reconciliation Criteria

Reexamining an appraisal helps ensure its accuracy, its consistency, and the logic leading to the value indications. An appraiser relies more on professional experience and judgment in reconciliation than in any other part of the valuation process. The appraiser weighs the relative significance, applicability, and defensibility of each value indication and relies most heavily on the approach that is most appropriate to the nature of the appraisal problem.

Reconciliation requires appraisal judgment and a careful, logical analysis of the procedures that lead to each value indication. Appropriateness, accuracy, and quantity of evidence are the criteria with which an appraiser forms a meaningful, defensible final opinion of value.

The appraiser uses reconciliation criteria to form a meaningful, defensible, and credible final value conclusion. The appropriateness of the approaches, the accuracy of the data and calculations, and the quantity or sufficiency of the evidence presented are considered relative to the specific appraisal problem.

Appropriateness

The appropriateness of an approach to the intended use of the appraisal is usually directly related to property type. For example, an appraisal to develop an opinion of the market value of a 30-year-old community shopping center will ordinarily employ procedures associated with the income capitalization approach, such as the derivation of an income multiplier, net income capitalization, or the discounting of cash flows. The cost approach might not be useful in valuing obsolete improvements, but it may be useful in an analysis of highest and best use to determine whether demolition of all or part of the improvements is appropriate. Where income data is scarce, in a market dominated by owner-occupants such as the buyers and sellers of single-family homes, the sales comparison approach is a more appropriate technique for obtaining value information on a property.

Although the final value opinion is based on the approach or approaches that are most applicable, the final value opinion need not be identical to the value produced by the most applicable approach. If two approaches are applicable, the final opinion of value may be closer to one value indication than to the other or be a blend of the results of the two approaches. For example, the value indication derived from the income capitalization approach may be lower than the value indication derived from the sales comparison approach. If market participants are primarily interested in income-earning potential, the final opinion of value may be closer to the conclusion derived from income capitalization than from sales comparison. If the property is an owner-occupied dwelling, however, the sales comparison approach would likely be of primary relevance.

Accuracy

The accuracy of an appraisal is determined by the quality of the data and the reasonableness of the adjustments made to each comparable property analyzed. For example, how reliable is the data supporting depreciation and cost estimates, estimates of income and expenses, and the selected capitalization rate? Were the adjustments appropriately developed and applied?

The number of comparable properties, the number of adjustments, and the magnitude of the gross and net dollar amounts of adjustments may suggest the relative accuracy of a particular approach. If a large number of comparable properties are available for one approach and they seem to suggest a reasonably uniform pattern of market activity, greater accuracy may be indicated and the appraiser may place more reliance on this approach. For example, if there are many rental properties competitive with the appraised property, an appraiser may be able to extract current income, expense, and capitalization rate data from these properties and attribute greater accuracy and confidence to the income capitalization approach. If the appraiser finds several recently developed properties similar to the property being appraised, comparable data supporting land values and development costs may lend authority to the cost approach. Recent sales of similar properties may provide the data needed to estimate accurate unit values by sales comparison.

Quantity of Evidence

Appropriateness and accuracy affect the quality and relevance of the value indication derived from a comparable sale or an approach. Although these criteria are considered separately in reconciliation, both must be studied in relation to the quantity of evidence provided by the market data. Even if the data analyzed is accurate, if data is scarce the value conclusion may lack strong support.

For example, consider an appraiser who is attempting to extract an overall capitalization rate from three comparable sales. The properties are considered appropriate in terms of their physical and locational characteristics and the similarity of the transactions. The available data for each sale is verified and considered reliable, and it appears that each comparable sale could produce an accurate estimate of the overall capitalization rate. However, the available data for one comparable property includes a detailed capital budget and an operating statement of the property's expenses and income for the preceding three years. The data on the two other comparable properties is less detailed. Only total gross and net income data for three years is available for one comparable property. For the other, detailed data is available for only one year. Because more data is available for the first comparable property, the appraiser will likely have greater confidence in the capitalization rate obtained from this sale than in the rates obtained from the other two sales.

> **confidence interval**
> In statistics, the specification of a zone within a population, based on a sample mean and its standard error, within which the true mean most probably lies.

In statistical terms, the confidence interval in which the indicated value lies may be narrowed by adding data to the statistical sample. Regardless of the quantity of evidence available, the appraiser is responsible for providing a market-supported value opinion consistent with the definition of value used in the assignment.

Final Opinion of Value

In an appraisal report, the final opinion of value may be stated as a single figure, as a range of values, or in relation to a benchmark amount (e.g., "not more than" or "not less than"). A reconciliation section consisting of boilerplate and stock comments does not often present useful information. A discussion of the data analyzed and its application to the subject, how the approaches apply to the subject, and other relevant information is essential to a meaningful reconciliation. Traditionally an opinion of value is reported as a single dollar amount, i.e., a point estimate. A point estimate is required for many purposes:

- real estate taxation
- calculating depreciation deductions for federal income tax
- estimating compensation in casualty, liability, and condemnation cases
- determining value-based rent
- making property transfer decisions
- securitization of a mortgage loan

Because of legal or other requirements, most clients require a point estimate of value.

A point estimate should be rounded to reflect the degree of precision the appraiser can associate with the particular opinion of value. Often the manner in which the figure is rounded is a matter of convention–e.g., to two or three significant digits. For example, if the final value estimate is a six-digit number, the figure will likely be rounded to the nearest ten thousand or hundred thousand dollars. If it is a seven-digit number, it will likely be rounded to the nearest hundred thousand dollars.

An appraiser may report a probability range to suggest the confidence level associated with the opinion of value if an adequate amount of data is available to apply statistical analysis. The evidence considered in each approach should allow for such variation. For example, an appraiser may be asked to consider a more aggressive and a less aggressive market rent schedule for a proposed shopping center. Different capitalization rates may be applied to the two income streams along with different discount rates and income multipliers. Any value differences resulting from the higher and lower projected rents in the income capitalization approach should be correlated with different levels of risk-related entrepreneurial incentive in the cost approach.

point estimate
A final value indication reported as a single dollar amount. A point estimate is typically regarded as the most probable number, not the only possible number, and is often required for revenue and compensation purposes.

range of value
In final reconciliation, the range in which the final market value opinion of a property may fall; usually stated as a variable amount between a high and low value limit.

rounding
Expressing an amount as an approximate number—i.e., exact only to a specified decimal place. An appraisal conclusion may be rounded to reflect the level of precision associated with the appraiser's analysis.

probability range
The confidence level associated with a specific value opinion or set of value opinions.

Although appraisers typically do not provide a confidence rating with a value opinion, the reconciliation section of the appraisal report is a good place to convey the concept to the intended user. If, for example, there were very few recent market transactions, the appraiser will want to indicate that there is some risk inherent in the final value conclusion. This is not the fault of the appraiser. Rather, it is the result of applying an analytical framework to an imperfect market. In another situation, there may be plenty of sales to use in the sales comparison approach and each sale may require very little adjustment. In this case, the appraiser will be able to convey a high level of confidence in the value opinion.

When reporting a range, an appraiser indicates that the most probable value is no lower than the low end and no higher than the high end of the range.

The Appraisal Report

The conclusions reached by appraisers in valuation analysis are communicated to the client in an appraisal report, which may be written or oral. Most clients request written reports. Regardless of whether an appraisal report is written or oral, it leads the reader from the definition of the appraisal problem through the analysis and relevant descriptive data to the appraiser's conclusion. Facts, reasoning, and conclusions must be presented clearly and succinctly. The length, type, and content of appraisal reports are dictated by the intended use, the type of value, the nature and complexity of the problem to be solved, and, most importantly, the information needs of the intended users.

Professional Standards for Appraisal Reports

Professional appraisal standards address the required content of a written or oral appraisal report. The International Valuation Standards address reporting in IVS 103. For appraisals subject to the Uniform Standards of Professional Appraisal Practice, Standard 2 sets forth the minimum requirements for reporting an appraisal of real property. Both IVS and USPAP require that the appraisal results be communicated clearly, accurately, and in a manner that is not misleading, and that the report contain sufficient information to enable the intended user to understand

> The content of an appraisal report must be consistent with the information needs and knowledge level of the intended users.

it properly. The Uniform Appraisal Standards for Federal Land Acquisitions (i.e., the Yellow Book) establish standards for appraisal reporting content and documentation in appraisal assignments involving real property being acquired by the federal government. The Yellow Book summarizes the reporting requirements with a report documentation checklist in one appendix and provides a recommended format for federal appraisal reports in another appendix.

Appraisers may use any number of forms for reporting but should be wary of appraisal report forms that do not call for all of the information required under standards. Some appraisal report forms need to be supplemented with essential information for understanding the appraisal such as intended use, intended user, and scope of work. It is incumbent on the appraiser to understand whether the form or format being used allows for compliance with the reporting requirements of the applicable standards.

Oral Reports

An appraiser may communicate assignment results in an oral report when the circumstances or the needs of the client and other intended users do not require or warrant a written report. Expert testimony presented in a deposition or in court may be considered an oral report. Oral reports may also be communicated to the client and other intended users in person or by telephone.

In USPAP, the reporting requirements for oral reports are set forth in Standards Rule 2-4, which states that, to the extent that is both possible and appropriate, an oral report must address, at a minimum, the substantive matters set forth for a written appraisal report in Standards Rule 2-2. Oral reports must include the underlying bases of the appraisal, especially any extraordinary assumptions or hypothetical conditions used. After communicating an oral report, the appraiser must keep a summary of the oral report and all notes and data relevant to the assignment in the workfile so that, if asked at a later date (i.e., any time during the required record retention period), the appraiser could produce a report that would meet the minimum requirements for a written appraisal report under Standards Rule 2-2.

The organization and composition of the appraiser's workfile may vary so long as the file contents are retrievable by the appraiser during the required record retention period. The workfile can reference information that is located elsewhere–e.g., stored electronically on a computer, in another file, or at some other location.

Written Reports

Written appraisal reports may be form reports or narrative reports.[1] Usually a report is presented in the format requested by the client, i.e., either a form report or a narrative report depending on the intended use

1. An appraisal report sent to a client via e-mail or some other electronic medium qualifies as a written appraisal report.

of the appraisal by the client. Even if a client asks for a report that does not include detailed documentation (e.g., a restricted appraisal report as defined in USPAP), the appraiser must undertake the analysis required by the assignment as established by the scope of work. In such a case, the appraiser keeps all necessary material, research data, and documents used to prepare the appraisal in the appraiser's workfile. Although appraisers may never need to provide written substantiation for value opinions that are submitted in abbreviated form, they may be asked to explain or defend their opinions at a later time.

> The workfile must include a true copy of a written appraisal report. The workfile for an oral appraisal report must include a summary of the oral report as well as a signed and dated certification.

The extent of workfile documentation depends on the type of report that is appropriate for the scope of work of the assignment. A less detailed report will require more workfile documentation, while a more detailed report will require little external documentation. In all cases, the appraisal report must include the information the client requires and address the reason why the client needs the appraisal. As an example, a client might request an appraisal report with little supporting documentation so that the client can make an initial decision about a possible real estate transaction. Depending on the client's subsequent needs, a more detailed written report might be provided later.

Form Reports

Form reports often meet the needs of financial institutions, insurance companies, and government agencies. They are required for the purchase and sale of most homes and existing mortgages on residential properties in the secondary mortgage market created by government agencies and private organizations. Because these intended users review many appraisals, using a standard report form is both efficient and convenient. When a form is used, those responsible for reviewing the appraisal know exactly where to find each category or item of data in the report. By completing the form, the appraiser ensures that no item required by the reviewer is overlooked. Note that the space allowed on some common report forms may not be sufficient to accommodate the supporting data necessary for a credible appraisal. Appraisers will likely need to provide additional information in an addendum or supplement to the form.

Some form reports do not address all of the information required by professional standards. These forms may be used only if they are augmented with supplemental information so that they meet the applicable reporting standards. In addition, most forms in use do not contain the certification statements required by the Appraisal Institute's Certification Standard. Designated members, candidates for designation, and practicing affiliates of the Appraisal Institute must therefore attach supplemental material when they use these forms. (Certification statements are discussed in a later section of this chapter.)

Guide Note 3 to the Standards of Professional Appraisal Practice of the Appraisal Institute addresses the use of form reports in the appraisal of residential property. Forms are increasingly being used for appraisals of both residential and nonresidential properties, e.g., apartment, commercial, and industrial properties.[2] Current market trends indicate that the use of form reports for all kinds of properties is likely to continue.

Appraisers must be careful to ensure that a report form does not dictate the scope of work to be applied in the appraisal process. The methodology employed in a valuation is determined by the nature of the specific appraisal problem, not by the type of report. If a report form does not provide for adequate presentation and discussion of all the analysis and data that the appraiser believes to be pertinent, that information must be added as a supplement.

One area that frequently must be supplemented is the highest and best use analysis. It is not sufficient to simply check the box to indicate that the highest and best use is "as improved." In a form report, the discussion of the highest and best use analysis requires some detail even when the existing improvements do represent the highest and best use. USPAP's Standards Rule 2-2 includes language relating to highest and best use specifying that the appraiser "summarize the support and rationale for that opinion." A brief statement can satisfy the requirements of the standards rule, but the appraiser must provide more than a checked box.

In 2011 and 2012, the government-sponsored entities (GSEs) active in the secondary mortgage market in the United States and the US Department of Housing and Urban Development developed the new Uniform Appraisal Dataset (UAD) to be used with four of the Fannie Mae residential forms (1004, 2055, 1073, and 1075). The key element of the UAD is the development of common appraisal data definitions to be used in UAD-compliant appraisal forms. Although the actual forms were not changed at that time, sections of the forms have since been changed to incorporate the new UAD language. However, the GSEs are only requiring this new language for single-unit dwellings and condominiums. It would be misleading to use the language in reporting the appraisal of a manufactured home or two- to four-unit properties. Although some of the fields are required, others are considered instruction fields. Many of the requirements are only directions as to how to format a date or how many decimal places to use in a given field.

The Uniform Residential Appraisal Report (URAR) and AI Reports Forms

In 1986 Fannie Mae and Freddie Mac introduced the Uniform Residential Appraisal Report (URAR). The URAR form was the first form to be adopted by all the major governmental and quasi-governmental agencies (Fannie Mae, Freddie Mac, the Department of Housing and Urban Development, the Department of Veterans Affairs, and the Fed-

2. For an in-depth discussion of appraisal form reports, see the following guidebooks: Mark Rattermann, *Using the Individual Condominium Unit Appraisal Report Forms: Fannie Mae Form 1073 and Exterior-Only Form 1075* (Chicago: Appraisal Institute, 2006); Mark Rattermann, *Using Residential Appraisal Report Forms: URAR, Form 2055, and the Market Conditions Form*, 2d ed. (Chicago: Appraisal Institute, 2009); and Mark Rattermann, *Using the Small Residential Income Property Appraisal Report: Fannie Mae Form 1025/Freddie Mac Form 72* (Chicago: Appraisal Institute, 2006).

Uniform Residential Appraisal Report

File #

The purpose of this summary appraisal report is to provide the lender/client with an accurate, and adequately supported, opinion of the market value of the subject property.

SUBJECT

Property Address | City | State | Zip Code

Borrower | Owner of Public Record | County

Legal Description

Assessor's Parcel # | Tax Year | R.E. Taxes $

Neighborhood Name | Map Reference | Census Tract

Occupant ☐ Owner ☐ Tenant ☐ Vacant | Special Assessments $ | ☐ PUD | HOA $ | ☐ per year ☐ per month

Property Rights Appraised ☐ Fee Simple ☐ Leasehold ☐ Other (describe)

Assignment Type ☐ Purchase Transaction ☐ Refinance Transaction ☐ Other (describe)

Lender/Client | Address

Is the subject property currently offered for sale or has it been offered for sale in the twelve months prior to the effective date of this appraisal? ☐ Yes ☐ No

Report data source(s) used, offering price(s), and date(s).

CONTRACT

I ☐ did ☐ did not analyze the contract for sale for the subject purchase transaction. Explain the results of the analysis of the contract for sale or why the analysis was not performed.

Contract Price $ | Date of Contract | Is the property seller the owner of public record? ☐ Yes ☐ No | Data Source(s)

Is there any financial assistance (loan charges, sale concessions, gift or downpayment assistance, etc.) to be paid by any party on behalf of the borrower? ☐ Yes ☐ No

If Yes, report the total dollar amount and describe the items to be paid.

NEIGHBORHOOD

Note: Race and the racial composition of the neighborhood are not appraisal factors.

Neighborhood Characteristics	One-Unit Housing Trends	One-Unit Housing		Present Land Use %	
Location ☐ Urban ☐ Suburban ☐ Rural	Property Values ☐ Increasing ☐ Stable ☐ Declining	PRICE	AGE	One-Unit	%
Built-Up ☐ Over 75% ☐ 25–75% ☐ Under 25%	Demand/Supply ☐ Shortage ☐ In Balance ☐ Over Supply	$ (000)	(yrs)	2-4 Unit	%
Growth ☐ Rapid ☐ Stable ☐ Slow	Marketing Time ☐ Under 3 mths ☐ 3–6 mths ☐ Over 6 mths	Low		Multi-Family	%
Neighborhood Boundaries		High		Commercial	%
		Pred.		Other	%

Neighborhood Description

Market Conditions (including support for the above conclusions)

SITE

Dimensions | Area | Shape | View

Specific Zoning Classification | Zoning Description

Zoning Compliance ☐ Legal ☐ Legal Nonconforming (Grandfathered Use) ☐ No Zoning ☐ Illegal (describe)

Is the highest and best use of the subject property as improved (or as proposed per plans and specifications) the present use? ☐ Yes ☐ No If No, describe

Utilities	Public	Other (describe)		Public	Other (describe)	Off-site Improvements—Type	Public	Private
Electricity	☐	☐	Water	☐	☐	Street	☐	☐
Gas	☐	☐	Sanitary Sewer	☐	☐	Alley	☐	☐

FEMA Special Flood Hazard Area ☐ Yes ☐ No | FEMA Flood Zone | FEMA Map # | FEMA Map Date

Are the utilities and off-site improvements typical for the market area? ☐ Yes ☐ No If No, describe

Are there any adverse site conditions or external factors (easements, encroachments, environmental conditions, land uses, etc.)? ☐ Yes ☐ No If Yes, describe

IMPROVEMENTS

General Description		Foundation		Exterior Description	materials/condition	Interior	materials/condition
Units ☐ One ☐ One with Accessory Unit		☐ Concrete Slab ☐ Crawl Space		Foundation Walls		Floors	
# of Stories		☐ Full Basement ☐ Partial Basement		Exterior Walls		Walls	
Type ☐ Det. ☐ Att. ☐ S-Det./End Unit		Basement Area	sq. ft.	Roof Surface		Trim/Finish	
☐ Existing ☐ Proposed ☐ Under Const.		Basement Finish	%	Gutters & Downspouts		Bath Floor	
Design (Style)		☐ Outside Entry/Exit ☐ Sump Pump		Window Type		Bath Wainscot	
Year Built		Evidence of ☐ Infestation		Storm Sash/Insulated		Car Storage ☐ None	
Effective Age (Yrs)		☐ Dampness ☐ Settlement		Screens		☐ Driveway # of Cars	
Attic	☐ None	Heating ☐ FWA ☐ HWBB ☐ Radiant		Amenities	☐ Woodstove(s) #	Driveway Surface	
☐ Drop Stair	☐ Stairs	☐ Other	Fuel	☐ Fireplace(s) #	☐ Fence	☐ Garage # of Cars	
☐ Floor	☐ Scuttle	Cooling ☐ Central Air Conditioning		☐ Patio/Deck	☐ Porch	☐ Carport # of Cars	
☐ Finished	☐ Heated	☐ Individual	☐ Other	☐ Pool	☐ Other	☐ Att. ☐ Det. ☐ Built-in	

Appliances ☐ Refrigerator ☐ Range/Oven ☐ Dishwasher ☐ Disposal ☐ Microwave ☐ Washer/Dryer ☐ Other (describe)

Finished area **above** grade contains: | Rooms | Bedrooms | Bath(s) | Square Feet of Gross Living Area Above Grade

Additional features (special energy efficient items, etc.)

Describe the condition of the property (including needed repairs, deterioration, renovations, remodeling, etc.).

Are there any physical deficiencies or adverse conditions that affect the livability, soundness, or structural integrity of the property? ☐ Yes ☐ No If Yes, describe

Does the property generally conform to the neighborhood (functional utility, style, condition, use, construction, etc.)? ☐ Yes ☐ No If No, describe

Freddie Mac Form 70 March 2005 | Page 1 of 6 | Fannie Mae Form 1004 March 2005 eral Home Administration) involved in mortgage activities. Since the form was introduced, these agencies have required that an appraisal presented on the URAR form the basis for all mortgages they issue that may eventually be sold in the secondary mortgage market.

The URAR form was revised most recently in 2005. Although the form does not need addenda to meet USPAP's reporting requirements, designated members, candidates for designation, and practicing affiliates of the Appraisal Institute will need to add the Appraisal Institute's certification statements. It is possible that, with careful and concise language, an appraiser could fit the majority of the necessary additions into the body of the form. However, this is unlikely. In most instances, supplementation will be needed to address the reporting requirements not covered by the form, in addition to a current certification as required by Standards Rule 2-3.

The revised URAR form is specifically used for mortgage lending purposes. In 2006, the Appraisal Institute issued an appraisal report form for use in non-mortgage lending situations, AI Reports AI-100 Summary Appraisal Report–Residential. The use of the Appraisal Institute's AI Reports forms is highly recommended when the appraisal does not need to meet Fannie Mae, Freddie Mac, FHA, or VA requirements. If the assignment is for a lender who is not concerned with these entities, use of the new URAR is not required. For a nonlending client, the URAR is not appropriate.

AI Reports forms are available to all appraisers at www.appraisalinstitute.org/education/aireports.aspx/. The forms are designed around the assignment parameters and the scope of work agreed upon by the appraiser and client. The scope of work best defines the needs of the client and reader of the report and dictates what factors the appraiser considered during the valuation process.

Narrative Appraisal Reports

In a narrative appraisal report, the most detailed format for reporting appraisal conclusions, the appraiser provides support and explanation about his or her opinions and conclusions fully and convinces the reader of the soundness of the final opinion of value. In preparing a narrative appraisal report, the appraiser should keep descriptive sections separate from analysis and interpretation. Factual and descriptive data is usually presented in early sections of the report so that subsequent analysis and interpretation may refer to these facts and indicate how they influence the final opinion of value. Repetition and unnecessary duplication should be avoided, but the presentation of data may depend on the nature and complexity of the valuation problem.

The research presented in a well-prepared appraisal report can be very detailed, and the report should exhibit logical organization and sound reasoning. These basic attributes are enhanced by good composition, a fluid writing style, and clear expression. The use of technical jargon and slang should be avoided. To communicate with the reader effectively,

AI Reports™
Form 100.04*

Client File #:		Appraisal File #:	

Summary Appraisal Report • Residential

Appraisal Company:
Address:
Phone: Fax: Website:

Appraiser:	Co-Appraiser:
AI Membership (if any): ☐ **SRA** ☐ **MAI** ☐ **SRPA**	AI Membership (if any): ☐ **SRA** ☐ **MAI** ☐ **SRPA**
AI Status (if any): ☐ **Candidate for Designation** ☐ **Practicing Affiliate**	AI Status (if any): ☐ **Candidate for Designation** ☐ **Practicing Affiliate**
Other Professional Affiliation:	Other Professional Affiliation:
E-mail:	E-mail:
Client:	Contact:
Address:	
Phone: Fax:	E-mail:

SUBJECT PROPERTY IDENTIFICATION

Address:
City: County: State: ZIP:
Legal Description:
Tax Parcel #: RE Taxes: Tax Year:
Use of the Real Estate As of the Date of Value:
Use of the Real Estate Reflected in the Appraisal:
Opinion of highest and best use (if required):

SUBJECT PROPERTY HISTORY

Owner of Record:
Description and analysis of sales within 3 years (minimum) prior to effective date of value:

Description and analysis of agreements of sale (contracts), listings, and options:

RECONCILIATIONS AND CONCLUSIONS

Indication of Value by Sales Comparison Approach	$
Indication of Value by Cost Approach	$
Indication of Value by Income Approach	$

Final Reconciliation of the Methods and Approaches to Value:

Opinion of Value as of:	**$**

The above opinion is subject to: ☐ **Hypothetical Conditions** and/or ☐ **Extraordinary Assumptions** cited on the following page.

*NOTICE: The Appraisal Institute publishes this form for use by appraisers where the appraiser deems use of the form appropriate. Depending on the assignment, the appraiser may need to provide additional data, analysis and work product not called for in this form. The Appraisal Institute plays no role in completing the form and disclaims any responsibility for the data, analysis or any other work product provided by the individual appraiser(s).

AI Reports® AI-100.04 Summary Appraisal Report · Residential January 2013 the contents of the report should be set forth as succinctly as possible. Figure 31.1 lists the principles of effective appraisal report writing.[3]

The appraiser may not be present when the report is reviewed or examined, so the report is the appraiser's representative. A well-written report shows the appraiser's professional competence. The following suggestions may help appraisers make a good impression:

- The paper, cover, and binding of the report should be of good quality.
- The size and style of the type used should be readable. Graphics such as photographs, charts, and graphs should be carefully prepared, and white space should be used judiciously to highlight the important information. The style of headings and subheadings should be appropriate to the subject matter.
- Ideally, illustrations should be integrated within the text or presented on pages that face the material being discussed. For example, a photograph of the subject property may be placed on the page facing the identification of the property. A neighborhood map could be included on a page facing the neighborhood description to show the location of the subject property. Charts and graphs should be presented where they are discussed, but illustrations that are not directly related to the narrative should be placed in the addenda.
- The contents of the report should be presented in clearly labeled sections that are identified in the table of contents.

General Outline

Narrative appraisal reports will vary in content and organization, depending on the scope of work of the appraisal assignment, but they

Figure 31.1 Preparing a Narrative Appraisal Report

1. Clarify the organization of the report.
2. Reveal the organization visually.
3. Use desktop publishing techniques to increase readability.
   - Typeface
   - Size
   - Line length
   - Justification
   - Creating emphasis
4. Graphics are powerful reporting tools.
5. Calculations need to be surrounded by white space.
6. Use tables and spreadsheets effectively.
7. Pie charts, line graphs, and bar graphs reveal relationships and trends.
8. Place graphics and exhibits where they communicate most effectively.
9. Label and number exhibits for easy reference.

Source: Alan Blankenship, *The Appraisal Writing Handbook* (Chicago: Appraisal Institute, 1998), Chapter 2.

3. For further discussion of effective appraisal report writing, see Alan Blankenship, *The Appraisal Writing Handbook* (Chicago: Appraisal Institute, 1998).

all contain certain elements. Essentially, a narrative appraisal report follows the order of steps in the valuation process.

A narrative appraisal report generally has four parts (introduction, premises of the appraisal, presentation of data, and analysis of data and conclusions) and addenda.

Most narrative appraisal reports have four major parts. The contents of each section may be formally divided with subheadings or presented in a continuous narrative. In either case, the major divisions of the report should be identified with individual headings. The four basic parts of a report are the introduction, the premises of the appraisal, the presentation of data, and the analysis of data and conclusions. Many reports have a fifth section, the addenda, which includes supplemental information and illustrative material that would interrupt the text. The organization of narrative reports varies, but the outline in Figure 31.2 can be used as a general guide.

The arrangement of items in this outline is flexible and can be adapted to almost any appraisal assignment and any type of real property. In practice, this outline would be adapted to the particular requirements of the assignment and to suit the personal preferences of the appraiser and, more importantly, the client and other intended users.

Part One—Introduction

Title Page. The title page lists the real property identification, the date of value, the name and address of the appraiser, and the name and address of the client.

Letter of Transmittal. The letter of transmittal formally presents the appraisal report to the client. It should be drafted in proper business style and be as brief as the character and nature of the assignment permit. A suitable letter of transmittal may include the following elements:

- date of letter and salutation
- street address of the property and a brief description, if necessary
- statement identifying the interest in the property being appraised
- statement that the property inspection and all necessary investigation and analyses were made by the appraiser
- reference that the letter is accompanied by an appraisal report of a specified number of pages and identification of the type of appraisal and report format
- type of value developed in the appraisal report
- effective date of the appraisal
- opinion of value
- any extraordinary assumptions and hypothetical conditions
- appraiser's signature

Figure 31.3 illustrates a typical format for a letter of transmittal.

Figure 31.2 General Outline of Narrative Appraisal Report

Part One—Introduction

Title page
Letter of transmittal
Table of contents
Certification
Summary of conclusions

Part Two—Identification of the Appraisal Problem and Scope of Work

Identification of the client and other intended users
Statement of intended use
Identification of the subject real estate and the property rights appraised
Type and definition of value and source of definition
Effective date of opinion of value
Extraordinary assumptions, hypothetical conditions, and jurisdictional exceptions
General assumptions and limiting conditions
Scope of work

Part Three—Presentation of Data

Legal description
Identification of any personal property or other items that are not real property
History, including prior sales and current offers or listings
Market area, city, neighborhood, and location data
Land description
Improvement description
Taxes and assessment data

Part Four—Analysis of Data and Conclusions

Market analysis and highest and best use
Land or site value
Cost approach
Sales comparison approach
Income capitalization approach
Reconciliation and final opinion of value
Estimate of exposure time
Qualifications of the appraiser

Addenda

Photographs
Detailed legal description, if not included in the presentation of data
Detailed statistical data
Leases or lease summaries
Other appropriate information
Secondary exhibits

Figure 31.3 Sample Letter of Transmittal

June 1, 2013

<Client name>
<Client organization>
<Street address>
<City, state, and ZIP>

RE: Appraisal of
1585 Northwestern Highway
Springfield, OR 29055

Dear <Client>:

In accordance with your request, I have appraised the above-referenced property. The attached report, containing XX pages, provides the data and reasoning used in reaching my opinions and conclusions.

The purpose of the appraisal is to develop an opinion of the market value of the fee simple estate of the property as of May 1, 2013. The intended use of the report is to assist in a permanent lending decision. My client, <Client> , is the sole intended user of this report. No other use or users are intended.

The subject real estate consists of a 30,000-sq.-ft. distribution warehouse facility located on a 3-acre site. In addition to the main building, the property includes paved parking for 60 vehicles, a loading dock area, and miscellaneous landscaping and signage.

My opinions and conclusions are based on the scope of work described in this report and qualified by the definitions, assumptions, limiting conditions, and certifications set forth.

Based on my analysis, my opinion of the market value of the subject property, as set forth, documented, and qualified in the attached report under conditions prevailing on May 1, 2013, was:

ONE MILLION FIVE HUNDRED FIFTY THOUSAND DOLLARS
$1,550,000

<Signature>

<State certificate or license no. (if appropriate)>

Table of Contents. The various sections of the report are customarily listed in order in the table of contents. The major divisions of the report and any subheadings used in the report should be shown here.

Certification. The certification usually follows the final opinion of value and must be signed by the appraiser. The certification states that the appraiser has personally conducted the appraisal in an unbiased, objective manner in accordance with professional standards.

Whether the certification is included as part of the introduction or presented on a separate, signed page, certification is important because it establishes the appraiser's role, thereby protecting both the appraiser's integrity and the validity of the appraisal. An appraiser who signs any part of the report, including the letter of transmittal, must also provide a signed certification.

Certification requirements may change, so appraisers must provide certifications that are applicable on the appraisal date. To assist appraisers, the Appraisal Institute provides sample certifications for appraisal,

appraisal review, and appraisal consulting assignments on its website. These documents, which include both the statements required by USPAP and the statements required by the Appraisal Institute, can be downloaded and copied directly into appraisal reports.

The USPAP certification does not have to be exactly the same as that in Standards Rule 2-3, but it must be similar in content. (In contrast, the Appraisal Institute's certification statements must be reproduced verbatim.) Appraisers must be careful not to deviate from the intent of the language if they do not use the USPAP certification language exactly. Additions relevant to the assignment are permitted.

Appraisers who use form reports must be careful. Often the certification included in available software is out of date or does not comply with Appraisal Institute requirements or with state appraisal law. With the exception of the Appraisal Institute's AI Reports forms, the certification provided in a form report is not compliant with the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute. Additions are required to be compliant. It does not matter where these additions go in the report, as long as they are included somewhere. They can be added to the certification page or presented in another logical place.

Certification Standard

The Appraisal Institute's Certification Standard requires designated members, candidates for designation, and practicing affiliates of the Appraisal Institute to include the following statements:

- The reported analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute.
- The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives.

Also, one of the following statements must be included in any report prepared by a designated member of the Appraisal Institute (according to Certification Standard Rule 1-3):

Either

> As of the date of this report, I (or Designated Member's name or Designated Members' names) have/has completed the continuing education program of the Appraisal Institute.

Or

> As of the date of this report, I (or Designated Member's name or Designated Members' names) have not/has not completed the continuing education program of the Appraisal Institute.

Candidates for designation and practicing affiliates of the Appraisal Institute must include one of the following statements in any report prepared by those individuals (according to Certification Standard Rule 1-4):

Either

> As of the date of this report, I (or name or names) have/has completed the Standards and Ethics Education Requirements for (Candidates for Designation or Practicing Affiliates) of the Appraisal Institute.

Or

> As of the date of this report, I (or name or names) have not/has not completed the Standards and Ethics Education Requirements for (Candidates for Designation or Practicing Affiliates) of the Appraisal Institute.

The value conclusion need not be included in the certification. The certification need not be dated (except in the case of the certification retained in the workfile for an oral report).

Note that the proper term is *certification*, not *certificate*, *certificate of value*, or *certification of value*. The certification statements relate to the entire assignment and the manner in which it was completed, not just the value conclusion.

The certification is an important part of an appraisal report. Only an appraiser can make such a statement. The certification should not be buried in the back of the report or in the addenda, or presented in tiny or unclear print. The report reader should know that the appraiser is committed to doing good work, which is confirmed by the certification statements.

Summary of Conclusions. When an appraisal report is long and complex, a summary of the major points and important conclusions in the report may be useful. Such a statement, which is sometimes called an *executive summary*, is convenient for readers of the report and allows the appraiser to stress the major points considered in reaching the final opinion of value. The following list indicates the type of material that is frequently included in a summary. However, all of the following items do not apply to every appraisal assignment:

- brief identification of the property (i.e., the interest appraised and real estate)
- any extraordinary assumptions or hypothetical conditions
- determinations of the highest and best use of the land as though vacant and of the property as improved
- distinguishing property characteristics, such as deferred maintenance or unique features that affect value
- land value opinion
- value indication from the cost approach
- value indication from the sales comparison approach
- value indication from the income capitalization approach
- final opinion of defined value

Figure 31.4 illustrates one possible format for a summary of conclusions included in an appraisal report.

Part Two—Identification of the Appraisal Problem and Scope of Work

Identification of the Client and Other Intended Users. An appraiser who writes a report is writing to his or her client and intended users. They are the audience for the analysis and conclusions. Standards Rule 2-1(b) of USPAP states that the report must contain sufficient information to enable the intended users to understand the report properly. To ensure that the report contains sufficient information, the appraiser must first know who the intended users are.

It is a misconception that the "addressee" named in the report is necessarily the client. Although appraisers often assume it is under-

Figure 31.4 Sample Summary of Facts and Conclusions

Property type:	30,000-sq.-ft. distribution warehouse facility
Location	1585 Northwestern Highway Springfield, OR 29055
Date of value opinion:	May 1, 2013
Property rights appraised:	Fee simple estate
Site:	A three-acre interior site that is fully improved and conforms to all applicable ordinances
Improvements:	A two-year-old masonry warehouse facility that contains 30,000 square feet of gross area. The finished office area of the building consists of 3,000 square feet, or 10%, which is typical for this type of building in this area. There is paved parking for 60 vehicles, miscellaneous landscaping, and one pole sign.
Client	<Client>
Intended use:	To provide a value opinion and documentation that will assist in a permanent lending decision
Intended user(s):	<Client>
Zoning:	I-1 Industrial
Highest and best use:	
As though vacant	30,500-square-foot masonry distribution warehouse facility with 3% to 5% office finish
As improved	Current use as a distribution warehouse facility is optimum use
Site value:	$350,000
Cost approach:	$1,610,000
Sales comparison approach:	$1,525,000
Income capitalization approach:	$1,565,000
Final value opinion:	$1,550,000

stood that the addressee is the client, this may or may not be the case. The report must specifically identify the client, whether the client is an individual or an entity.

The client is not necessarily the only intended user. The appraiser is responsible for reporting conclusions and analyses in a manner that is clear and understandable to all intended users identified by the appraiser at the onset of the assignment.

Statement of Intended Use. The report must include a clear statement of how the appraiser intends the report to be used, which should align with the client's reason for requesting it.

Identification of Subject Property. A complete legal description is commonly used to identify the subject property. Depending on the nature of the subject property, the appraiser may need to provide more or less detail to identify the subject property clearly. For example, a parcel of raw land may need to be identified by a detailed metes and bounds description whereas an existing home might be identified simply by a street address. Maps and surveys can be used if the sources are adequate and clear.

Identification of Property Rights Appraised. In identifying the subject property, the appraiser must state and should define the particular rights or interests being valued. A thorough discussion is warranted in appraisals of partial interests in property or limited rights such as surface or mineral rights. Other encumbrances such as easements, mortgages, and special occupancy or use requirements should also be identified and explained in relation to the defined value to be developed.

Type and Definition of Value. An acceptable definition of the type of value being appraised is included in the report to eliminate any confusion in the mind of the intended user (or users) or other readers of the report. (Definitions of various types of value are cited in Chapter 6.) USPAP also requires that the source of the value definition be cited.

Effective Date. An appraisal assignment may call for one or more of the following:

- an opinion of current value
- an opinion of retrospective value
- an opinion of prospective value

It is essential to report the date as of which the value conclusion is applicable. Commonly, the date of the opinion of value and the date of the inspection of the property are the same for appraisals of current market value. If the date of inspection differs from the date of the opinion of value, then both dates should be noted in the appraisal report.

Extraordinary Assumptions, Hypothetical Conditions, and Jurisdictional Exceptions. When a value opinion is subject to an extraordinary assumption or hypothetical condition, the report must clearly and conspicuously disclose the assumption or condition and state that its use might have affected the value conclusion. In the rare case of a jurisdictional exception, the report must identify the law or regulation that is contrary to applicable professional standards. The report must also cite the portion or portions of the professional standards that are excepted because of the law or regulation.

General Assumptions and Limiting Conditions. General assumptions and limiting conditions may be stated in the letter of transmittal, but they are usually included as separate pages in the report. These statements are used to help protect the appraiser and to inform the client and other intended users of the report. The general assumptions found in a typical appraisal report deal with issues such as legal and title considerations, liens and encumbrances, property management, information furnished by others (e.g., engineering studies, surveys), concealment of hazardous substances on the property, and compliance with zoning regulations and local, state, and federal laws. General assumptions and limiting conditions should not be treated as boilerplate in the report, although they may be typically applicable to almost all assignments. (Figure 31.5 shows examples of typical general assumptions and limiting conditions.)

Scope of Work. A clear and accurate description of the scope of work appropriate to the appraisal assignment protects those persons whose reliance on the appraisal may be affected, and professional standards

Figure 31.5 General Assumptions and Limiting Conditions

The following assumptions and limiting conditions are commonly found in appraisal reports, but the specific wording of the items and the inclusion of a specific item may not be applicable to every assignment:

This appraisal has been made with the following general assumptions:

- No responsibility is assumed for the legal description provided or for matters pertaining to legal or title considerations. Title to the property is assumed to be good and marketable unless otherwise stated.
- The property is appraised free and clear of any or all liens or encumbrances unless otherwise stated.
- Responsible ownership and competent property management are assumed.
- Information furnished by others is believed to be reliable, but no warranty is given for its accuracy.
- All engineering studies are assumed to be correct. The plot plans and illustrative material in this report are included only to help the reader visualize the property.
- It is assumed that there are no hidden or unapparent conditions of the property, subsoil, or structures that render it more or less valuable. No responsibility is assumed for such conditions or for obtaining the engineering studies that may be required to discover them.
- It is assumed that the property is in full compliance with all applicable federal, state, and local environmental regulations and laws unless the lack of compliance is stated in the appraisal report.
- It is assumed that the property conforms to all applicable zoning and use regulations and restrictions unless a nonconformity has been described in the appraisal report
- It is assumed that all required licenses, certificates of occupancy, consents, and other legislative or administrative authority from any local, state, or national government or private entity or organization have been or can be obtained or renewed for any use on which the opinion of value contained in this report is based.
- It is assumed that the use of the land and improvements is confined within the boundaries or property lines of the property described and that there is no encroachment or trespass unless noted in the report.
- Unless otherwise stated in this report, the existence of hazardous materials, which may or may not be present on the property, was not observed by the appraiser. The appraiser has no knowledge of the existence of such materials on or in the property. The appraiser, however, is not qualified to detect such substances. The presence of substances such as asbestos, urea-formaldehyde foam insulation, and other potentially hazardous materials may affect the value of the property. The value estimated is predicated on the assumption that there is no such material on or in the property that would cause a loss in value. No responsibility is assumed for such conditions or for any expertise or engineering knowledge required to discover them. The intended user is urged to retain an expert in this field, if desired.
- The forecasts, projections, or operating estimates contained herein are based on current market conditions, anticipated short-term supply and demand factors, and a continued stable economy. These forecasts are, therefore, subject to changes with future conditions.

This appraisal has been made with the following general limiting conditions:

- Any allocation of the total value estimated in this report between the land and the improvements applies only under the stated program of utilization. The separate values allocated to the land and buildings must not be used in conjunction with any other appraisal and are invalid if they are.

The intended use of this appraisal report is ____. The client is the sole intended user. This appraisal may not be appropriate for other uses or users.

require the appraisal report to include enough information to allow the intended users to understand the scope of work performed.

Providing a freestanding section in the appraisal report on the scope of work helps the intended user find the discussion of what the appraiser did to solve the appraisal problem, why the activities were performed, and who helped in the appraisal process. Alternatively, the scope of work of the assignment can be discussed throughout the appraisal report within each respective section, e.g., discussion of the scope of the research and analysis of comparable sales in the sales comparison approach section of the report.

Whether scope of work is discussed in its own section, throughout the appraisal report, or in some combination of the two, the scope of work must be clear and not misleading.

Part Three—Presentation of Data

Legal Description. The subject real estate is identified so that it cannot be confused with any other parcel of real estate. This can be achieved by including a full legal description of the property in the report. When a copy of the official plat or an assessment map is used, the appraiser may refer to it at this point and present it on a facing or following page. If the official plat is unavailable, the appraiser can describe the property by name, specifying the side of the street on which the property fronts, the street address, and the lot and block number. A photograph of the subject property on a facing page can enhance this section of the report. Personal property and other items that are not real property should be identified.

History. USPAP requires that current listings and prior sales of the subject property within three years of the effective date of value be analyzed and addressed in the appraisal report if available in the normal course of business. USPAP has no requirement to analyze the sales history of each comparable sale. However, Fannie Mae and certain other government bodies require comparable sales histories. This regulation is applicable to lenders, and it is reflected on the URAR form. Other jurisdictional standards such as the Uniform Standards for Federal Land Acquisitions (i.e., “the Yellow Book”) require sales of the subject transacted within 10 years to be reported.

For properties other than one-unit residences, recent changes in the property’s operating profile should be addressed. Historical property data may include information on

- original assemblage, acquisition, or construction costs
- expenditures for capital additions or modernization
- financial data or transfers of ownership
- operating statements
- casualty loss experience
- history and type of occupancy
- any other facts that may pertain to or affect the computations, estimates, or conclusions presented in the report

Market Area, City, and Neighborhood Data. Relevant facts about the subject's market area, city, and neighborhood should be discussed in the report. (The use and reliability of different types of data in relation to various classifications of property and specific appraisal problems are discussed in Chapters 9 and 11.) An appraiser weighs and considers all pertinent factors in data analysis, but the report should discuss only the data found to be significant to the appraisal problem. Both positive and negative aspects of the market area should be discussed. If the appraiser only provides data in support of either positive or negative factors, the report will be misleading, which is evidence of bias and a violation of the ethical rules for professional conduct.

The amount of neighborhood and location data required depends on the information needs of the intended user or users. For example, when an appraisal is prepared for an out-of-town client who is unfamiliar with the property and the community, it may be wise to include more community and neighborhood data than would be needed by a local client.

An appraiser should also note the presence of special amenities or detrimental conditions in the neighborhood and provide reasons or data to support any conclusions about these factors. For example, if the appraiser states that the market area is growing, actual growth figures or building projections supporting that assertion should be included in the report. If a report states that a neighborhood is in decline due to abnormal deterioration or poor maintenance, the appraiser might refer to specific properties that exhibit these detrimental conditions or use photographs to illustrate neighborhood conditions. Photographs can also be used to show positive and negative value influences. Reviewers have access to aerial maps and can easily identify these influences on the maps. It is incumbent upon the appraiser to report these positive and negative influences in the neighborhood or market area analysis.

Land Description. Pertinent facts about the subject site belong in the land description section. Land description involves three different aspects of the subject property's site:

- physical characteristics
- legal characteristics
- economic characteristics

Relevant physical site data may include descriptions of the following:

- the property's frontage, depth, site area, and shape
- soil and subsoil conditions
- utilities
- any improvements that benefit or harm the site

In the land description section of an appraisal report, the appraiser should offer a conclusion as to the utility or adaptability of the site for existing or proposed improvements.

When significant to the appraisal problem, zoning and private restrictions (such as easements) should be discussed in detail. The appraiser should provide sufficient land use data to help the reader understand the limitations that zoning regulations place on the use or development of the site. If the appraiser needs to explore the possibility of a zoning change, this analysis should also be addressed. Other existing public and private restrictions such as floodplain regulations, scenic easements, wetland restrictions, or covenants, conditions, and restrictions (CC&Rs) should be discussed and their effect on the utility and value of the property described.

Improvement Description. In the description of improvements section, all building and improvement data relevant to the appraisal problem is presented and discussed. Although an appraiser considers and processes much data in the course of an appraisal, only significant property characteristics that influence the value conclusion are presented in the report. These characteristics may include the following:

- actual and effective building age
- building size
- number and size of units
- structural and construction details
- mechanical equipment
- physical condition
- functional utility or inutility

Property information may be supported with drawings, photographs, floor plans, and elevations. If the description of structural details and mechanical equipment is long, an outline may be used in the body of the report to emphasize the important items and full details may be included in an addenda.

Tax and Assessment Data. Economic characteristics of a property that may have an effect on its value and should be discussed in the appraisal report include

- real estate taxes
- special assessments
- development bonds
- facilities benefit districts or other public encumbrances affecting the site

If relevant to the assignment analyses or conclusions, current assessed values and ad valorem tax rates should be reported and a calculation of the current annual tax load of the subject property should be included in the appraisal report. Existing assessment trends or prospective changes in tax rates should be analyzed and reported. It may be appropriate to discuss the tax assessment or tax load on the subject in relation to the taxes on other properties, particularly if the difference is significant.

Part Four—Analysis of Data and Conclusions

Market Analysis and Highest and Best Use. Market analysis provides support for the analysis of alternative land uses and ultimately the highest and best use conclusion, although full documentation of the six-step market analysis process is not usually included in an appraisal report.

For an appraisal of market value, the appraisal report must address the highest and best use conclusion, including discussion of the effects on use and value of existing land use regulations, reasonably probable modifications of those regulations, economic supply and demand, the physical adaptability of the real estate, and market area trends, as outlined in Standards Rule 1-3 of USPAP.

It is a common misconception that presenting only a summary of the appraiser's highest and best use conclusion is appropriate. This is incorrect. The appraiser must summarize his or her analysis, and, if the objective is market value, some analysis of highest and best use is required. In some cases, that analysis is quick and the highest and best use conclusion is obvious. For example, in the valuation of a single-family residence located in a subdivision of similar houses, there is little chance that a likely buyer would demolish the house to maximize value, and modifying the improvements would not significantly increase the value above the cost. However, Standards Rule 2-2 of USPAP still requires a summary of the support and rationale for the highest and best use conclusion.

It is not necessary to repeat sections of the report in the highest and best use analysis. Report sections are not intended to be stand-alone. The market analysis and other descriptive sections of the report can be used to support highest and best use conclusions as well as the valuation sections. Material from other report sections may be referenced in the highest and best use section to support the analysis and conclusions.

Land or Site Value. If land is valued as though vacant, a section of the report must address this analysis. In the land value section, market data is presented along with an analysis of the data and reasoning that lead to the land value opinion. The factors that influence land value should be presented in a clear and precise manner and the narrative should lead the reader to the land value opinion.

Approaches to Value. An appraiser develops the approaches required to produce credible assignment results. In the report, the appraiser describes the application of each approach and presents the factual data, analysis, and reasoning leading to the value indication.

If the intended users are not familiar with the mechanics of the three approaches to value, the appraiser should briefly explain the procedures applied. The extent of explanation required depends on the circumstances of the assignment and knowledge of the intended users. Simple statements that describe what is included in each of the three approaches (such as those provided in Figure 31.6) can help the reader better understand the report.

Reconciliation of Value Indications. Professional standards require reconciliation of the data within each approach as well as reconciliation of the approaches used. A reconciliation section consisting of boilerplate and stock comments does not often present useful information about reconciliation. A discussion of the data used, its application to the subject, how the approaches apply to the subject, and so on, is essential to a meaningful discussion of the appraiser's conclusions. The reconciliation of value indications should lead the reader logically to the final opinion of value. The appraiser considers the strengths and weaknesses of each approach, the availability and reliability of the data, and other concerns.

Qualifications of the Appraiser. The appraiser's qualifications may be included in the report as evidence of the appraiser's competence to perform the assignment. These qualifications may include facts concerning the following:

- professional experience
- educational background and training
- business, professional, and academic affiliations and activities
- typical clients
- the types of properties appraised and the nature of the appraisal assignments undertaken

Misrepresentation of qualifications or presenting misleading information regarding qualifications is a breach of professional ethics. Ethical Rule 5-5 of the Appraisal Institute's Code of Professional Ethics states, "It is unethical to prepare or use in any manner a resume or statement of qualifications that is misleading."

Figure 31.6 Descriptions of the Approaches to Value

The approaches to value could be described in an appraisal report as follows:

> In the sales comparison approach, properties similar to the subject property that have been sold recently or for which listing prices or offers are known are compared to the subject. Data from generally comparable properties is used, and comparisons are made to demonstrate a probable price at which the subject property would sell if offered on the market.
>
> In the cost approach, an estimated reproduction or replacement cost of the building and site improvements as of the date of appraisal is developed (including an estimate of entrepreneurial profit or incentive), and an estimate of the losses in value (depreciation) that have taken place due to wear and tear, design and plan deficiencies, or external influences is subtracted. An estimate of the value of the land is then added to this depreciated building cost estimate. The total represents the value indicated by the cost approach.
>
> In the income capitalization approach, the potential income of the property is calculated and deductions are made for vacancy and collection loss and expenses. The prospective net operating income of the property is then estimated. To support this estimate, operating statements for the subject property in previous years and for comparable properties are reviewed. An applicable capitalization method and appropriate capitalization rates are developed and used in calculations that lead to an indication of value.

Note that the description of the approaches to value may be more or less detailed depending on the level of detail required by the report format and the sophistication of the client.

Addenda

Depending on the size and complexity of the appraisal assignment, supplementary material may be added to the report to present information that would interrupt the narrative. The following items may be included in the addenda, if they have not already been incorporated into the body of the report:

- plot plan
- plans and elevations of buildings
- photographs of properties referred to in the report
- city, neighborhood, and other maps
- charts and graphs
- historical income and expense data
- building specifications
- detailed estimates of the reproduction or replacement costs of buildings
- sales and listing data
- leases and lease abstracts

Illustrations of many of the addenda items listed above can be seen in earlier sections of this book.

Appraisal Review

In common usage, the term *review* means to examine or critique. In appraisal practice, appraisal review has a very specific meaning. An appraisal review is an opinion about the quality of another appraiser's work, where that work involved an appraisal or appraisal review (see Standard 3 of USPAP). Appraisal review is a valuation-related service that many different types of clients may need. The extent and nature of a review is a scope of work decision reached jointly by the appraiser and the client. There are distinct best practices and professional standards that apply when an appraiser provides this type of service.

For the purposes of the discussion in this chapter, the *reviewer* is the appraiser performing the appraisal review, the *appraiser* is the appraiser whose work is being reviewed, and the *subject of the appraisal review* is the work being reviewed. The subject of the appraisal review could be all or part of an appraisal report or appraisal review report. It could be an oral appraisal report or oral appraisal review report as well. All or part of the appraiser's workfile could be the subject of the appraisal review, either in conjunction with or in addition to a written or oral appraisal report.

Most often, the subject of the appraisal review is an appraisal report prepared by another appraiser. When that is the case, the appraisal review may or may not include an opinion about the appraiser's value conclusion–for example, that the value conclusion is or is not well supported.

The service is *not* appraisal review if the work under review was prepared by a non-appraiser. For example, an appraiser may be asked to "review" a broker's price opinion (BPO) prepared by a real estate agent. While an appraiser may certainly provide such a service, it is not *appraisal review*. However, if the appraiser agrees or disagrees with the BPO presented by the non-appraiser, the appraiser would be providing an *appraisal*, which would be subject to professional standards relating to appraisal.

Another example of a service that is *not* appraisal review is one in which only facts about the work of another appraiser are stated–for example, "the capitalization rate applied in the income approach was 10%," or "the appraisal report contained all items required by the Uniform Standards of Professional Appraisal Practice for an appraisal report." However, if a reviewer expresses the opinion that the appraisal "complied with USPAP," the reviewer would be providing an appraisal review because making a determination about standards compliance involves making a determination about quality.

For the service to be appraisal review, the communication of the reviewer's opinions and conclusions must be provided to a client. If an appraiser provides an opinion about the quality of another appraiser's work only to the appraiser who performed the work, no appraisal review service is being provided. In such a scenario, one appraiser is simply providing feedback to another. This is a common practice among appraisers and serves to advance appraiser competence.

Appraisal review should never be used as an opportunity to discredit another appraiser. Nor should a reviewer criticize solely for the sake of criticizing. The reviewer's findings must be supported by evidence and logic (i.e., data and analysis), just as the appraiser's conclusions must be supported in an appraisal assignment. The reviewer must at all times be aware that the role of a reviewer is to provide an unbiased, objective opinion about the quality of the work under review. This stance must be maintained regardless of the reason for the appraisal review. For instance, in litigation work, the role of the reviewer's client (usually an attorney) will be to advocate for his or her client's cause or objective. The reviewer, however, cannot assume such a role but instead must remain an impartial third party whose role is to provide unbiased, objective information to the client about matters pertaining to value.

In an appraisal review assignment, it is possible that the reviewer will not find any errors or weaknesses in the work being reviewed. A reviewer should never believe that the appraisal review report must mention something negative about the work under review. Rather, a key function for an appraisal review is to supplement the work of the appraiser by providing additional information and analysis that further supports the appraiser's opinions and conclusions.

Reviewers must also keep in mind that their role is to review the work of appraisers, not the appraisers themselves. In this regard, reviewers must be careful about making conclusive statements about the competency of an appraiser. While substandard work by an appraiser may suggest a lack of competency, reviewers should refrain from expressing judgments about the individual and instead express judgments about the work under review.

Why Appraisal Reviews Are Needed

Appraisal reviews are performed to reinforce the client's confidence in the credibility of the work and its conclusions. An appraisal review, like an appraisal, is a risk management tool. A user of an appraisal needs to be comfortable with the value opinion that the user will rely on, and an appraisal review provides the yardstick for measuring the user's comfort level. The appraisal profession is no different from other professions in that clients often seek second opinions from other professionals. Obtaining appraisal reviews is a prudent business practice for users of appraisal services.

Appraisal reviews are critical for regulated lending institutions in the United States. The review requirements of lenders may be tailored to their specific policies and procedures, which include compliance with the requirements of federal agencies, most notably the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA). Mortgage insurers have unique appraisal requirements, as do federal and quasi-federal agencies that conduct appraisal reviews as a normal part of their appraisal acceptance and audit procedures and of their pre- and post-funding reviews. State and local government agencies such as highway departments conduct reviews in conjunction with the acquisition of rights of way and have specific appraisal requirements for condemnation proceedings. Appraisal reviews are also critical in litigation and dispute resolution where the value of property is a pivotal question.

Appraisal reviews may be performed for quality control purposes, either within an appraisal firm or by a user of appraisal services. However, when prepared within the appraisal office for quality control purposes, the activity is not *appraisal review* as long as the results are not communicated to a client. Some client groups, such as government agencies and lending institutions, have quality control policies that call for regular, periodic review of some segment of the appraisals they obtain. These quality control reviews may serve to provide important lessons in hindsight for the appraiser, the appraisal firm, or the user of the appraisal services.

Who Can Prepare Appraisal Reviews?

While anyone might form an opinion about an appraiser's work, appraisal reviews are prepared by qualified appraisers according to professional standards.[1] Appraisers are retained to perform these services

1. The term *administrative review* has been used to describe a review performed by a non-appraiser or by an individual who may be an appraiser but is not acting as an appraiser when providing the service. These reviews are generally for purposes of checking factual accuracy or completeness only, not evaluating the quality of the valuation work. For example, individuals involved in loan processing often review appraisals to check their completeness for loan underwriting purposes, and attorneys often review appraisals to check their completeness and factual accuracy for litigation purposes. Non-appraisers are not expected to have appraisal competency and independence, and thus they are not expected to comply with professional appraisal standards.

because they possess competency in valuation methods and techniques and because they are independent, objective, and impartial. Freedom from bias is a key characteristic of the qualified reviewer.

In the United States, state licensing laws might require that the reviewer be a licensed or certified appraiser in the state where the real property that is involved in the assignment is located. A reviewer would be well advised to check with the applicable state appraiser regulatory body before accepting a review assignment. An appraisal review for a federally regulated lender must be prepared by a state-licensed or -certified appraiser if the reviewer provides a different opinion of value and the lender relies on that reviewer's opinion.[2]

Because a defining characteristic of a professional appraiser is competency in valuation methods and techniques, an appraiser acting as a reviewer must likewise have the competency needed to provide credible appraisal reviews. However, the competency level needed by the reviewer is different from the competency level needed by the appraiser. The competency level needed by the reviewer is highly dependent upon the reviewer's scope of work. For instance, if the reviewer's scope of work includes developing an opinion about the value of the property, market area and geographic area competency become very important. They may be less important if the reviewer's scope of work does not include agreeing or disagreeing with the appraiser's value conclusion.

A qualified reviewer generally has expertise with the property type involved in the work being reviewed and with the methods applicable to the valuation of that property type. A qualified reviewer also has expertise in review techniques, can identify the strengths and weaknesses of the work under review, and can discern between major and minor errors and omissions.

Like an appraiser in an appraisal assignment, a reviewer must be able to judge the level of competency needed for the appraisal review assignment prior to accepting it, and then judge whether he or she has that requisite competency. This requires a good understanding of the assignment–e.g., the client's problem to be solved, the nature of the property involved, the intended use, applicable laws and regulations–at the outset. Reviewers must also have a good understanding of their own skill sets.

Professional standards include competency requirements applicable to reviewers. For example, USPAP's Competency Rule applies to appraisers acting as reviewers. The Code of Professional Ethics of the Appraisal Institute contains identical requirements relating to competency. These require the appraiser (or reviewer) to understand the problem to be solved in the assignment and the competency level needed to solve it. Any lack of competency must be disclosed to the client at the time of the assignment or as soon as it is discovered. If the appraiser (or reviewer) is to proceed with the assignment, he or she must attain the needed competency. The report subsequently provided to the client must disclose the initial lack of competency and the steps taken to attain it.

2. Interagency Appraisal and Evaluation Guidelines, December 2010, section XV.

A lack of competency will likely manifest itself in the quality of the reviewer's work. Without the requisite competency, the reviewer might overlook important issues or fail to discern between significant and insignificant problems in the work under review. This will result in an appraisal review that lacks sufficient credibility for its intended use.

Applicability of Professional Standards

When an individual is "acting as an appraiser"–i.e., the client has engaged the individual with the expectation that the individual has valuation expertise and is independent, unbiased, and objective–professional standards apply to whatever service is being provided. In USPAP, Standard 3 addresses the development and communication (i.e., reporting) of an appraisal review. The reviewer may be required to comply with other standards, laws, or regulations when preparing the appraisal review. The reviewer must identify at the outset the standards, laws, and regulations applicable to the assignment as well as any additional client requirements.

For example, the Uniform Appraisal Standards for Federal Land Acquisition (commonly known as the "Yellow Book") includes specific requirements for appraisal review. When the Yellow Book applies to the assignment, the reviewer must follow those requirements.

Similarly, Fannie Mae, Freddie Mac, FHA, and VA have specific guidelines for reviewers, including requiring the use of a specific appraisal review reporting form. This form (Fannie Mae Form 2000/ Freddie Mac Form 1032) sets forth a minimum scope of work for the reviewer, which includes agreeing or disagreeing with the appraiser's value. In accepting an assignment using the form, the reviewer agrees that his or her scope of work will include this determination. If the reviewer's scope of work does not include agreeing or disagreeing with the appraiser's value, the appraisal review will not be acceptable for the purposes of those governmental and government-sponsored enterprises.

Structuring the Appraisal Review Assignment

The first step in an appraisal review assignment is to understand why the client needs the appraisal review. All clients who engage reviewers seek to understand if the work to be reviewed has enough credibility to be relied upon for its intended use. However, many clients have specific reasons for obtaining appraisal reviews that go beyond that question. For example, some clients want the reviewer to accept or reject an appraisal based on certain criteria. Other clients want the reviewer to independently verify the data used in the appraisal and determine its accuracy. Still others want the reviewer to verify the accuracy of the description of the subject property–for example, site area, building area, physical characteristics such as condition or location attributes, or legal characteristics such as zoning.

Not all clients are specific about their reasons for wanting an appraisal review, so it is incumbent upon the reviewer to consult with the client until those reasons are understood. The reason (or reasons) the client needs the appraisal review will translate into the intended use of the appraisal review report. Once the reviewer has established the intended use and intended users, the reviewer is obligated to determine and apply a scope of work for that assignment that is appropriate for the intended use and to prepare a report that is understandable to those intended users. Therefore, *identification of the problem to be solved* in the appraisal review assignment is a critical first step. If the identification of the problem is inadequate, the risk increases that the reviewer will provide the wrong type of service and not satisfy the client's needs.

Once the problem to be solved is identified, the reviewer can determine the scope of work. Key scope of work decisions include the following:

- What will be reviewed–an entire report, a portion of a report, a workfile, or something else?
- Will the reviewer provide his or her own value opinion?
- Will the reviewer visit the property that is the subject of the appraisal (field or desk review)?
- Will the review accept or reject the work under review according to certain criteria?

The reviewer should be careful not let a review form or format drive the scope of work. Many review forms (and formats) include a preset scope of work discussion. When the reviewer uses such a form, it is understood that the minimum scope of work will be that stated in the form. However, the reviewer may determine that the scope of work should be expanded.

Along with determining the scope of work of the review, the reviewer should clarify with the client whether the reviewer is expected to communicate directly with the appraiser regarding the work under review. Depending on the circumstances, several different alternatives are possible:

- The reviewer will complete the appraisal review without having any contact with the appraiser who completed the work under review.
- The reviewer will not know the identity of the appraiser who completed the work under review.
- The reviewer will contact the appraiser after completing the review and request that errors or omissions be corrected.
- The reviewer will work with the appraiser from the point of the appraiser's engagement to provide guidance throughout and then review the work upon completion by the appraiser.

It is critical to clarify with the client prior to accepting the review assignment which of the above alternatives is expected. If the expectation is that the reviewer will have contact with the appraiser, the review assignment will present some additional challenges. These challenges include the need for interpersonal communication skills as well as additional time to complete the assignment.

Development of the Appraisal Review Opinion

As reviewers gain experience, they tend to develop their own approaches to reviewing. When the subject of the review is an entire appraisal report, some reviewers prefer to read through it from beginning to end so they can get a sense of the report as the intended user or users will see it. Other reviewers prefer to read the portions of the report that summarize the key findings and conclusions and then focus on the sections of the report where the key analyses are presented. For example, if upon reading the final reconciliation section the reviewer learns that the appraiser gave no weight to the cost approach, the reviewer might spend little time reviewing the cost approach section. Conversely, if the reviewer learns that a key risk factor for the property is its deteriorating condition, the reviewer might focus more attention on the portions of the report that address the effect of the property's condition on value.

One key review function is making judgments about the quantity and quality of the data and analyses in the work under review. A competent reviewer knows when issues are important or are immaterial. Throughout the review process, the reviewer must remain cognizant of, and stay focused on, the objective of the review assignment, which is to inform the client about the quality of the work under review so the client can decide whether or not the work can be relied upon for its intended use. The reviewer must be able to discern when judgments made in the work under review are acceptable and when additional support with data and analyses are needed given the intended use.

An appraisal review of an appraisal must be conducted in light of the market conditions as of the effective date of that appraisal. The reviewer must consider the data and information that the appraiser could have or should have uncovered at the time the appraiser performed the appraisal. It is unreasonable to expect the appraiser who prepared the work under review to be responsible for knowing something that was not knowable at the time. Also, because an appraisal needs to reflect the actions of market participants, transactions that occurred after the date of value that market participants would not have been aware of are generally not meaningful to the analysis.

Providing an Opinion of Value as a Reviewer

If the reviewer agrees or disagrees with the value conclusion as part of the scope of work provided in the work under review, the reviewer is providing an appraisal. By agreeing, the reviewer is taking the appraiser's value opinion to be his or her own, though subject to certain stated conditions (e.g., extraordinary assumptions, as discussed below). By disagreeing, the reviewer is saying his or her value opinion is something different.

A reviewer cannot simply state that he or she disagrees. Because the reviewer is at this point providing an opinion of value–that is, an appraisal–professional standards require the reviewer to provide support for that opinion. That support can be provided by a combination of (1) the data and analyses presented in the work under review that the reviewer does agree with and (2) the reviewer's own data and analysis. Figuratively speaking, the reviewer removes from the appraiser's report the portion that the reviewer cannot accept, thereby creating a "hole" in that report, which the reviewer must then fill with his or her own data and analysis. (In many cases, there will be more than one unacceptable part and so more than one hole to fill.) The new material–the reviewer's own data and analysis–must be presented in the review report. There is no need for the reviewer to develop an appraisal opinion from scratch or to prepare an entirely new appraisal report. Rather, the reviewer's appraisal development process (e.g., under Standard 1 of USPAP) is handled through the combination of the appraiser's work and the reviewer's own work, and the reviewer's appraisal reporting process (e.g., under Standard 2 of USPAP) is handled through the combination of the appraisal report under review and the reviewer's review report.

Extraordinary assumptions play a key role in the review process, especially when the reviewer is providing an opinion of value in the review report. For example, the reviewer might agree or disagree with the appraiser's value opinion, but if the reviewer's scope of work does not include verification of the information presented in the appraisal report about the property, the reviewer's opinion of value is based on the assumption that the property information presented in the report under review is accurate. The reviewer must then include a statement in the review report to this effect and also state that if the assumption proves to be false (i.e., the property information in the report is inaccurate) the reviewer's opinion could be different.

Another time an extraordinary assumption is made by a reviewer is when the reviewer's scope of work does not include doing an independent search for comparable data. In this case, whether the reviewer agrees or disagrees with the appraiser's value conclusion, the reviewer would be basing the conclusion on the assumption that the data presented in the report under review is accurate and is the best available data. Again, the reviewer must include a statement in the review report to this effect and also state that if the assumption proves to be false (i.e., the data is inaccurate or better data would have been available) the reviewer's opinion could be different.

Clear disclosure of extraordinary assumptions is critical–and is required by professional standards–so that the client and users of the review report can determine its suitability for their use. Clients might decide, for example, that their comfort level with the review and the underlying appraisal would be enhanced if the reviewer's scope of work were expanded so that extraordinary assumptions are not necessary. Or clients might find that the appraisal review report meets their needs, even though it is based on certain extraordinary assumptions.

Reporting the Appraisal Review Opinion

Clear communication of the reviewer's findings is a critical step in an appraisal review assignment. The communication could take one of several forms:

- an oral report
- a written report using a standardized form or format
- a written report in a format created by the reviewer

Oral review reports may be used in cases where the client does not need a written report. In those cases, the appraiser and client might meet, in person or by phone, to discuss the work under review. Oral review reports may also be used in situations involving testimony, such as court testimony or a deposition by the reviewer.

When an oral review is provided, the reviewer must develop the review opinion prior to delivering the oral report. A reviewer cannot be expected to provide an opinion about another appraiser's work on the spot. The development of a review opinion takes due diligence, which takes time. The reviewer must ensure that the review has been properly developed and a workfile in support of the review has been created prior to delivering the oral report.

As mentioned earlier, if the review report is to be in writing, the client might request that a standardized form or format be used.[3] For one- to four-unit residential property appraisal review work for lenders, reviewers generally use Fannie Mae Form 2000/Freddie Mac Form 1032. For other property types, there is no single, widely used form or format. Different client groups have created their own forms and formats that meet their specific needs.[4] Any form may require supplemental detail to make it conform to USPAP and Appraisal Institute requirements.

If the reviewer is writing a narrative report or creating his or her own format, the reviewer must make sure that (1) the review report complies with applicable professional standards for reporting an appraisal review and (2) the review report meets the needs of the client and any other intended users.

Professional standards require the inclusion of the following items, at a minimum, in a review report:

1. The reviewer's client and any other intended users.
2. The intended use of the appraisal review. (In other words, why does the client need the review?)
3. The purpose, or objective, of the appraisal review. (What is the client's question about the work under review?)

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3. A text or e-mail is considered written communication. Also, if an oral report is provided and the client subsequently requests "written follow-up," that written communication is a written review report if it contains the reviewer's opinion about the quality of the appraiser's work.
4. Developing a single, standardized review form for all review assignments is difficult because the information that needs to be conveyed in a review report varies greatly with the property type and the reviewer's scope of work. A form or format that is sufficient for one review assignment might be insufficient for another assignment and, at the same time, be overly detailed for a third assignment.

4. The subject of the appraisal review assignment. (What is being reviewed?)
5. The ownership interest of the property that is the subject of the work under review.
6. The date of the work under review (i.e., the date of the report).
7. The effective date of the opinions and conclusions in the work under review.
8. The appraisers who completed the work under review.
9. The effective date of the appraisal review.
10. Extraordinary assumptions and hypothetical conditions used by the reviewer and a statement that their use might have affected the reviewer's conclusions.
11. The reviewer's scope of work.
12. The reviewer's opinions and conclusions about the work under review, including the reasons for any disagreement.
13. When the scope of work includes the reviewer's development of an opinion of value, a statement of which information, analyses, opinions, and conclusions in the work under review the reviewer accepted as credible and used in developing the reviewer's own opinion and a summary of any additional information relied on and the reasoning for the reviewer's opinion of value.
14. The reviewer's signed certification.

When the appraiser is subject to USPAP, the applicable performance standard for the development and communication of the appraisal review is Standard 3. The reporting requirements for an appraisal review are set forth in Standards Rules 3-4, 3-5, and 3-6.

Unless otherwise required, an appraisal review report need not repeat what is in the appraiser's report. The purpose of the review report is not to summarize or reiterate the work under review. Instead, the purpose is to provide the client with the reviewer's clearly explained opinion about the quality and credibility of that work.

The Reviewer's Workfile

Professional standards requirements, including the Code of Professional Ethics of the Appraisal Institute and USPAP, require the retention of records for appraisal review assignments. The records, or *workfile*, must be retained for a minimum of five years, or two years after the final disposition of any judicial proceeding in which the reviewer gave testimony relating to the assignment, whichever is longer. The workfile must either be in the reviewer's possession, or the reviewer must have an agreement that addresses retention, access, and retrieval arrangements with the party in possession of the workfile.

When a written review report is provided to a client, the workfile for the assignment must include the following:

- A true copy of the reviewer's appraisal review report. This may be documented on any type of media–e.g., it can be an electronic copy–as long as it is an *exact copy* of what was given to the client.
- Any additional data, information, or documentation necessary to support the reviewer's findings or reference to the location of the documentation. A copy of the work under review is generally necessary to meet this requirement.

When an oral review report is provided to a client, the workfile for the assignment must include the following:

- The identity of the client and any other intended users.
- All information necessary to support the reviewer's opinions and conclusions–in essence, enough information to prepare a written review report.
- Any additional data, information, or documentation necessary to support the reviewer's findings or reference to the location of the documentation. A copy of the work under review is generally necessary to meet this requirement.
- The reviewer's signed and dated certification.
- A summary of the oral review presented by the reviewer. If the oral review was given as testimony or in a deposition, a transcript of the reviewer's testimony or deposition suffices.

In addition to the above minimum requirements, as a matter of good business practice the reviewer might want to retain other work notes, a copy of the engagement letter, and copies of other communications with the client and with the appraiser.

Common Issues Found in Appraisal Reviews

The challenges faced by reviewers are tied directly to the most common problems encountered by appraisers. Difficult appraisal assignments will often lead to difficult appraisal review assignments. Some reviewers use checklists to ensure that they perform the review function competently and completely. The checklist shown in Figure 32.1 lists the sort of problems reviewers commonly find in appraisal reports.[5]

Regardless of the scope of the review process and the tools applied, the reviewer's conclusions should be communicated professionally and without bias. The importance of appraisal review has increased in recent years with more oversight of government agencies, financial institutions, and other businesses. Ideally, the review process can raise the level of professionalism among appraisers and encourage them to produce high-quality appraisal reports. Reviewers are sometimes seen as gatekeepers of the appraisal profession, and they do hold practitioners responsible for their work product. Although this role is challenging,

5. An expanded version of this checklist and many other sample forms and checklists can be found in *Appraising the Appraisal: The Art of Appraisal Review*, 2d. ed. (Chicago: Appraisal Institute, 2010).

the review process can be an educational and rewarding exercise for the reviewer and appraiser and, if performed properly, will improve client satisfaction and confidence.

Figure 32.1 Reviewer's Checklist

- ❏ Accepting an assignment without the appropriate education, training, or experience to perform competently.
- ❏ Agreeing to deliver an appraisal assignment within a requested unrealistic time frame that may lead to rushed, inadequate results
- ❏ Failure to follow client appraisal requirements
- ❏ Use of flawed data as a basis for the analysis
- ❏ Apparent lack of compliance with FIRREA when compliance is required
- ❏ Apparent lack of compliance with USPAP
- ❏ Use of excessive limiting conditions
- ❏ Excessive use of meaningless statements and irrelevant material
- ❏ Use of outdated reference citations
- ❏ Failure to provide effective "when completed" or "at stabilization" dates for projects to be built
- ❏ Lack of meaningful analysis and failure to arrive at a conclusion in the highest and best use determination
- ❏ Hypothetical conditions that are implied or "buried" deep within the report
- ❏ Use of inadequate exhibits
- ❏ Use of material that has been improperly recycled from other appraisal reports
- ❏ Mathematical errors
- ❏ Missing pages
- ❏ Omission of market trend discussion
- ❏ Overuse of extracted textbook boilerplate material
- ❏ Repetition overload
- ❏ Typos, errors, and inconsistencies
- ❏ Omission of the appraiser's signature
- ❏ Lack of independent verification of comparable data based on presentation
- ❏ Use of non-market-oriented units of comparison

Successful Reviewers Are

- Professional in their demeanor and provide quality feedback to the appraiser
- Optimistic and begin each appraisal review expecting a quality work product
- Fair and give the appraiser the benefit of any doubt
- Tolerant and keep an open mind regarding original methods and techniques
- Good listeners
- Competent and avoid getting hung up on trivial things
- Positive and make each review a positive experience

Source: Richard C. Sorenson, *Appraising the Appraisal: The Art of Appraisal Review*, 2d. ed. (Chicago: Appraisal Institute, 2010), 8.

Consulting

Most work performed by professional appraisers involves developing some type of value opinion, i.e., an appraisal. However, because of their expertise, appraisers may be called upon to provide related services that do not involve appraisal. These services–loosely referred to as "consulting"–range from simply providing market data to providing advice or a recommendation such as whether to invest in a property or whether the contemplated design of a project conforms to market tastes.

Consulting is a generic term that encompasses a broad variety of services, and the term should be used with care. Any service provided by an appraiser–including valuation–could be classified as consulting according to common dictionary definitions. To avoid being misleading, *consulting* should be used only in conjunction with a modifier or description of the type of consulting being discussed. If the client expects the individual hired to have valuation expertise and to provide the service in an unbiased, objective manner, that individual is *acting as an appraiser* and professional standards apply regardless of whether the service includes a valuation. An appraiser must remain unbiased and objective even if the service does not involve valuation. An appraiser may be an advocate only for his or her professionally developed opinions and conclusions, whatever the client's objectives.

Many consulting services require specialized knowledge and skills, and additional study and experience in these areas may be required.

If the purpose of the assignment is to express an opinion about another appraiser's work, then the assignment is not consulting but rather appraisal review.

Appraisers must be particularly careful when providing consulting or advisory services to properly identify the client's problem to be solved and advice sought as well as to ascertain whether they have the required competence to solve that problem.

If the consulting service does not involve a valuation (i.e., an appraisal), there are no specific performance standards concerning the development or reporting of the service, but requirements relating to ethics and competency apply. For example, if the appraiser is subject to the Uniform Standards of Professional Appraisal Practice, then the Ethics and Competency Rules would apply, but Standards 1-10 would not.[1]

If the consulting service includes a valuation, the appraisal portion of the service is subject to professional appraisal standards. In other words, an appraisal assignment is "wrapped into" the consulting service. That appraisal may be prepared by the appraiser engaged in the consulting service, or it may be prepared by another appraiser. If the appraisal is prepared by another appraiser, the consulting appraiser may either: (1) review the appraisal and agree with it (or disagree and provide an alternative value conclusion) or (2) rely on the other appraiser's appraisal and premise the consulting conclusion on the extraordinary assumption that the appraisal it relies upon is credible. This latter approach may be appropriate when the consulting appraiser lacks the competency (particularly geographic or market area competency) to value the property, but does possess the competency to complete the rest of the consulting analysis. This latter approach may also be appropriate when the valuation portion of the consulting service is less critical to the final recommendation or conclusion of the consulting service.

Feasibility Studies

An example of a consulting service that encompasses a valuation is a feasibility study. The objective of a feasibility study is not to develop an opinion of value, but rather to draw a conclusion about feasibility, which is assessed by determining whether the financial benefit (i.e., the value) of an action or project is equal to or greater than the cost, or to analyze alternative actions or projects. In a feasibility study, the appraiser develops an opinion of value for a proposed land use and tests the feasibility of that use by comparing costs and benefits.

Cost-Benefit Studies

Appraisers conduct cost-benefit studies on either a macroeconomic or microeconomic basis. For example, a community might require a cost-benefit study to determine the economic benefits that would most likely result from a new public project such as an expressway or a sewage

1. Technically, the Preamble, Definitions, and Jurisdictional Exception Rule would also apply. The Record Keeping Rule and Scope of Work Rule would not apply.

treatment plant. The cost-benefit study would focus on the relationship between the benefits created and the costs associated with the project to determine whether the benefits warrant the costs.

Some public bodies hire an appraiser as a consultant to determine the preliminary effect of a project. This may entail the assessment of project risk as well as the cost of implementing various project scenarios. For example, a road-widening project that results in diminished access to a commercial site may significantly reduce the value of the business on the land taken, for which the business owner must be compensated. This will add to the cost of the public project, which must be considered in the decision-making process.

Developers also use cost-benefit studies, particularly when they are called upon to install major items that properly belong to the infrastructure. This work clearly goes beyond direct project requirements, so developers must look to the future to recapture the extra dollars invested. A cost-benefit study can establish the relative worth of the expenditures in relation to the benefits.

In some cases, a cost-benefit study may involve an appraisal. An appraiser must carefully consider what the service involves and the appropriate professional standards that may apply.

Pricing and Rent Projection Studies

Pricing and rent projection studies may be components of marketability studies or the subject of separate studies. These analyses are frequently conducted to establish sales and marketing strategies for real estate projects and to facilitate decisions involving property management and investment. In some cases, such a study entails an appraisal.

Property Tax Services

Property owners have the right to appeal the ad valorem assessments on their real property, and appraisers are often hired to provide a professional opinion of value in a dispute over the assessed value. Most property tax consulting work involves an appraisal, but on occasion the basis for the appeal is something other than value–for example, the assessor's records show an incorrect building or land area, or the records are otherwise incorrect regarding property characteristics.

Property owners seeking abatement will generally claim that their properties are overvalued, but appraisers must remain unbiased and report their conclusions of the defined value regardless of whether the value opinion is higher or lower than the assessed value. The appraiser cannot be an advocate for the property owner and cannot accept a fee contingent on the amount of tax savings achieved.

Specific challenges to proper appraisals for assessment purposes include

- potentially dramatic changes in property values from year to year

- income-producing properties that outperform the local competition
- special-use properties that are assessed at use value rather than market value
- identification of the relevant property interest to tax
- the increasing diversity and specialization of property types[2]

Appraisers working on property tax appeal assignments deal with these issues regularly. For example, in a market with volatile pricing and demand, the appraiser's research and collected evidence of the rapidly changing market conditions will be of critical importance to a successful application for tax abatement.

Two important areas of investigation in a property tax appeal assignment are the classification of the property and any tax exemptions that may apply. If a property is improperly classified in the jurisdiction's records, the assessed value is unlikely to be appropriate for the actual use of the property. Similarly, an appraiser's research into the economic characteristics of a property could reveal unclaimed tax exemptions that the property owner would benefit from knowing about.

Litigation

The disposition of real estate is often the subject of litigation. Appraisers are frequently called upon to testify in court regarding appraisal methodology, appraisal standards, or the value of property involved in a dispute. Principles and processes established by the US Supreme Court may create a need for the court to seek testimony to qualify (or disqualify) someone offered as an expert witness.[3] Methodology and standards testimony typically involves generally accepted valuation principles and methods and applicable appraisal standards.

Appearing as an expert witness is a common assignment that may involve appraisal, appraisal review, or consulting services. Behind the scenes, appraisers provide litigation support in other ways by investigating information about the subject property or comparable properties that may be useful to the case, helping organize the testimony of other expert witnesses, or suggesting other experts for the attorney's team. Attorneys and their clients may also ask appraisers to assist in the discovery process, to prepare questions for the examination or cross examination of witnesses, and to advise on the preparation of graphics to be presented in court.

Appraisers can often offer expert advice in cases involving the dissolution of a business partnership or a marriage. In addition to advising on the value of jointly held real estate assets, appraisers may counsel the parties as to the allocation of their holdings. For example, the appraiser may be able to help settle a dispute between one partner, who is willing to assume the risks and responsibility of owning a management-

2. Robert W. Owens, "Valuation and the Property Tax," *The Appraisal Journal* (July 2000): 342-346.
3. John D. Dorchester, Jr., "The Federal Rules of Evidence and 'Daubert': Evaluating Real Property Valuation Witnesses," *The Appraisal Journal* (July 2000): 290-306.

intensive asset, and another, who wants to retain only assets that provide cash flow with little risk.

Advocacy is an issue when an appraiser serves as an expert witness. While attorneys are acknowledged to be advocates for their clients, appraisers can only advocate for their own value opinions in order to comply with professional standards. An appraiser on the witness stand who is seen as an advocate for the attorney's client loses credibility as an independent and objective analyst. Professional standards usually distinguish between acting as an appraiser and performing a consulting service. Regardless of the role the appraiser assumes, he or she cannot misrepresent that role in the process of completing the assignment.

Other Consulting Services

Some other assignments that fall under the broader category of consulting services include

- land use studies
- market studies
- marketability studies
- due diligence for a client's acquisition or sale decision
- operations audits
- absorption analysis
- risk analysis
- portfolio analysis
- adaptive reuse analyses–i.e., analysis of an existing property's proposed change of use
- property inspections
- capital market analyses
- arbitration

Consulting services are often provided to assist clients in making decisions about the acquisition or disposition of real estate, the development or redevelopment potential of a property, and the financial management and planning of alternative real estate investments. The specific services performed for a client must be tailored to the individual circumstances.

Valuation for Financial Reporting

Most countries in the world, including the United States, have either adopted International Financial Reporting Standards (IFRS), are in the process of doing so, or are converging their national accounting and financial reporting systems (such as the generally accepted accounting principles in the United States, usually referred to by the acronym GAAP) to comply with IFRS. The US Financial Accounting Standards Board (FASB) has actively pursued a policy of convergence between US GAAP and IFRS since the Norwalk Agreement between FASB and the International Accounting Standards Board (IASB) in 2002, and the US Securities and Exchange Commission, at one point, issued a proposed timeline for complete acceptance of IFRS as soon as 2014.[1] Globally, the International Financial Reporting Standards (IFRS) affect how all assets and liabilities, including real property interests, are appraised for financial reporting, and the convergence of US GAAP with IFRS, although not a certainty, has already affected certain valuation activities in the United States. The SEC has reported that as of 2013, more

1. In 2002, the Norwalk Agreement between FASB and IASB called for convergence of US GAAP and International Financial Reporting Standards. Certain milestone projects (including convergence of fair value measurement and leases) were agreed to, and completion of these was confirmed by the respective boards in 2009. The original goal was to eliminate many, if not most, distinctions between the two systems by the end of 2011. However, work continues on these and other projects. In 2005, the SEC made its first public comments about the possibility of adopting IFRS. A "roadmap" was developed a few years later outlining the participation of the commission in international accounting standards development and the possible acceptance of IFRS by 2014. In 2012, however, the report of the SEC work group formed in 2010 did not include a recommendation of a date for the transition of the US financial reporting system to incorporate IFRS.

than 450 foreign private issuers in United States capital markets filed financial reports under IFRS without reconciliation with US GAAP.[2]

Early on in the development of generally accepted accounting principles, including those relating to the accumulation of accounting data for preparing earnings statements, balance sheets, and other statements for financial reporting, the US accounting profession elected to adopt what was considered a "conservative approach" when financial information was publicly disclosed or reported to third parties. The axiom of "cost or market, whichever is lower" was the vehicle for this approach. Under this system, original accounting entries commonly reflected the cost of assets such as real property rather than market value. Similar principles were applied to other tangible assets and, customarily, to liabilities. In this context, as real estate markets change, the market value of real property can rise while the books of account (and related financial reports) can still record the value of real property and many other assets at original cost less depreciation. Because the depreciation reported is customarily based on income tax or other formula-based approaches to depreciation, significant differences can develop between current market values and the figures shown on balance sheets.

Although in the United States steps have been taken on several occasions to move to a system that would reflect current market values in financial reporting, the concept had generally been resisted until the 1990s. And despite the recent moves toward convergence, the SEC has indicated that any move to adopt or require IFRS will come slowly, as preparers have cited "change fatigue" from recent Accounting Standards Codification changes from the Financial Accounting Standards Board as a reason against wholesale change.[3] In contrast, in the United Kingdom, most of Europe, Canada, Mexico, and many other countries, account-

What Is Financial Reporting?

According to Barron's *Dictionary of Accounting Terms*, 3rd ed., *financial reporting* refers to the "analysis and presentation of financial data of a company's position, operating performance, and flow of funds for an accounting period. Financial statements along with related information may be contained in various forms for use by external parties such as in an annual report, SEC Form 10-K, or prospectus."

The Financial Accounting Standards Board has discussed the objectives of financial reporting in Concepts Statement No. 1:

1. Financial reporting is not an end in itself but is intended to provide information in making business and economic decisions—for making reasoned choices among alternative uses of scarce resources in the conduct of business and economic activities (e.g., investment and credit decisions, assessing cash flow prospects, resource allocation, management performance).
2. The objectives of financial reporting are affected by the economic, legal, political, and social environment.

FASB also adds that "Financial reporting includes not only financial statements but also other means of communicating information that relates, directly or indirectly, to the information provided by the accounting system—that is, information about an enterprise's resources, obligations, earnings, etc."

2. See http://www.journalofaccountancy.com/News/20137908.htm/.
3. Ibid.

ing procedures encourage the use of independent valuation experts to support financial statements. For instance, *International Accounting Standard 40, Investment Property*, requires preparers to disclose the extent to which the fair value of investment property is based on a valuation by a qualified independent valuer and if one is not obtained.[4]

An acknowledged goal of the ongoing shift from historical cost accounting to fair value accounting is to increase the relevance of the information in financial reports, in particular by reflecting losses and gains more quickly. The materiality of information provided in financial statements and the cost of collecting and reporting that information serve as constraints on the benefits of including a particular type of information in a financial report. Currently, US GAAP requires a mixture of types of measurement, balancing the costs and benefits of historical cost accounting and fair value accounting. However, the convergence of GAAP with IFRS is anticipated to reduce the cost of capital, increase access to international capital markets, and reduce costs by eliminating the need for reconciliations.

Why Is Fair Value Important and What Is VFR?

Fair value accounting is also known as *mark-to-market accounting* because the assets and liabilities on a company's financial reports are set (or "marked") to reflect current market values rather than based on the original cost. In mark-to-market accounting, a value is assigned to assets based on current market prices for the same or similar assets. This value may contrast the amount that the assets are worth to the holder alone, i.e., a value in use.

FASB Accounting Standards Codification Topic 820: Fair Value Measurements and Disclosures defines

mark to market
The act of recording the value of an asset or liability to reflect its current fair value rather than its book value.

Acronyms Used in Valuation for Financial Reporting

AICPA	American Institute of Certified Public Accountants
ASC	Accounting Standards Codification
FASB	Financial Accounting Standards Board
GAAP	generally accepted accounting principles
GAAS	generally accepted auditing standards
IAS	International Accounting Standards
IASB	International Accounting Standards Board
IFRS	International Financial Reporting Standards
IVS	International Valuation Standards
IVSC	International Valuation Standards Council
SAS	Statement on Auditing Standards
SEC	Securities and Exchange Commission
SFAS	Statement of Financial Accounting Standards
VFR	Valuation for Financial Reporting

4. See http://www.iasplus.com/en/standards/ias40/.

fair value as "the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date." As discussed in Chapter 6, this accounting definition is close to the commonly cited definitions of *market value* used by valuers[5] of real property, as can be seen in Figure 34.1. The similarity in the concepts helps accountants use the market value opinions of valuers as evidence of fair value in their financial reports.

Fair value is the standard of value expressed in financial accounting standards that provides information to investors about the price an asset could be sold for at the measurement date. The fair value standard does not provide information on anticipated internal rate of return or future results that the current investors are expecting. The reporting of an appraisal prepared for financial reporting purposes might be different from the reporting of an appraisal prepared for, say, a bank. For example, the appraisal of an office building owned by a real estate investment trust for five years would not likely require an in-depth description of the property in the report to the REIT if the appraisal were for financial reporting purposes because the management of the REIT is already familiar with the property. A bank, on the other hand, would need more information about the property to be able to assess

Figure 34.1 Comparison of Definitions of Value

fair value	market value
The price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.	The most probable price that a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby: · Buyer and seller are typically motivated; · Both parties are well informed or well advised, and acting in what they consider their best interests; · A reasonable time is allowed for exposure in the open market; · Payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and · The price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.
FASB Accounting Standards Codification Topic 820: Fair Value Measurements and Disclosures, formerly Statement of Financial Accounting Standard 157	12 C.F.R. Part 34.42(g); 55 *Federal Register* 34696, August 24, 1990, as amended at 57 *Federal Register* 12202, April 9, 1992; 59 *Federal Register* 29499, June 7, 1994

5. In many parts of the world, the term *valuer* is more commonly used than *appraiser* to describe a person who performs a valuation, and who is often licensed to do so.

the risk involved in providing a loan for construction or purchase of that sort of property.

> "Fair value measurement provides critical information on the value of financial instruments to investors, supervisors, and other users of financial statements. For many types of financial instruments, especially trading assets, fair value represents the best estimate of value as of the measurement date."
>
> — Statement of Kevin J. Bailey, deputy comptroller, Office of the Comptroller of the Currency, to the Committee on House Financial Services Subcommittee on Capital Markets, Insurance, and Government-Sponsored Enterprises (March 12, 2009)

The emergence of one consistently used definition of *fair value* in financial accounting standards effective in 2008 has helped provide authoritative guidance to valuation specialists. Valuation for financial reporting (commonly known by the acronym VFR) is the growing area of appraisal work for corporate accounting and auditing purposes, often involving the development of an opinion of the fair value of real property subject to accounting standards as well as, or instead of, valuation standards. Fair value measurements may not be relevant for real property valuations prepared for intended uses other than financial reporting, such as property taxation, federal gift and estate taxation, collateral valuations, divorce, or bankruptcy. Fair value accounting is of particular importance to publicly traded entities or public entities with a strong responsibility to third parties.

Fair value accounting involves valuing an asset at its highest and best use in the marketplace, i.e., based on its use by market participants, not by the reporting entity. If the current use of an asset would provide market participants with the maximum value through the use of the asset as part of a group, then the asset is valued "in use." In contrast, if the asset would provide maximum value to market participants on a stand-alone basis, rather than as part of a group, then the asset is valued "in exchange."

Figure 34.2 illustrates a framework for dealing with fair value assignments. The language of fair value accounting has parallels to the lexicon of real property appraisal as well as some important conceptual differences that should be noted.

The concepts of an *entry price* and an *exit price* implicit in the reference to an *exit market* in the first step of the process do not have obvious synonyms in the language of real property valuation. However, an entry price could be considered analogous to the replacement cost of an improved property before accounting for entrepreneurial incentive and obsolescence or to the sale price of a comparable property before

Figure 34.2 Fair Value Framework

Step	Action
1	Identify the exit market—i.e., the principal or most advantageous market.
2	Identify the valuation premise (highest and best use)—either value in use or value in exchange.
3	Determine the assumptions used by market participants.
4	Apply inputs into the valuation techniques—cost approach, market approach, and income approach.
5	Reconcile fair value.

Source: *Introduction to Valuation for Financial Reporting* seminar (2009) adjusting for conditions of sale and other elements of comparison. By extension, an exit price, which is the basis of fair value, would be analogous to the indication of market value. In short, the transaction price paid to acquire an asset is an entry price whereas the price received in the sale of an asset is an exit price and the fair value of the asset.

The similarity of the concept of an exit price with the structure of commonly cited definitions of *market value* can cause confusion in fair value assignments. For financial reporting purposes, real property is often accounted for in the context of the business that it serves rather than as a separate asset, so market comparisons may have to be made of sales of a group of assets rather than real property on its own, depending on the valuation premise identified in Step 2 of the process shown in Figure 34.2. For example, if a manufacturing company owns real property that in some way uniquely serves its manufacturing process but would not have much value to general industrial users, the superadequacy of the design of the real estate may not have value if viewed on a stand-alone basis but would have value when viewed as part of the value of the business enterprise.

Multiple valuation techniques may be appropriate for measuring fair value (Step 4 of Figure 34.2), just as multiple approaches to value can be applied in other market value appraisals of real property as shown in earlier chapters of this textbook. Likewise, the reconciliation (Step 5) of the value indications of whichever approaches are applied is an essential step in the both fair value accounting and the familiar valuation process for appraising the market value of real property.

Hierarchy of Inputs

Financial reports contain the assumptions that market participants would use to price an asset such as the risk involved in acquiring and holding the asset. In financial accounting standards, those assumptions are known as *inputs*. The hierarchy of inputs is a system of characterizing the relative reliability of the assumptions that are included in a financial statement. For example, observable inputs like prices of publicly traded stock are more reliable than unobservable inputs like a company's estimate of the value of an intangible asset like a patent. Table 34.1 illustrates the hierarchy of inputs.

Real estate valuers regularly collect information on real property and real estate markets that qualifies as Level 2 input. Valuers are rarely able to incorporate Level 1 inputs in a valuation of real property because every parcel is unique. (Even though professional valuation standards typically require analysis of the sales history of the subject property, the quoted prices of previous sales of the subject property are not current and thus would be classified as a Level 2 input rather than Level 1.) In fair value accounting, Level 3 inputs are used when there is little market activity for the asset being valued. The reasonableness of information about the property becomes an issue for unobservable Level 3 inputs. That is, the observations of an independent observer such

Table 34.1 The Hierarchy of Inputs

Level of Input	Description	Examples
Level 1	Quoted prices (unadjusted) in active markets for identical assets	· Prices of stock in blue chip companies (e.g., a publicly traded REIT)
Level 2	Inputs other than quoted prices included within Level 1 that are observable for the asset, either directly or indirectly	· Quoted prices for *similar* assets in active markets · Quoted prices for identical or similar assets in markets that are *not* active (e.g., few transactions for the asset, prices are not current, price quotations vary substantially over time or among market makers, or little information is released publicly) · Inputs other than quoted prices that are observable for the asset · Valuation inputs derived principally from, or corroborated by, observable market data by correlation or other means
Level 3	Inputs that are unobservable for the asset, i.e., the reporting entity's own assumptions about the inputs that market participants would use to price the asset, including risk	· Some forms of intangibles such as patents, trademarks, trade names, warranties, some commercial real estate in thinly traded markets, and minority interests

Source: FASB Accounting Standards Codification 820 (2010) and *Introduction to Valuation for Financial Reporting* seminar (Chicago: Appraisal Institute, 2009)

as a valuer that would be characterized as Level 2 inputs would generally be considered more reliable (and less subjective) than an entity's self-reported observations, which would most likely be characterized as Level 3 inputs. In the valuation of income-producing property using the income capitalization approach, almost all the inputs used in that approach are Level 3 inputs, which is not an issue. However, Level 3 inputs used in the application of the sales comparison approach can be problematic.

The valuation approaches used in a fair value measurement are expected to maximize the use of observable inputs and minimize the use of unobservable inputs. The availability and reliability of the inputs might affect the relevance and selection of valuation techniques, but the hierarchy of inputs affects the priority of the inputs, not the valuation techniques.

What Services Can Appraisers Provide?

The market for valuation-related services in financial reporting is seen as a potential growth area for real estate valuers, working with (or for) accountants, business valuers, and personal property appraisers. As a significant example, corporate assets often must be valued for inclusion on corporate financial statements. A corporate merger or acquisition also triggers a valuation of the entire business, requiring that allocations be made for tangible and intangible assets in addition to determining if there is any residual goodwill in the business value. Accountants often need information on the value and depreciation of building components, both long- and short-lived items. Debt valuation is also a growing area within valuation for financial reporting. Other valuation services that are often categorized as valuation for financial reporting include

- portfolio review and valuation
- review of internally generated values and information
- audit assistance
- purchase price accounting
- “fresh start” accounting (i.e., after declaring corporate bankruptcy)
- property tax analysis or assistance
- capitalization rate and discount rate analysis
- valuation model building
- assistance in defining valuation procedures
- valuation management

Valuation for financial reporting has long been a staple for valuers internationally, and this work is increasingly available for valuers in the United States who have the appropriate training and competency.

In valuation for financial reporting assignments, a valuer may be recognized as what auditing standards consider a specialist. The American Institute of Certified Public Accountants defines a *specialist* as “a person (or firm) possessing special skill or knowledge in a particular field other than accounting of auditing,” according to AICPA Statement on Auditing Standards No. 73: Using the Work of a Specialist. In this context, an appraiser has the valuation knowledge and expertise that auditors are neither required nor expected to have, such as specialized knowledge of professional valuation standards, relevant state laws and regulations, property characteristics and utility, trends in market conditions, and analysis of the highest and best use of real property. However, auditors generally are expected to be able to use the audit evidence provided by a valuation specialist.

The appendix to Auditing Standard No. 3: Auditing Documentation (published by the Public Company Accounting Oversight Board, which was created by the Sarbanes-Oxley Act of 2002) also identifies appraisers as *specialists* who “play a vital role in audit engagements.” The standard deals with auditing engagements such as an audit of financial statements, an audit of internal control over financial reporting, or a review of interim financial information. According to the standard, auditors who rely on the work of specialists such as appraisers, actuaries, and environmental consultants must ensure that the audit evidence–in the case of an appraiser, the appraisal report–is adequately documented.

When acting as a specialist in an auditing assignment, a valuer must pay particular attention to the assignment’s intended use and disclose the assignment’s purpose in sufficient detail for the client to understand and use the valuation report as audit evidence in internal and external audits for financial reporting purposes, which from a valuer’s perspective is no different from an appraisal assignment for other purposes. The opinion of value provided by a valuation specialist has value to

Information Commonly Needed in Financial Reports Provided by Real Property Valuation Specialists

- Listing and sale price information on comparable properties
- Capitalization rates or discount rates to use with cash flows
- Costs from a known cost service manual
- Depreciation rates for physical wear and tear
- Land sale prices
- Trend studies on market conditions for competitive real estate
- Demographic data demonstrating socioeconomic change patterns
- Assessment records (e.g., percentage change reports)
- Industry trends pertaining to business openings and closings

auditors and their clients because the valuation specialist is independent and unbiased. In fact, in certain situations the clients of auditors need to hire valuation specialists because independence issues prohibit the auditors themselves from estimating the value of assets that may affect their financial statements.

Under auditing standards, the qualifications of a specialist are similar to the requirements of practitioners in many professional fields:

- professional certification, licensing, or other recognition of competence in the field
- reputation and standing within the community of professional peers
- experience in the type of work under consideration

As the valuation questions that arise in the preparation of a financial report become more complicated, the need for specialized expertise increases. As a result, valuers with demonstrated expertise with IFRS and GAAP are well-positioned to forge ongoing working relationships with the auditors, accountants, and corporations who need valuation-related services.

Impairment of Fixed Assets

A common appraisal problem in valuation for financial reporting assignments is the revaluation of fixed assets triggered by what is known as the impairment test. According to IAS 36: Impairment of Assets, an asset is considered "impaired" if its carrying amount exceeds the amount that could be recovered through use or sale of the asset. The carrying amount is the value amount recorded in a company's financial statement for each asset within an asset group (such as buildings and infrastructure). That value includes deductions for depreciation and impairment losses, although *depreciation* in this context is accounting depreciation rather than the accumulation of physical deterioration and functional and external obsolescence that is estimated in the traditional valuation process for real property. The recoverable amount that is compared to the carrying amount is either (1) fair value less selling costs, i.e., the net selling price, or (2) value in use, whichever is higher. Again, in this context, *value in use* refers to the present value of future cash flows expected to be derived from an asset or asset complex, rather than serving as a synonym of the term *use value* as used in real estate valuation.

For the purposes of financial reporting, assets that are deemed impaired would require a new fair value measurement and an estimate of remaining useful life. A revaluation of those indicators can affect the net income reported in financial statements. Companies are not required to have their assets revalued at the end of each financial reporting period, but they are required to look for indications that an impairment loss is likely.

An impairment test involves a discounted cash flow analysis using a forecast income statement based on the use of the existing fixed assets as of the date of appraisal excluding consideration of the future growth or replacement of the assets. In an impairment test, the DCF analysis of net operating income differs from the analysis of profit and loss (and from the application of the income capitalization approach in a market value appraisal) in that certain expenses are excluded from the calculations:

- interest expense and interest income
- other income and related expenses not derived from the use of the fixed asset complex
- extraordinary gains or losses
- depreciation expenses
- income taxes

In other words, earnings before interest, income tax, and depreciation would be equal to net operating income, and cash flow from operations would be equal to net income because depreciation is excluded. Note that estimating value in use for an impairment test is not a business valuation, nor is it a technique for the direct valuation of assets.

Professional Auditing, Accounting, and Valuation Standards

The relevant set of professional appraisal standards that apply in a particular assignment for financial reporting depends on whether law, regulation, or agreement with the client requires compliance with the Uniform Standards of Professional Appraisal Practice (USPAP), the International Valuation Standards (IVS), or some other set of professional standards. Valuers in the United States who are licensed or certified by their state often must comply with USPAP because their state board requires compliance with USPAP (i.e., through law). However, a valuer may be in compliance with USPAP and IVS simultaneously.[6]

Recent editions of professional valuation standards have addressed valuation for financial reporting more directly than they have in the past.

6. More discussion of International Valuation Standards and professional practice and law can be found in Appendix A.

For example, the 2011 edition of the International Valuation Standards—a major revision of the focus of that set of standards—introduced a valuation application section directly addressing appropriate valuation standards for assignments that will be used for financial reporting purposes, IVS 300. USPAP first addressed the applicability of those valuation standards in VFR assignments in the frequently asked questions section of the 2010-2011 edition that are printed with that document. In the future, global pressures will likely lead to more discussion of the potential for convergence between USPAP, IVS, and other relevant professional valuation standards along with new discussion of valuation for financial reporting by valuation standards-setting bodies.

The International Accounting Standards Board (IASB) is responsible for developing and maintaining the International Financial Reporting Standards, including the fair value accounting standards that valuation specialists must understand to be able to perform VFR assignments effectively. FASB and IASB have mutually agreed to work toward standards that

- are principles-based (rather than rules-based)
- are internally consistent
- are internationally converged
- lead to financial reporting that provides information needed for investment, credit, and similar decision making

A principles-based set of standards is commonly believed to require more interpretation by the user of the standards than a rules-based system. Proponents of principles-based standards point out that a system based on a set of consistent and coherent concepts is robust and not likely to become mired in discussion of exceptions to specific rules, whereas critics point out the significant potential for disputes (and litigation) when rules are not presented explicitly.

Since the Norwalk Agreement, FASB has written and updated a number of Accounting Standards Codification (ASC) statements recognizing the importance of market inputs when valuing tangible and intangible corporate assets (such as real property interests) for financial reporting:

- ASC 350: Goodwill and Other Intangible Assets (Goodwill Impairment Testing)

IVS 300 Valuation for Financial Reporting

Introduction
Definitions
Standard
Scope of Work
Implementation
Reporting
Effective Date
Application Guidance
Fair Value
Aggregation
Valuation Inputs and Fair Value Hierarchy
Liabilities
Depreciation
Depreciation: Land and Buildings
Depreciation: Plant and Equipment
Depreciation: Componentisation
Leases
Lease Classification
Classification of Property Leases
Leased Investment Property
Valuing Lease Asset or Liability
Purchase Price Allocation
Impairment Testing
Impairment Testing—Recoverable Amount
Impairment Testing—Value in Use
Impairment Testing—Fair Value less Costs to Sell
Annexe
Property, Plant and Equipment in the Public Sector

Source: *International Valuation Standards 2011*

- ASC 360: Accounting for the Impairment or Disposal of Long-Lived Assets
- ASC 805: Business Combinations (Purchase Price Allocations)
- ASC 820: Fair Value Measurements (formerly *Statement on Financial Accounting Standards 157*)
- ASC 840: Accounting for Leases (Leasehold Valuations)

Current FASB proposals to update accounting standards that have the potential to create opportunities for commercial real estate valuers include

- ASC Topic 973: Real Estate–Investment Property Entities
- ASC Topic 946: Financial Services–Investment Companies (Amendments to the Scope, Measurement, and Disclosure Requirements), which would eliminate the current exemption from fair value accounting requirements for real estate investment trusts

Appraisers engaged in valuation for financial reporting activities should keep abreast of the ongoing evolution of financial accounting standards. The organizations listed in Table 34.2 publish information on new standards and, along with professional journals covering accounting issues, are the best sources of information about the convergence of standards internationally.

In the same manner that US and global valuation and accounting standards are converging, US generally accepted auditing standards (GAAS) are converging with their international counterpart. The American Institute of Certified Public Accountants recently completed its Clarity Project in which US generally accepted auditing standards were redrafted and recodified. AICPA's new statements on auditing standards are principles-based, mirroring the trend in the convergence of professional accounting and valuation standards.

Table 34.2 Organizations Involved in Accounting, Auditing, and Valuation Standards

Entity	Description	Relevant Rules	Website
American Institute of Certified Public Accountants (AICPA)	The largest US national professional association for CPAs	· SAS 73: Using the Work of a Specialist · SAS 101: Auditing Fair Value Measurements and Disclosures	www.aicpa.org
The Appraisal Foundation	A US nonprofit educational organization dedicated to the advancement of professional valuation	· Uniform Standards of Professional Appraisal Practice (USPAP)	www.appraisalfoundation.org
Financial Accounting Standards Board (FASB)	A private nonprofit organization, not a government agency; the primary US standards-setting organization for developing generally accepted accounting principles; subject to oversight by the Financial Accounting Foundation (FAF)	· ASC 840: Accounting for Leases (SFAS 98) · ASC 805: Business Combinations (SFAS 141(R)) · ASC 350: Goodwill and Other Intangible Assets (SFAS 142) · ASC 360: Accounting for Impairment or Disposal of Long-Lived Assets (SFAS 144) · ASC 820: Fair Value Measurements (SFAS 157)	www.fasb.org
International Accounting Standards Board (IASB)	A private nonprofit standards-setting board responsible for developing and amending international standards for financial reporting	· International Financial Reporting Standards (IFRS)	www.iasb.org
International Valuation Standards Council (IVSC)	A private nonprofit organization established as an international valuation standards-setting body	· International Valuation Standards (IVS)	www.ivsc.org
Public Company Accounting Oversight Board (PCAOB)	A nonprofit corporation established by Congress to oversee the audits of public companies in order to protect the interests of investors and further the public interest in the preparation of informative, accurate, and independent audit reports	· Sarbanes-Oxley Act of 2002	www.pcaob.org
Securities and Exchange Commission (SEC)	An independent US regulatory agency with the statutory authority to establish financial accounting and reporting standards for publicly held companies	· Securities Act of 1933 · Securities Exchange Act of 1934 · Trust Indenture Act of 1939 · Investment Company Act of 1940 · Investment Advisors Act of 1940 · Sarbanes-Oxley Act of 2002 · Credit Rating Agency Reform Act of 2006	www.sec.gov

Note that the *Standards of Professional Appraisal Practice of the Appraisal Institute* are composed of the Certification Standard of the Appraisal Institute and (a) the Uniform Standards of Professional Appraisal Practice *or* (b) the International Valuation Standards and applicable national standards.

Valuation of Real Property with Related Personal Property or Intangible Property

The primary benefit of private real estate ownership is its ability to house human activities. For example, unimproved land is used for raw materials, agriculture, recreation, and open space. Improved properties provide shelter for households or businesses. Income to real property is generally in the form of rent or royalties. Whenever the income to a property includes payments for goods or services other than real property rents, the property potentially includes non-real property assets that needed to be addressed appropriately. The presence of services that generate income over and above rent on the real property may create intangible property value. Often, however, the net income attributable to those services is viewed as being only incidental, and any incremental value created is considered to be inconsequential. As the proportion of income attributable to non-real estate sources increases, the potential for the property to include intangible assets also rises.

Standards Rule 1-4(g) of the Uniform Standards of Professional Appraisal Practice states, "When personal property, trade fixtures, or intangible items are included in the appraisal, the appraiser must analyze the effect on value of such non-real property items." Those standards do not require a specific allocation of the value opinion between realty and non-realty components or a separate valuation of those components. However, the scope of work for appraisals prepared for ad valorem taxation, eminent domain, financial reporting, mortgage lending, and other purposes may encompass an allocation or a separate valuation of the real property component. For some property types like hotels, car washes, and assisted-living facilities, the real property rarely sells independently of personal property and intangible property. In those cases, establishing a reasonable allocation of the value opinion among the realty and non-realty components can be challenging.

If a separate value in exchange opinion is provided for a non-realty component, the appraiser needs to consider the conditions of the value definition being used. For example, *market value* presumes a hypothetical sale of the asset being valued under certain stated conditions. The analyses and conclusion of value for the component must be consistent with the value definition. On the other hand, allocation is usually a matter of considering how much the component contributes to the larger asset–for example, how much it contributes to the going concern. The allocated amount does not necessarily represent a value in exchange. More likely, it represents a value in use. Furthermore, when a separate value in exchange opinion is developed for each component, the sum of those values may be more (or less) than the value of the whole as if sold together. However, in the case of allocation, the sum of the amounts allocated to each component will equal the value of the whole.

Asset Classes and Transaction Types

Appraisal practice identifies three general classes of property:

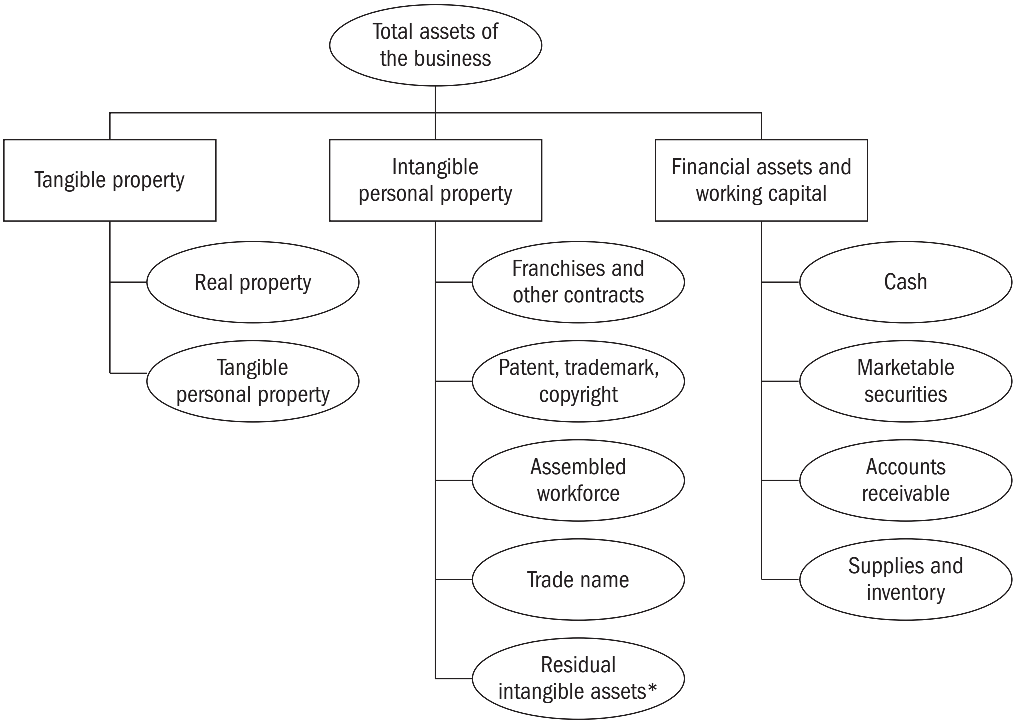
1. Real property
2. Personal property
3. Intangible property (intangible assets)

Real property and personal property make up the tangible asset class. Personal property includes all tangible property not classified as real property. Intangible property is defined as nonphysical assets, including, but not limited to, contracts, franchises, trademarks, copyrights, and goodwill items such as a valuable trade name and a trained workforce. Businesses also generally require working capital and other financial assets, which are best placed in a separate category called *financial assets*. Financial assets include cash and other assets the business intends to eventually convert to cash.

Sales of businesses can be classified in two general transaction types: (1) entity-based transactions and (2) asset-based transactions. In an entity-based transaction, the buyer acquires the actual business entity of the seller through a purchase of the stock, partnership interests, membership interests, or other specified interests, depending on the form of the business. In an asset-based transaction, the buyer acquires only the assets of the business but does not acquire the business entity itself. Say, for ex-

> The appraiser must make clear to the reader of the report what assets are included in the value opinion.

Figure 35.1 Components of the Total Assets of a Business in an Asset-Based Transaction



Note. Some appraisers consider supplies and inventory to be a subset of tangible personal property rather than a financial asset, which is also acceptable. In any case, the appraisal report must make it clear to the reader what assets are included in the valuation and how they are allocated.

* The earnings that an entrepreneur receives after all other agents of production have been paid (agents being capital, land, and labor, including management)

ample, a hotel is owned by Jones Hotel Inc. and is the primary asset of that business. In an entity-based transaction, the buyer would acquire the ownership interests through stock certificates in Jones Hotel Inc. and would assume control of that company. The buyer would not only acquire the hotel and any other assets of Jones Hotel Inc. but also any liabilities of the company. In an asset-based transaction, the buyer would acquire only assets of Jones Hotel Inc., such as the real property, the personal property, certain financial assets (when appropriate), and perhaps certain intangible assets. The business entity, Jones Hotel Inc., would remain in the hands of the seller. For small businesses, asset-based transactions are often preferred because of simplicity, reduced legal exposure, and potential tax advantages.

Regardless of the form of a sale, an appraiser must take care to identify which assets were included in the transaction. For some property types, it is common for an asset-based transaction to include real property, related personal property (such as furniture, fixtures, and equipment, commonly referred to by the acronym FF&E), and certain intangible assets, but to exclude the financial assets. However, that is not always the case. In some asset-based sales contracts, a mechanism is set up for the transfer of certain financial assets like accounts receivable or inventory, but the price of those items may or may not be included in the stated purchase price. When this is the case, it poses an additional requirement for the appraiser analyzing comparable sales to determine which assets where included in the transfer. The verification process of comparable sales should also focus on the presence of any financial assets that were included. This is critical to ensure that proper rates and ratios are developed.

The Going-Concern Premise

Business appraisers generally consider the value of a business under both a going-concern premise and a liquidation premise. Under the going-concern premise, the business is assumed to continue operating indefinitely. Under the liquidation premise, it is assumed that the business operation is closed and the assets are sold off. The premise that results in the highest value indication is used for the development of the final value opinion. The appraiser's determination of the appropriate premise is critical in determining the proper appraisal techniques, in selecting comparables, and in making an appropriate allocation of value to the various asset classes.

If the income generated by the business is less than the amount required to support the value of the assets, liquidation (closing the business and selling the assets) is the best course of action because it results in the highest value. Unless a forced liquidation is specifically assumed, the liquidation premise assumes an orderly disposition without atypical seller motivation or a limited marketing period.[1]

Suppose, for example, that an appraiser is asked to value a car wash operating under a franchise agreement with a large national chain. The building has a distinctive design and an upgraded facade required by the franchisor, and the equipment includes some specialized detailing equipment to provide services that are required by the franchise agreement. If the operation is highly profitable, the appraiser may conclude that continued operation of the business will produce the highest value. In that case, the proper allocation of value to the real property and personal property could be as high as the physically depreciated replacement cost (because the facade upgrades and specialized equipment contribute to the value of the tangible assets as a part of the going concern), and the franchise contract could be viewed as a valuable intangible asset. Alternatively, the appraiser may conclude that a higher value may be realized by closing the franchised business operation and reduce costs by eliminating franchise fees and cutting staff and other expenses related to the special services. In that case, the proper allocation to real property may be lower because the spe-

1. A value indication under the liquidation premise is not commensurate with *liquidation value* as that term is used in real estate appraisal.

cial facade required by the franchise may not contribute to value as an overimprovement to the real estate, and the proper allocation of value to the franchise contract may be zero. A third alternative is that the appraiser may conclude that demolition or conversion to a different use altogether is the highest and best use, in which case the allocation to tangible personal property may be limited to salvage value, and there may be no allocation to intangible assets.

Another important concept under the going-concern premise is that the sum of the values in exchange of the parts may not be equal to the value of the whole. It is generally improper to value the real property, personal property, and intangible property separately from the going concern and simply sum up those individual values to arrive at the value of the whole property under the going-concern premise. When a team of appraisers (e.g., a real estate appraiser, a personal property appraiser, and a business appraiser) work together on an assignment, the appraisers must ensure that the valuation premises and income and expense projections are accounted for consistently in their work to avoid double-counting income or expense items.

Application of the Approaches to Value

For real estate–intensive business properties, all three valuation approaches may be applicable. However, depending on the assignment, certain approaches could be less applicable to some of the asset classes, and certain approaches may be less helpful in determining an appropriate allocation of the final value opinion. These scope of work decisions are made by the appraiser in determining a solution to the client's problem.

Appraiser Competence

Before accepting an appraisal or appraisal review assignment, an appraiser must decide that he or she has or can acquire the expertise to complete the assignment competently, and the appraiser must notify the client of any actions taken to acquire competency. For certain assignments, it may be necessary for a real estate appraiser to collaborate with a personal property appraiser, a business appraiser, or both. With adequate training and experience, a real estate appraiser may become competent in valuing business properties that are primarily real property and also include tangible personal property and intangible property. However, in valuing such a property, a real estate appraiser is generally only valuing the asset-based entity that could be bought and sold by businesses. Without additional specialized education, real estate appraisers are not generally competent to provide an opinion of the value of a business itself. Valuation of a business entity requires an analysis of liabilities as well as assets, and must consider the organizational structure, capital structure, control, basis and income taxes, and other issues. Business valuation and personal property valuation are distinct segments of the valuation profession, and those disciplines require substantial specialized education and experience that most real estate appraisers do not have. Even when an appraisal assignment involves valuing only real property, any allocation is an appraisal according to professional standards. In making an allocation, an appraiser must adhere to applicable professional standards (e.g., Standard 1 of USPAP for real property, Standard 7 for personal property, and Standard 9 for intangible assets or the various asset standards in the International Valuation Standards) and must comply with any standards rules related to competency (e.g., the Competency Rule in USPAP and E.R. 1-3 in the Code of Professional Ethics of the Appraisal Institute).

The Cost Approach

In situations where the cost approach can be developed reliably, it can be useful in determining the appropriate allocation of value to the different asset classes. A common strategy is to use the cost approach to value only the tangible asset classes. The value indication of the cost approach can then be compared to the value indications of the sales comparison and income capitalization approaches. If those approaches indicate a higher value than the cost approach, the difference may be an indication of the value of intangible assets.

In some circumstances, it may also be appropriate to allocate value to certain intangible assets based on replacement cost. For example, the appropriate value allocation to an assembled workforce in a particular case may be the cost of replacing the workforce, including employment agency fees, advertising costs, interview expenses, and payroll expenses during any unproductive training period. It is important to keep in mind that, as with real property, the cost of an intangible asset does not necessarily equal value. However, cost may be an appropriate basis for an allocation.

Table 35.1 illustrates the application of the cost approach to value tangible assets alone. In cases where intangible assets can be reasonably valued based on replacement cost, it may be possible to include a column for intangible assets and develop a value indication for the total property by the cost approach.

An important consideration for the cost approach is that allocating all the entrepreneurial incentive attributable to the property to only the real property may not be appropriate. The portion of entrepreneurial incentive relating to the development of the real property should be allocated to that asset class, but the portion of entrepreneurial incentive relating to the personal property and to establishing the business (e.g., legal, marketing, and staffing expenses) may be more appropriately allocated to those assets.

Supportable estimates for all forms of depreciation are critical to the development of a reliable cost approach. Properties that are tied to business operations tend to be specialized constructions and can be more

Table 35.1 Application of the Cost Approach Addressing Tangible Assets Only

	Real Property	Personal Property	Total Tangible Assets
Direct and indirect costs	$2,500,000	$210,000	$2,710,000
Entrepreneurial incentive	$250,000	–	$250,000
Total replacement cost	$2,750,000	$210,000	$2,960,000
Depreciation			
Physical deterioration	– $600,000	– $42,000	– $642,000
Functional obsolescence	– $200,000	$0	– $200,000
External obsolescence	$0	$0	$0
Total depreciation	– $800,000	– $42,000	– $842,000
Depreciated value of improvements	$1,950,000	$168,000	$2,118,000
Land value	$600,000	–	$600,000
Value indication by the cost approach	$2,550,000	$168,000	$2,718,000

susceptible to functional obsolescence than a simple office, warehouse, or retail building. If there is any oversupply of a particular property type in a given market, it is likely that existing properties of that type exhibit external obsolescence due to market conditions.

The Sales Comparison Approach

For certain property types, real property rarely sells independently from personal property and intangible property. However, in some cases, it may be possible to allocate the prices of comparable sales between real property, personal property, and intangible property. Also, it could be reasonable to address each asset class separately in the sales comparison approach or to address real property on its own. One consideration could be the allocation agreed to by the buyer and seller in a transaction. However, caution is necessary because those allocations may be based on income tax issues or other considerations and may not reasonably reflect the actual value contribution of the various assets. Other sources of allocation information could be industry standards, interviews with market participants, or comparisons with paired sales if available.

For property types where real property rarely sells independently from the personal property and intangible property, comparable sale prices often cannot be reliably allocated to the various asset classes. In those cases, the sales comparison approach may only provide a value indication for the total property without allocation. In a sales comparison analysis without allocation, the total price of the comparable sales can be analyzed to provide a value indication for the subject property in total, including all the asset types. Whether quantitative adjustments or qualitative analyses are used, the analyses must consider differences in personal property and intangible property as well as differences in real estate characteristics. It is critical that the appraiser identify what assets were included in each comparable sale.

The Income Capitalization Approach

Income capitalization methods used by appraisers to value properties with personal property and intangible property components vary widely. Some methods address only the total value of the property without allocation to the asset classes. Others are more detailed and break down income between the various assets or asset classes.

As with all income property valuation, the selection of the appropriate method or methods is based on three considerations:

1. The capitalization method (or methods) used by market participants. If the goal of the valuation is to predict what would have been paid for the property if it had been exposed on the open market, it is preferable to perform calculations in the way typical buyers and sellers do.
2. What market data is available. Appraisers should avoid applying techniques for which the income and expense projections or capitalization rates cannot be supported with market evidence. Depending on the scope of work, a less detailed method may be preferable to a more detailed method if it can be better supported by market data.

3. The method selected must be adequately detailed to solve the problem. For example, if the pattern of income projected for a particular property is highly irregular, an appraiser may decide that discounted cash flow analysis is necessary even though direct capitalization is more commonly used by market participants and direct capitalization rate data is more readily available.

Selecting the appropriate capitalization method for a property with personal property and intangible property components requires judgment. For some property types, data is more plentiful for overall capitalization methods. However, if the scope of work includes an allocation of the value opinion between the asset classes, or the value of real property only, judgments on a breakdown of income between asset classes may be necessary to apply the appropriate rates to the components.

The Ongoing Debate Over Valuation Techniques

Intangible assets are inherent in the operation of some property types. In those cases, appraisers do not ask whether intangibles exist, but rather how the intangibles should be measured. The same is true of personal property. The challenge of accounting for the value of non-realty assets is complicated by the variety of property types and markets in which they are traded. For example, intangible assets inherent in the operation of sports stadiums may be treated differently by market participants than the manner in which market participants treat intangible assets inherent in convenience stores. Intangible assets inherent in health care properties may be treated differently by buyers and sellers in that market than by buyers and sellers of regional malls. How market participants treat these assets is one of the unresolved issues, and various methods have been developed for appraisers to consider. Because all of the methods are subject to criticism, the professional appraiser should exercise judgment as to which method, or combination of reconciled methods, provides a credible conclusion.

The appropriate method of valuing or allocating intangible assets has been highly controversial among real property appraisers, particularly over the past 30 years. It is important for all involved in this form of valuation work to understand the history and intensity of the debate and to understand the various alternative methodologies advocated

Resources for Further Research on the Debate

Numerous court decisions have been made in property tax cases in various states, and research may be performed on those cases and on the ongoing debate about allocation of assets using a variety of recommended resources:

- the Y. T. and Louise Lee Lum Library of the Appraisal Institute
- Appraisal Institute publications such as *A Business Enterprise Value Anthology* (2001) and *A Business Enterprise Value Anthology*, 2nd ed. (2011), which include citations of relevant court decisions
- articles in *The Appraisal Journal*

by real property appraisers regarding how intangible assets should be accounted for in the valuation process.

Given the complexity of the issues and intensity of the controversy, generalizations can be dangerous. Nevertheless, several basic approaches can be identified that are being used in the marketplace, and those approaches are described below.

The Cost Approach

The cost approach is one method of allocation that is straightforward and eliminates the need to address tangible and intangible personalty. Many appraisers use the approach as a check to see if an indication of intangibles exists in a going concern in addition to use of the approach as support along with another method. The cost approach is particularly useful in situations where sales of total assets of going concerns are the only sales available. Care must be taken when using this approach because cost is not always equal to market value. The amount and type of depreciation existing in the asset play a role in the effectiveness of this approach. When significant depreciation exists, the approach may have less applicability.

The cost approach does not provide an indication of value for certain assets, such as intangibles, unless specifically supplemented to do so. Thus, the value indication of the cost approach is often compared with the value indications from the sales comparison approach and income capitalization approach when only sales of the total assets of the going concern are available to the appraiser. The premise is that the cost approach provides an indication of value of the fee simple interest in the real estate (and possibly non-realty personalty also) whereas the other two approaches provide value indications for the total assets of the going concern. Therefore, the difference between the reconciled value using the income capitalization and sales comparison approaches for the total assets of the going concern and the cost approach for the fee simple interest in the real estate plus other tangibles represents the intangible business value. An example of the approach is shown in Figure 35.2.

Figure 35.2 Example of Cost Approach Application

A six-year-old, 90-bed assisted-living facility has an estimated market value of the going concern equal to $6,750,000. The land value has been estimated at $900,000, and the depreciated value of the improvements is estimated at $5,200,000. The estimated value of FF&E is $450,000.

What is the allocated market value of the intangible assets?

Market Value of the Going Concern	$6,750,000
Less Depreciated Value of the Improvements	– $5,200,000
Less Land Value	– $900,000
Less FF&E	– $450,000
Intangible Assets	$200,000

Source: *Fundamentals of Separating Real Property, Personal Property, and Intangible Business Assets* course materials (Chicago: Appraisal Institute, rev. 2012)

The Management Fee Approach

The management fee approach has been used by many appraisers on certain property types to separate income attributable to intangible assets and capitalize or discount the remaining net operating income. This approach of valuing tangible assets exclusive of intangible assets is based on the theory that once the revenue attributable to intangible assets is deducted, all other remaining income is attributable to the real property and other tangible assets. In other words, this approach involves the calculation of a residual, in much the same way that residuals are calculated in land residual analysis or in the various residual calculations in the income capitalization approach. The management free approach is similar to the business valuation approach called *relief of royalty*, where the value of the intangible property is equal to the value of the royalty payments from which the company is relieved by virtue of its ownership of the asset. Critics of this method assert that the value of intangible assets and rights cannot be removed by merely deducting the related expenses from the income stream to be capitalized; allowing a deduction for the associated expense does not allow for a return on the capital expenditure.

For a hotel property, proponents of this approach would deduct the management fee and franchise fee (if it is a branded hotel affiliated with a chain) along with other operating expenses. By removing management fees and franchise fees from the revenue, appraisers reason that the influence of intangible assets has been eliminated. This approach maintains that the offices, staff, salaries, and overhead associated with management of the hotel reside not with the owner of the real property but with the company that manages and operates the hotel for the owner of the real property. Advocates of this approach state that because the management fee compensates the management company for those expenses, including staffing the hotel, the value of any intangible assets is removed, and any remaining net income is attributable to the real property. Advocates further state that, in the case of branded hotels, removal of the franchise fee eliminates intangible assets attributable to the brand and the final result represents only the value of the real and tangible personal property.

The management fee method is also used by appraisers to account for intangible assets inherent in other property types that typically have a business management fee or franchise. Proponents of this approach say it is justified on the same grounds as the market participant survey–based approach described below in situations where market participants rely solely on the deduction of management fees to account for intangible assets.

Market Participant Survey Approach

Interviews with market participants and, in some cases, regulatory filings may be used to assist in understanding the value allocated to intangible assets in market transactions. For example, in valuing specific property types, appraisers may interview market participants to ascertain how buyers and sellers of those properties value or allocate intangible assets in pricing decisions. The same questions may also be posed regarding personal property and how this property is valued or priced. The objective of that sort of exercise is to determine the thinking of market participants on these issues as opposed to relying on post-transaction book values recorded by accountants in financial statements.

Appraisers also research filings with the Securities and Exchange Commission. Given the dominance of real estate investment trusts in various property classes and the regulatory requirements imposed on publicly traded companies, these filings may be insightful, if only as a secondary source. According to the Statement of Financial Accounting Standards No. 141r, Business Combinations (codified in Accounting Standards Codification Topic 805), companies are required to allocate the purchase price of an acquired company among the tangible and intangible assets when acquired.

Sales verifications and market interviews may be used as the foundation for the treatment of intangible assets. Advocates say that the strength of this approach is that its conclusions are tied directly to the marketplace. It also recognizes the possibility that treatment of intangible assets may vary based on property type (e.g., convenience stores, marinas, stadiums, and health care properties) and asset class. Critics of this approach say that survey responses of buyers and sellers may be influenced by tax or financial considerations or other non-market conditions, which may result in a skewed survey. Critics also assert that buyers and sellers may have no need or motivation to allocate the value of traded assets to the various component parts and that this is not really a method at all but only a part of normal verification requirements of professional standards for comparable data.

Parsing Income Method

The parsing income method is consistent with the going-concern premise. The application of the method starts with an allocation of income and expenses to each of the asset classes. Once the net income to each asset class is identified, it can then be capitalized into an indication of value by dividing by an appropriate capitalization rate for each asset class. This method is based on the business valuation methodology called the *excess earnings method*, which was developed by the US Department of Treasury in the 1920s.

When the scope of work calls for the appraisal to include an allocation of the value opinion among the various asset classes, it may be appropriate to allocate income to each asset class with a separate capitalization rate or multiplier assigned to each income component. When real property is included as a fee simple estate, the appropriate income allocation to real property is generally considered to be equal to absolute net rent. Any allocation to personal property should account for both a return on and return of the investment for that asset class.

When using the parsing income method, it is critical to ensure that any allocation of the income and expenses correctly identifies the contribution of the income to the total assets from tangible and intangible personalty. If the allocation is not done properly, it is unlikely that the residual value of the value for any asset class will be correct. Ideally, the estimate of real estate rent in this method is based on an analysis of direct rent comparables. However, for some property types, data of that type is scarce or nonexistent. In those cases, the rent must be estimated in some other way, such as

- multiplying or dividing the depreciated cost from the cost approach by a lease constant (capitalization rate or multiplier as appropriate)
- analyzing comparable rents for similar property types (e.g., apartment rents for assisted-living facilities, big-box retail rents for a fitness club or bowling center) and making appropriate adjustments
- applying an appropriate rent-to-revenue ratio based on data from an industry association study, interviews with market participants, or other sources

Each of the alternative methods of estimating real estate rent has potential weaknesses. By using more than one method, appraisers can make reasonably supported conclusions.

Critics state that this methodology is flawed because the identification of an appropriate capitalization rate to convert the residual income to different asset classes can be difficult. This method has also been criticized for using a percentage deduction from income to quantify the value of both the franchise and residual intangibles. Further criticism is leveled at the deductions for a return on the various components of the going concern, which create an opportunity for double-counting unless caution is exercised by the appraiser.

Communicating Value Opinions

When talking about properties operated as going concerns, market participants sometimes use imprecise terms or use terms inconsistently. This can cause confusion for both the appraiser and the reader of the valuation report unless the appraiser clearly identifies what is included in their valuation and what is not. For example, market participants might refer to the value of intangible property as *business value*, *business enterprise value*, *goodwill*, or *blue sky*, or sometimes even as the *going-concern value*. The total value of all asset classes might be referred to as *going-concern value*, the *value of the total assets of the business,* or sometimes *business value* or *business enterprise value*. Lenders sometimes request an opinion of what they call *dark value* or *value as if dark*, meaning the value as if the business is closed. *Going-concern value*, *business enterprise value*, and *dark value* are problematic terms in an appraisal setting because they may be confused with *types* of value, i.e., alternatives to market value, investment value, use value, or disposition value.

An appraisal report should include precise language that communicates four things:

1. The type of value being reported (e.g., market value, investment value, use value, disposition value)
2. The assets or asset classes included in the valuation
3. The valuation premise (i.e., the going-concern premise or the liquidation premise)
4. Property rights appraised

The following are examples of language that adequately communicates the information outlined above:

- market value of a going concern, including real property, personal property, and intangible property
- market value of the total assets of the business as a going concern, including real property, personal property, intangible property, and financial assets
- use value of the real property only, as part of the going concern

Each of the individual terms may also need to be defined in the report.

A market value opinion should be based on the going-concern premise or the liquidation premise, whichever is the highest and best use of the assets considered as a whole (i.e., all categories of assets rather than just real property). A lender or other client may request a value opinion for real property as if it were not occupied by the business, which is commensurate with the liquidation premise, although the highest and best use is continued operation as a going concern. In those cases, the value of the real property as if it were not occupied by the business should be treated as a hypothetical condition to avoid misleading the user of the report.

Professional Practice and Law

Professional appraisal practice applies the scientific processes of economic analyses (i.e., the valuation process), and the professional purposes of appraisal are to develop conclusions in an impartial, objective manner, without bias or any desire on the part of appraisers to accommodate their own interests or the interests of their clients. To form sound conclusions, appraisers avoid personal beliefs or biases and search for market evidence to support their appraisal opinions. It is this level of independence and freedom from either personal views or personal financial gain, and strict adherence to the scientific principles contained in the valuation process, that separate the profession of appraisal from other fields that also deal with real estate values.

A profession is distinguished from a trade or service industry by a combination of the following factors:

- high standards of competence in a specialized field
- a distinct body of knowledge that is continually augmented by the contributions of members and can be imparted to future generations
- a code of ethics and standards of practice and members who are willing to be subject to peer review
- dedication to serve the public interest

Current standards-related material is presented in this appendix, but readers should be aware that standards of professional appraisal practice are revised regularly. Appraisers should consult the most recent editions of any publications referenced in this appendix.

The founders of the Appraisal Institute were guided by these principles. The organization was formed for three purposes:

1. To establish criteria for selecting and recognizing individuals with real estate valuation skills who were committed to competent and ethical practice
2. To develop a system of education to train new appraisers and sharpen the skills of practicing appraisers
3. To formulate a code of professional ethics and standards of professional practice to guide real estate appraisers and serve as a model for other practitioners

In 2007, the Board of Directors of the Appraisal Institute approved the inclusion of the International Valuation Standards and appropriate national standards as part of the organization's Standards of Professional Appraisal Practice. As a result, the Appraisal Institute's Standards of Professional Appraisal Practice are currently composed of

- Uniform Standards of Professional Appraisal Practice (USPAP) and the Certification Standard of the Appraisal Institute

or

- International Valuation Standards (IVS), applicable national standards, and the Certification Standard of the Appraisal Institute

The set of standards that apply in a particular assignment depends on whether law, regulation, or agreement with the client requires compliance with USPAP, IVS, or other standards. Designated members, candidates for designation, and practicing affiliates of the Appraisal Institute in the United States who are licensed or certified by their state must comply with USPAP when their state board (i.e., law) requires compliance with USPAP. However, an individual may be in compliance with USPAP and IVS simultaneously.

The heart of the Appraisal Institute's commitment to professionalism is contained in the five canons of the Code of Professional Ethics and in the Standards of Professional Appraisal Practice.

Code of Professional Ethics of the Appraisal Institute

Canon I

A Member, Candidate, Practicing Affiliate, or Affiliate must refrain from conduct that is detrimental to the Appraisal Institute, the profession, and the public.

Canon 2

A Member, Candidate, Practicing Affiliate, or Affiliate must assist the Appraisal Institute in fulfilling its role relating to qualifications and compliance with ethics and standards.

Canon 3

A Member, Candidate, Practicing Affiliate, or Affiliate must not develop or report biased analyses, opinions, and conclusions when providing services (appraisal, appraisal review, appraisal consulting, or real property consulting).

The full text of the Appraisal Institute's Code of Professional Ethics can be downloaded at www.appraisalinstitute.org.

Canon 4

A Member, Candidate, Practicing Affiliate, or Affiliate must not disclose confidential information to unauthorized parties.

Canon 5

A Member, Candidate, Practicing Affiliate, or Affiliate must not advertise or solicit in a manner that is misleading or otherwise contrary to the public interest.

Uniform Standards of Professional Appraisal Practice

The Appraisal Standards Board of The Appraisal Foundation develops, interprets, and amends the Uniform Standards of Professional Appraisal Practice, a set of standards of the appraisal profession. The standards are endorsed by professional appraisal organizations, and state and federal regulatory authorities enforce the content of the current or applicable editions of the standards.

According to the preamble in the USPAP document, the standards do not establish who or which assignments must comply:

> Neither The Appraisal Foundation nor its Appraisal Standards Board is a government entity with the power to make, judge, or enforce law. Compliance with USPAP is required when either the service or the appraiser is obligated to comply by law or regulation, or by agreement with the client or intended users. When not obligated, individuals may still choose to comply.[1]

USPAP contains a section of definitions, followed by a section of rules, and then standards, standards rules, and statements. Additional guidance is provided in the form of advisory opinions and frequently asked questions.

International Valuation Standards

The first statement of valuation standards intended for application worldwide was issued by the International Assets Valuation Standards Committee (TIAVSC) in 1984, and these standards were recognized as world standards by the United Nations in 1985. International valuation standards have been developed by the TIAVSC and its successor organizations, the International Valuation Standards Committee and currently the International Valuation Standards Council (IVSC), after review of domestic standards for each country, recognition of the appraisal principles that are

1. *Uniform Standards of Professional Appraisal Practice*, 2012-2013 ed. (Washington D.C., The Appraisal Foundation, 2012), U-6.

Uniform Standards of Professional Appraisal Practice, 2012-2013 ed.

Definitions
Preamble
Ethics Rule
Record Keeping Rule
Competency Rule
Scope of Work Rule
Jurisdictional Exception Rule

Standards and Standards Rules

Standard 1: Real Property Appraisal, Development
Standard 2: Real Property Appraisal, Reporting
Standard 3: Appraisal Review, Development and Reporting
Standard 4: Real Property Appraisal Consulting, Development*
Standard 5: Real Property Appraisal Consulting, Reporting*
Standard 6: Mass Appraisal, Development and Reporting
Standard 7: Personal Property Appraisal, Development
Standard 8: Personal Property Appraisal, Reporting
Standard 9: Business Appraisal, Development
Standard 10: Business Appraisal, Reporting

Statements on Appraisal Standards

Statements on Appraisal Standards (SMT) are authorized by the bylaws of The Appraisal Foundation and are specifically for the purposes of clarification, interpretation, explanation, or elaboration of the *Uniform Standards of Professional Appraisal Practice* (USPAP). Statements have the full weight of a Standards Rule and can be adopted by the Appraisal Standards Board only after exposure and comment.

Statement on Appraisal Standards No. 1†	
Statement on Appraisal Standards No. 2:	Discounted Cash Flow Analysis
Statement on Appraisal Standards No. 3:	Retrospective Value Opinions
Statement on Appraisal Standards No. 4:	Prospective Value Opinions
Statement on Appraisal Standards No. 5†	
Statement on Appraisal Standards No. 6:	Reasonable Exposure Time in Real Property and Personal Property Opinions of Value
Statement on Appraisal Standards No. 7†	
Statement on Appraisal Standards No. 8†	
Statement on Appraisal Standards No. 9:	Identification of Intended Use and Intended Users
Statement on Appraisal Standards No. 10†	

* Note that Standards 4 and 5 will be retired in the 2014-2015 edition of USPAP.

† Retired by action of the Appraisal Standards Board.

reflected in these standards, review of appraisal practices worldwide, and interaction with other standards bodies such as the International Accounting Standards Board and the International Federation of Accountants.

When initially formed, the IVSC concentrated on standards for valuations performed in support of financial reporting, which appeared to be more applicable to countries other than the United States. In the 1970s, the United States declined a move towards reporting current values in financial statements and until recently was slow to adopt standards applied throughout most of the world. The IVSC and many nations determined that market value reporting of assets provided a basis for clear understanding in international commerce and for reasonable financial comparisons and decisions when accompanied by unequivocal international valuation standards. This view, also reflected in international accounting standards, has now been incorporated into new and developing standards of the US Financial Accounting Standards Board (FASB). FASB has elected to use its new term and concept of *fair value* in financial reporting and is continuing to harmonize US and international accounting standards and financial reporting requirements.

As is true of other international standards bodies, the IVSC does not establish standards for individual countries, although a number of countries have adopted the international standards as their domestic standards. By promulgating internationally accepted standards and by developing their standards only after public disclosure, debate among nations, and liaison with other international standards bodies, the IVSC offers objective, unbiased, and well-researched standards that are a source of agreement among nations and provide guidance for domestic appraisal standards.

The objectives of the IVSC, as explained on the IVSC's website (www.ivsc.org), are to strengthen the valuation profession worldwide by

- developing high-quality international standards and supporting their adoption and use
- facilitating collaboration and cooperation among member organizations
- collaborating and cooperating with other international organizations
- serving as the international voice for the valuation profession

The most recent edition of the International Valuation Standards, the 2011 edition, is a significant reinvention of the standards, with a greater focus on principles than previous editions. The reorganized IVS document includes three general standards and six asset standards, along with applications of the standards, a set of definitions, and a conceptual framework for the entire standards document.

International Valuation Standards 2011

General Standards

IVS 101	Scope of Work
IVS 102	Implementation
IVS 103	Reporting

Asset Standards

IVS 200	Business and Business Interests
IVS 210	Intangible Assets
IVS 220	Plant and Equipment
IVS 230	Real Property Interests Annexe—Historic Property
IVS 233	Investment Property under Construction
IVS 250	Financial Instruments

Valuation Applications

IVS 300	Valuations for Financial Reporting Annexe—Property, Plant and Equipment in the Public Sector
IVS 310	Valuations of Real Property Interests for Secured Lending

Federal Statutes Affecting the Appraisal Profession*	
7 USC §1925	**Limitations on Amount of Farm Ownership Loans** Requires that real estate loans made by the Agricultural Credit Program with the US Department of Agriculture are based upon appraisals made by "competent appraisers."
7 USC §1932	**Assistance for Rural Entities** Allows the US Secretary of Agriculture to require that any appraisal made in connection with a business and industry loan be conducted by a specialized appraiser who uses standards that are similar to standards used for similar purposes in the private sector.
7 USC §1935	**Down Payment Loan Program** Establishes a down payment loan program for qualified beginning farmers or ranchers and limits the amount of the down payment loan to 45% of the purchase price, the appraised value, or $500,000, whichever is lower.
10 USC §2662	**Real Property Transactions: Reports to Congressional Committees** Requires the secretary of a military department or the US Secretary of Defense to report to Congress prior to entering into various real estate transactions that exceed $750,000 in transaction value.
11 USC § 327	**Employment of Professional Persons** Allows trustees in cases before the US Bankruptcy Court to hire appraisers to represent or assist the trustee in carrying out the trustee's duties under this title.
12 USC §1463	**Supervision of Savings Associations** Requires the Comptroller of the Currency and the Federal Deposit Insurance Corporation to establish appraisal standards for savings associations that are no less stringent than those for national banks.
12 USC §1710	**FHA Mortgage Insurance: Disposition of Assets** Requires that appraisals for the disposition of REO assets of the Federal Housing Administration are based upon the market value of the property in "as is" condition and based upon the asset being used as a residence.
12 USC §1715q	**Delivery of Statement of Appraisal or Estimates to Home Buyers** Requires FHA appraisals to be delivered to the purchaser of the property.
12 USC §1715z-22	**Multifamily Mortgage Credit Programs** Requires appraisals for FHA multifamily mortgage credit programs to be completed by a Certified General Appraiser in accordance with the Uniform Standards of Professional Appraisal Practice (USPAP).
12 USC §1715z-23	**HOPE for Homeowners Program** Requires that refinanced mortgages in the HOPE for Homeowners Program are not to exceed 90% of the appraised value of the property and the appraisals must be done in accordance with USPAP and appraiser independence requirements.
12 USC §2018	**Farm Credit Loan Security** Provides that the amount of a real estate mortgage loan originated by a farm credit bank, or a loan that a farm credit bank participates in with a lender that is not a system institution, shall not exceed 85% of the appraised value of the real estate security, except if the loan is guaranteed by a federal, state, or other governmental agency (in which case the loan may not exceed 97% of the appraised value) or is covered by private mortgage insurance. The statute also requires that the value of security shall be determined by appraisal under standards prescribed by the bank in accordance with regulations of the Farm Credit Administration.

* Appraisal policies and procedures may also be established by means other than legislation or regulation. Memoranda and banking or examining circulars are noteworthy examples. Several federal agencies (OCC, FDIC, OTS) issue circulars that specify additional guidance or clarification of policy. The executive branch can also issue policy by executive order, which helps agencies with management issues. See Executive Order 12630, for example.

Federal Statutes Affecting the Appraisal Profession (continued)	
12 USC §2603	**Uniform Settlement Statement (Real Estate Settlement and Procedures Act)** Allows that the uniform settlement statement that is required to be provided for each consumer loan secured by real estate may include, in the case of an appraisal coordinated by an appraisal management company, a clear disclosure of the fee paid directly to the appraiser by that company and the administration fee charged by that company.
12 USC §3331 et. seq.	**Appraisal Subcommittee of the Federal Financial Institutions Examination Council (Title XI of the Financial Institutions Reform, Recovery, and Enforcement Act)** Provides that federal financial and public policy interests in real estate–related transactions will be protected by requiring that real estate appraisals used in connection with federally related transactions are performed in writing, in accordance with uniform standards, and by individuals whose competency has been demonstrated and whose professional conduct will be subject to effective supervision.
12 USC §4103	**Appraisal and Preservation Value of Eligible Low-Income Housing** Outlines the requirements that must be used by the US Department of Housing and Urban Development to determine the value of eligible low-income housing projects.
15 USC §77k	**Civil Liabilities on Account of False Registration Statement** Allows the purchasers of financial securities to sue appraisers who make untrue statements of material facts or fail to state a material fact if the appraiser has consented to being named as having prepared or certified any part of the registration statement or as having prepared or certified any report or valuation that is used in connection with the registration statement.
15 USC §696	**Small Business Investment Program: Loans to State and Local Development Companies—Loans for Plant Acquisition, Construction, Conversion, and Expansion** Requires an appraisal of the value of a parcel of real property that collateralizes certain loans to state and local development companies within the Small Business Investment Program if the estimated value of the property is more than $250,000, or if the value of the property is less than $250,000 if the appraisal is necessary for the appropriate evaluation of creditworthiness.
15 USC §1639e	**Appraisal Independence Requirements (Dodd-Frank Act)** Requires appraisals for consumer credit transactions to be done independently and free from outside influence.
15 USC §1639h	**Property Appraisal Requirements (Dodd-Frank Act)** Requires creditors to obtain written appraisals based on physical inspections for certain higher risk mortgages. The statute also requires second appraisals in certain circumstances and requires creditors to provide consumers obtaining higher risk mortgages with copies of appraisals prior to closing.
15 USC §1691	**Scope of Prohibition (Equal Credit Opportunity Act)** Requires creditors to furnish applicants with all written appraisals and valuations developed in connection with the applicant's application for a mortgage loan free of charge and no less than three days prior to the closing of the loan.
16 USC §1 et. seq.	**Conservation** Establishes the real estate appraisal requirements for various conservation programs administered by the US Department of the Interior.
26 USC §170	**Charitable, etc., Contributions and Gifts** Requires taxpayers donating real property with a value of more than $5,000 to obtain a qualified appraisal from a qualified appraiser.

Federal Statutes Affecting the Appraisal Profession (continued)	
26 USC §6695A	**Substantial and Gross Valuation Misstatements Attributable to Incorrect Appraisals** Establishes the monetary penalties that may be imposed on an appraiser who prepares an appraisal of the value of property for income tax purposes that contains a substantial and gross valuation misstatement.
38 USC §3731	**Appraisals** Outlines the requirements and processes that must be followed for real estate loans made by the US Department of Veterans Affairs.
42 USC §4651	**Uniform Policy on Real Property Acquisition Practices (Uniform Relocation Assistance and Real Property Acquisition Act)** Outlines the appraisal policies and procedures to be used by federal agencies when acquiring federal lands.
43 USC §1716	**Exchanges of Public Lands or therein within the National Forest System** Outlines the requirements for appraisals for public land exchanges including that they be performed according to the Uniform Appraisal Standards for Federal Land Acquisitions.

Federal Regulations Affecting the Appraisal Profession*

Agriculture	
7 CFR §761.7	**Farm Service Agency: Appraisals** Establishes the appraisal standards within the Farm Service Agency of the US Department of Agriculture, including the Farm Loan Program.
7 CFR §762.127	**Farm Service Agency: Guaranteed Farm Loans—Appraisal Requirements** Establishes additional appraisal requirements for the Guaranteed Farm Loan Program administered by the Farm Service Agency within the US Department of Agriculture. Requires that real estate loan transactions of greater than $250,000 are performed by an appraiser who possesses sufficient experience or training to estimate the market value of agricultural property. All real estate appraisals must be done in accordance with the Uniform Standards of Professional Appraisal Practice. Specifies that appraisals must be self-contained or summary reports.
7 CFR §763.14	**Farm Service Agency: Land Contract Guarantee Program—Appraisals** Specifies that the value of real estate within the Land Contract Guarantee Program will be established by an appraisal conducted in accordance with US Department of Agriculture appraisal regulations.
7 CFR §765.353	**Farm Service Agency: Direct Loan Servicing—Determining Market Value** Requires appraisals conducted in conjunction with a partial release of real estate security within the Farm Service Agency be done in accordance with US Department of Agriculture appraisal regulations if the estimated value of the real estate is $25,000 or more.
7 CFR §1491.4	**Commodity Credit Corporation: Farm and Ranch Lands Protection Program—Program Requirements** Requires adherence to Uniform Standards of Professional Appraisal Practice or the Uniform Standards for Federal Land Acquisitions within the Farm and Ranch Lands Protection Program.
7 CFR §1942.3	**Community Facility Loans: Preparation of Appraisal Reports** Specifies the appraisal requirements to be used by the Rural Housing Service, Rural Business–Cooperative Service, Rural Utilities Service, and Farm Service Agency within the US Department of Agriculture in relation to Community Facility Loans for properties for water and waste disposal systems.
7 CFR §1980.334	**Rural Housing Loans: Appraisal of Property Serving as Collateral** Specifies the appraisal requirements to be used by the Rural Housing Service within the Department of Agriculture for Rural Housing Loans. Requires the use of licensed or certified appraisers and specifies certain information that must be contained in appraisal reports.
7 CFR §1980.444	**Business and Industrial Loan Program: Appraisal of Property Serving as Collateral** Outlines the requirements for appraisals of property serving as collateral within the Business and Industrial Loan Program of the US Department of Agriculture. Requires the use of independent, qualified fee appraisers, except when the loan is less than $2 million, in which case a qualified appraiser on the lender's staff may be used.
7 CFR §3015.56	**US Department of Agriculture: Appraisal of Real Property** Requires that the market value of land and buildings, or the fair rental rate of land or of space in a building, by agencies of the US Department of Agriculture be performed by an independent appraiser or a representative of the US General Services Administration.

* The cited regulations include appraisal-related issues among other considerations. For example, regulations that establish appraisal requirements or relevant professional standards also exempt Fannie Mae and Freddie Mac from certain appraisal requirements, among other things.

7 CFR §3550.62	**Rural Housing Service: Section 502 Program—Appraisals** Requires real property serving as collateral for a loan that exceeds $15,000 made via the Section 502 Program of the Rural Housing Service to be appraised in accordance with Uniform Standards of Professional Appraisal Practice.
7 CFR §3550.111	**Rural Housing Service: Section 504 Program—Appraisals** Requires real property serving as collateral for a loan that exceeds $15,000 made via the Section 504 Program of the Rural Housing Service to be appraised in accordance with Uniform Standards of Professional Appraisal Practice.
7 CFR §3560.752-§3560.753	**Rural Housing Service: Direct Multifamily Housing Loans and Grants** Establishes the appraisal use, request, review, and release requirements for direct multifamily housing loans and grants administered by the Rural Housing Service of the US Department of Agriculture.
7 CFR §4279.144	**Rural Housing Service: Direct Multifamily Housing Loans and Grants—Appraisals** Outlines that lenders making loans in the Rural Business-Cooperative Service Program are responsible for ensuring that appraisal values adequately reflect the actual value of the collateral via a USPAP-compliant appraisal performed by an appraiser who has the necessary experience and competency to appraise the property in question.
7 CFR §4279.244	**Biorefinery Assistance Loans—Appraisals** Requires that appraisals conducted in relation to Biorefinery Assistance Loans for the Rural Business-Cooperative Service and Rural Utilities Service of the US Department of Agriculture be self-contained appraisals performed by specialized appraisers.
7 CFR §4280.141	**Rural Energy for America Program—Appraisals** Requires that all loans made within the Rural Energy for America Program must be USPAP-compliant appraisals. For loans of $600,000 or more, a complete self-contained appraisal by a specialized appraiser must be conducted. For loans of $600,000 or less, a complete summary appraisal may be conducted.
36 CFR §223.222	**US Forest Service: Appraisals** Requires the Chief of the Forest Service to determine the appraised value of special forest products. Valid methods to determine appraised value include, but are not limited to, transaction evidence appraisals, analytical appraisals, comparison appraisals, and independent estimates based on average investments. Special forest products must be sold at minimum rates or appraised value, whichever is higher.
36 CFR §230.8	**US Forest Service: Acquisition Requirements** Outlines the appraisal requirements for appraisals performed in conjunction with the Community Forest and Open Space Conservation Program of the US Department of Agriculture.
36 CFR §223.60-§223.65	**US Forest Service: Timber Sale Contracts—Appraisal and Pricing** Establishes the appraisal methods to be used by the US Forest Service to determine fair market value for timber sale contracts.
36 CFR §254.9	**US Forest Service: Appraisals** Establishes the requirements for minimum appraiser qualifications, determinations of market value, appraisal report standards, and appraisal review requirements for land exchanges entered into by the US Forest Service.
36 CFR §254.26	**US Forest Service: Appraisals** Requires that appraisals for National Forest townsite transactions be performed in accordance with the Uniform Standards for Federal Land Acquisitions.
36 CFR §254.42	**US Forest Service: Valuation of Tracts** Establishes the appraisal requirements for the conveyance of certain small tracts by the US Forest Service.

Federal Regulations Affecting the Appraisal Profession (continued)	
Banking	
12 CFR §34.42-§34.47	**Office of the Comptroller of the Currency: Appraisals** Establishes the appraisal requirements for federally related transactions entered into by financial institutions regulated by the Office of the Comptroller of the Currency.
12 CFR §34.85	**Office of the Comptroller of the Currency: Appraisal Requirements** Establishes requirements relating to transfer of property to the Other Real Estate Owned category.
12 CFR §34.203	**Office of the Comptroller of the Currency: Appraisals for Higher-Priced Mortgage Loans** Contains the appraisal requirements for certain higher-priced mortgage loans that are made by financial institutions regulated by the Office of the Comptroller of the Currency
12 CFR §128.11	**Office of the Comptroller of the Currency: Nondiscriminatory Appraisal and Underwriting** Prohibits financial institutions regulated by the Office of the Comptroller of the Currency from using appraisals that are discriminatory under the Fair Housing Act or the Equal Credit Opportunity Act.
12 CFR §160.172	**Office of the Comptroller of the Currency: Reevaluation of Real Estate Owned** Requires financial institutions regulated by the Office of the Comptroller of the Currency to obtain an appraisal of each parcel of real estate owned at the earlier of (a) in-substance foreclosure or (b) the time of the savings association's acquisition of the property, and at any times thereafter that are dictated by prudent management policy.
12 CFR §163.170	**Office of the Comptroller of the Currency: Examinations and Audits—Appraisals** Grants to the Office of the Comptroller of the Currency the authority to order appraisals of real estate in conjunction with any examination or audit of a regulated savings association, affiliate, or service corporation.
12 CFR §164.1-§164.8	**Office of the Comptroller of the Currency: Appraisals** Establishes the appraisal and evaluation requirements to be used by financial institutions that are regulated by the Office of the Comptroller of the Currency.
12 CFR §202.14	**Federal Reserve: Rules on Providing Appraisal Reports** Establishes the rules of the Federal Reserve System in relation to providing copies of appraisal reports to consumers as required by the Equal Credit Opportunity Act.
12 CFR §225.61-§225.67	**Federal Reserve: Appraisal Requirements** Establishes the Appraisal Standards for Federally Related Transactions that are regulated by the Board of Governors of the Federal Reserve System.
12 CFR §226.42	**Federal Reserve: Valuation Independence** Establishes the valuation independence standards, including the requirements for the payment of reasonable and customary fees, applicable to institutions regulated by the Board of Governors of the Federal Reserve System.
12 CFR §226.43	**Federal Reserve: Appraisals for Higher-Priced Mortgage Loans** Specifies the appraisal requirements for certain higher-priced mortgage loans made by institutions that are regulated by the Federal Reserve, including the requirements for written appraisals and second appraisals in certain circumstances. Also requires that creditors provide copies of all appraisals to consumers.
12 CFR §323.1-§323.8	**Federal Deposit Insurance Corporation: Appraisal Requirements** Establishes the appraisal requirements for federally related transactions entered into by financial institutions regulated by the Federal Deposit Insurance Corporation.

Federal Regulations Affecting the Appraisal Profession (continued)	
12 CFR §390.143	**Federal Deposit Insurance Corporation: Nondiscriminatory Appraisal and Underwriting** Prohibits the use of appraisals that discriminate on the basis of the age or location of the dwelling by financial institutions regulated by the Federal Deposit Insurance Corporation, and requires that institutions have clearly written, nondiscriminatory loan underwriting standards available to the public upon request.
12 CFR §390.272	**Federal Deposit Insurance Corporation: Reevaluation of Real Estate Owned** Requires that financial institutions regulated by the Federal Deposit Insurance Corporation obtain an appraisal or evaluation upon transfer of a property to the "Other Real Estate Owned" category.
12 CFR §390.350	**Federal Deposit Insurance Corporation: Examinations and Audits—Appraisals** Permits the Federal Deposit Insurance Corporation to obtain appraisals in conjunction with periodic examinations and audits of state savings associations.
12 CFR §390.440-§390.446	**Federal Deposit Insurance Corporation: Appraisal Requirements** Establishes the appraisal requirements for federally related transactions made by institutions regulated by the Federal Deposit Insurance Corporation.
12 CFR §390.447	**Federal Deposit Insurance Corporation: Appraisal Policies and Practices of State Savings Associations and Subsidiaries** Establishes the minimum appraisal policies and practices that are to be employed by state savings associations that participate in the federal deposit insurance program.
12 CFR §614.4240, §614.4245, §614.4250, §614.4255, §614.4260, §614.4265, §614.4266, and §614.4267	**Farm Credit System: Collateral Evaluation Requirements** Establishes the collateral evaluation requirements within the Farm Credit System.
12 CFR §722.1-§761.7	**National Credit Union Association: Appraisal Requirements** Establishes the appraisal requirements for federally related transactions made by financial institutions regulated by the National Credit Union Administration.
12 CFR §1002.14	**Consumer Financial Protection Bureau: Rules on Providing Appraisals and Other Valuations** Contains the Consumer Financial Protection Bureau rules regarding the provision of appraisal reports and other written valuations to consumers by creditors.
12CFR §1026.42	**Consumer Financial Protection Bureau: Valuation Independence** Establishes the valuation independence standards, including the requirements for the payment of reasonable and customary fees, applicable to institutions regulated by the Consumer Financial Protection Bureau.
12 CFR Part 1102	**Appraisal Subcommittee: Operating Rules** Outlines the operating rules of the Appraisal Subcommittee regarding temporary waiver requests, nonrecognition proceedings, and access to and privacy of individually identifiable personal information.
Defense	
32 CFR Part 644	**US Department of Defense, US Army: Real Estate Handbook** Establishes various appraisal requirements to be used by various entities within the Department of Defense when leasing, acquiring, or disposing of real property.
33 CFR §211.4	**US Army Corps of Engineers: Acquisition of Land** Establishes the appraisal requirements to be used by the US Army Corps of Engineers when purchasing, condemning, transferring, or leasing real property and interests therein for civil works projects.

***Federal Regulations Affecting the Appraisal Profession* (continued)**	
Energy	
10 CFR §611.101	**US Department of Energy: Advanced Technology Vehicles Manufacturer Assistance Program—Application Requirements** Requires that appraisals of property that will serve as collateral for a loan be performed in accordance with the Uniform Standards of Professional Appraisal Practice and by a licensed or certified appraiser.
18 CFR §1306.2	**Tennessee Valley Authority: Uniform Real Property Acquisition Policy** Establishes the appraisal requirements for the Tennessee Valley Authority.
Housing and Urban Development	
24 CFR §81.43	**US Department of Housing and Urban Development: Reports—Underwriting and Appraisal Guideline Review** Requires the US Department of Housing and Urban Development to periodically review the appraisal guidelines of Fannie Mae and Freddie Mac to ensure that they are consistent with the Fair Housing Act.
24 CFR §200.35	**Federal Housing Administration: Appraisal Standards—Nondiscrimination Requirements** Prohibits discrimination in the selection of appraisers on the basis of race, color, religion, national origin, sex, age, or disability, and requires appraisers to certify that an FHA appraisal contains a statement that the racial/ethnic makeup of the neighborhood in no way affected the appraisal determination.
24 CFR §200.200-§200.206	**Federal Housing Administration: Appraiser Roster** Specifies the requirements for appraisers interested in being placed on the Federal Housing Administration's Appraiser Roster.
24 CFR §200.810	**Federal Housing Administration: Lead-Based Paint Poisoning Prevention** Requires FHA appraisers to inspect dwellings constructed prior to 1978 for defective paint surfaces.
24 CFR §203.5	**Federal Housing Administration: Direct Endorsement Process** Establishes the appraisal requirements to be used as part of the FHA Direct Endorsement process.
24 CFR §203.15	**Federal Housing Administration: Certification of Appraisal Amount** Establishes the appraisal and underwriting requirements for single-family mortgage loans insured by the Federal Housing Administration.
24 CFR §248.111	**HUD: Appraisal and Preservation Value of Eligible Low-Income Housing** Establishes the appraisal requirements applicable to low-income affordable housing project programs administered by the Federal Housing Administration, including a requirement that appraisers have six years of appraisal experience and three years of experience appraising multifamily properties.
24 CFR §257.114	**US Department of Housing and Urban Development: Hope for Homeowners Program—Appraisal** Requires that appraisals performed for the Hope for Homeowners Program be performed by an appraiser on the FHA Appraiser Roster in accordance with the Uniform Standards Of Professional Appraisal Practice.
24 CFR §266.642	**Federal Housing Administration: Appraisals** Requires the Federal Housing Administration to obtain an appraisal when actions taken by the FHA have the effect of the recovery of less than the face amount of the debenture held by the US Department of Housing and Urban Development.
24 CFR §3500.15	**Real Estate Settlement and Procedures Act: Affiliated Business Arrangements** Exempts appraisers who are hired by financial institutions to represent the interests of the institutions in transactions from the rules and regulations applicable to affiliated business arrangements adopted according to the Real Estate Settlement and Procedures Act.

Federal Regulations Affecting the Appraisal Profession (continued)	
24 CFR §4001.114	**US Department of Housing and Urban Development: Hope for Homeowners Program—Appraisals** Establishes the eligibility requirements and underwriting procedures of the Hope for Homeowners Program and requires that properties shall be appraised by an appraiser on the FHA Appraiser Roster in accordance with the Uniform Standards of Professional Appraisal Practice.
24 CFR §4001.403	**US Department of Housing and Urban Development: Hope for Homeowners Program—Prohibitions on Interested Parties in Insured Mortgage Transactions** Establishes appraiser independence requirements within the Hope for Homeowners Program.
Interior	
25 CFR §152.24	**Bureau of Indian Affairs: Appraisal** Establishes the appraisal requirements for trust or restricted land within the Bureau of Indian Affairs.
25 CFR §162.211, §162.322, §162.422, and §162.551	**Bureau of Indian Affairs** Outlines the various appraisal requirements for agricultural, business, residential, and wind and solar resource leases of Indian-owned lands.
30 CFR §882.12	**US Department of the Interior: Appraisals** Requires appraisals of abandoned mine land that is designated for reclamation.
36 CFR §64.11	**National Park Service: Project Performance** Establishes the appraisal requirements applicable to grants and allocations for recreation and conservation use of abandoned railroad rights of way within the National Park Service.
43 CFR §11.83	**US Department of the Interior: Damage Determination Phase—Cost Estimating and Valuation Methodologies** Establishes the appraisal requirements for natural resource damage assessments by the US Department of the Interior.
43 CFR §30.167 and §30.169	**US Department of the Interior: Indian Probate Hearing Procedures** Establishes various appraisal requirements for purchase of real property using Indian Probate Hearing Procedures.
43 CFR §404.26, §404.41-§404.46, and §426.13	**US Department of the Interior: Appraisal Investigation Requirements** Outlines the appraisal investigation requirements to be used within the Reclamation Rural Water Supply Program of the Bureau of Reclamation of the US Department of the Interior.
43 CFR §2201.3-§2201.4	**Bureau of Land Management: Appraisals, Appraiser Qualifications, Market Value, Appraisal Report Standards, and Appraisal Review** Establishes the appraisal requirements for land exchanges by the Bureau of Land Management of the US Department of the Interior.
48 CFR §1437.7002	**US Department of the Interior: Appraisal Services (Real Property)** Establishes the appraisal standards for all real property appraisals for condemnation purposes for the US Department of the Interior.
50 CFR §34.6-§34.7	**National Wildlife Refuge System: Schedule of Appraisals** Requires that areas administered by the US Fish and Wildlife Service be appraised at least once every five years in accordance with standard appraisal procedures in order to estimate the fair market value of each area.
Labor	
29 CFR §2570.34	**US Department of Labor: Employee Retirement Income Security Act—Information to be Included in Every Exemption Application** Establishes various appraisal requirements within the Employee Retirement Income Security Act administered by the US Department of Labor.

Federal Regulations Affecting the Appraisal Profession **(continued)**	
Transportation	
23 CFR Part 710	**Federal Highway Administration: Right of Way and Real Estate** Outlines various appraisal requirements of the Federal Highway Administration regarding right of way acquisition, condemnation, and disposal.
49 CFR Part 24	**Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs: Acquisition Procedures** Outlines the various appraisal requirements for the Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs that are administered by the US Department of Transportation.
Veterans Affairs	
38 CFR §36.4342-§36.4348	**US Department of Veterans Affairs: Appraisals** Establishes the appraiser qualifications and appraisal requirements for loans guaranteed by the US Department of Veterans Affairs.
US Postal Service	
39 CFR §777.31	**US Postal Service: Acquisition Procedures** Establishes the real property acquisition policies of the US Postal Service.
Omnibus Federal Property Regulations	
41 CFR Part 102-73	**Federal Property Management Regulations: Real Estate Acquisition** Establishes omnibus appraisal regulations for all acquisitions of real property by purchase or condemnation by federal agencies.
41 CFR §102-75.300-§102-75.320	**Federal Property Management Regulations: Real Estate Disposal** Establishes appraisal policies for all federal agencies to employ when disposing of surplus real property.

For further insights on the development of appraisal legislation, see Alison K. Bailey Seas, "Evolution of Appraisal Reform and Regulation in the United States," *The Appraisal Journal* (January 1994): 26-46; and Thomas A. Dorsey, "The Influence of Government Regulations on Market Value," *Valuation Insights & Perspectives*, vol. 3, no. 1 (First Quarter 1998): 16-18, 20-21.

Regression Analysis and Statistical Applications

The most commonly used statistical application in the appraisal of real property, tax assessment, automated valuation modeling, and other forms of real estate analysis is undoubtedly regression analysis. As discussed in Chapter 14, regression analysis allows comparison of a dependent variable, usually price or rent, and either a single independent variable (in simple linear regression) or many independent variables (in multiple regression). This appendix supplements the discussion of essential statistical topics in Chapter 14 with more detailed discussion of the application of simple linear regression and multiple regression. Other topics include model specification, model validation, underlying regression model assumptions, and the potential misuse of statistical methods.

Simple Linear Regression

In its simplest form, linear regression captures a relationship between a single dependent variable and a single independent, or predictor, variable. This relationship is usually written as follows:

$$Y_i = \alpha + \beta x_i + \varepsilon$$

which reflects an underlying deterministic relationship of the linear form $Y = \alpha + \beta x$ plus the stochastic (i.e., random) component ε. As shown on a graph, the slope of the regression line is b, and the intercept is a. The effect of any variables, other than the single independent variable, that may influence the value of the dependent variable is not included in a simple linear regression model.

In an appraisal application of simple linear regression, for example, the Y variable in the model could represent market rent and the x variable could be apartment living area. The random component would reflect sampling error plus the imperfections of real estate markets, which include the influence of factors such as informational advantages, the negotiating strengths of the parties to a sale or lease transaction, and any other variables not included in the model. The simple linear regression model yields an estimate of the equation

$$\hat{Y}_i = a + bx_i + e$$

where

a is an estimator of α,

b is an estimator of β,

and e is an estimator of ε.

The outcome variable $\hat{Y}_i$ is the expected market price (for example, the model's estimate of market rent) of property i, given the value of the independent variable x.

The presence of the random error term is an indication that regression models are inferential (or "stochastic"), rather than deterministic. Regression models provide estimates of the outcome variables that should be accompanied by a statement about the degree of uncertainty associated with the estimate. In addition, they provide estimates of the coefficient on the independent variable, b in this context, which also incorporate a degree of uncertainty.

In Table B.1, the apartment rent data set that was introduced in Chapter 14 is augmented by adding living area to demonstrate a simple linear regression model. Note that the range in rent per square foot is \$0.35 (\$1.20 – \$0.85), an indication that living area probably is not the sole factor determining rent. Otherwise, rent per square foot would exhibit minimal variation.

A simple linear regression model will uncover the extent to which rent is explained by the living area variable. The model can be run on a number of statistical software packages. Figure B.1 shows the output that was derived using Excel.

This output illustrates that the best-fitting linear relationship between living area and rent is a line with intercept \$336.17 and a slope of \$0.57359 per square foot of floor area:

$$\textit{Price} = \$336.17 + \$0.57359 \times \textit{Floor Area}$$

The model F-statistic, 42.85908, is highly significant, meaning that the model predicts rent better than merely relying on mean unit rent. The t-statistic on floor area, 6.546685, is also highly significant, meaning that living area is an important factor for rent estimation. The coefficient of determination, R^2, can vary from 0 to 1, with 0 indicating no explanatory power whatsoever and 1 indicating perfect explanatory power (i.e., a deterministic model). The R^2 of .557632 indicates that 55.8% of the variation

Table B.1 Living Area and Monthly Rent

	Rent	Living Area (Sq. Ft.)	Rent per Sq. Ft.
	$600	650	$0.92
	650	670	0.97
	695	655	1.06
	710	755	0.94
	715	695	1.03
	730	770	0.95
	735	840	0.88
	735	820	0.90
	760	865	0.88
	760	760	1.00
	785	740	1.06
	800	740	1.08
	800	730	1.10
	805	890	0.90
	815	850	0.96
	820	850	0.96
	820	740	1.11
	825	970	0.85
	825	970	0.85
	825	770	1.07
	825	690	1.20
	850	850	1.00
	850	970	0.88
	850	970	0.88
	850	970	0.88
	850	805	1.06
	850	850	1.00
	860	830	1.04
	860	790	1.09
	890	860	1.03
	890	850	1.05
	920	970	0.95
	920	1,030	0.89
	930	890	1.04
	970	1,050	0.92
	995	1,000	1.00
Median	$825.00	845	$0.985
Mean	$815.83	836	$0.983
S	$84.71	110	$0.087
Minimum	$600.00	650	$0.85
Maximum	$995.00	1,050	$1.20

Figure B.1 Excel Summary Output of Simple Linear Regression

SUMMARY OUTPUT

Regression Statistics	
Multiple *R*	0.746748
R Square	0.557632
Adjusted *R* Square	0.544621
Standard Error	57.16637
Observations	36

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	140063.2	140063.2	42.85908	1.69E-07
Residual	34	111111.8	3267.994		
Total	35	251175			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	336.1697	73.88506	4.549901	6.53E-05
X Variable 1	0.573589	0.087615	6.546685	1.69E-07

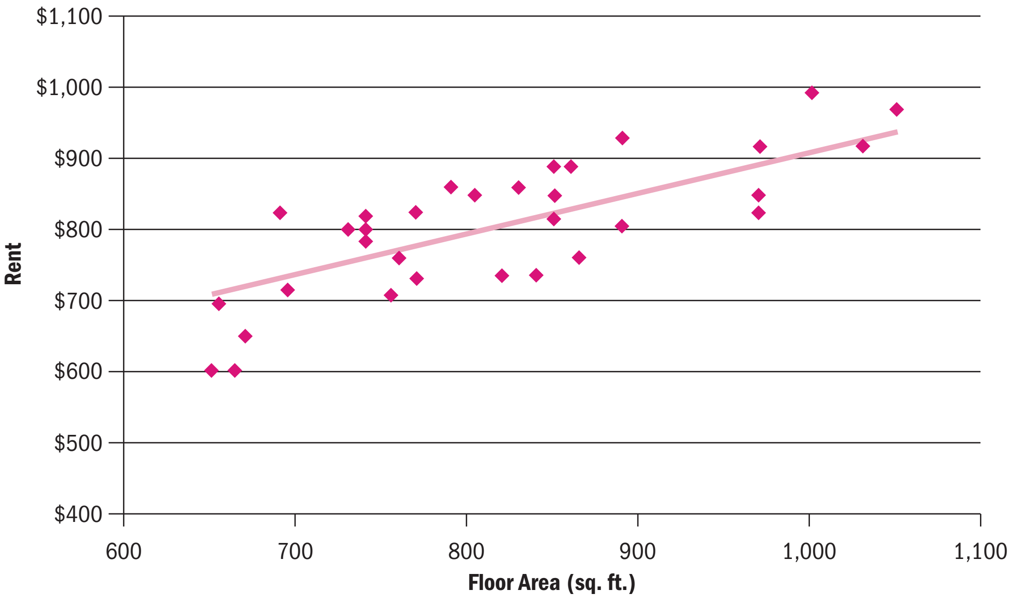
in rent is accounted for by variation in floor area. Adjusted R^2 is useful for comparing multiple competing models with differing sets of independent variables because the measure accounts for the number of explanatory variables in relation to sample size. The model having the highest adjusted R^2 is usually the preferred model. In this instance, with only one independent variable under consideration, there is no competing model.

Obtaining an understanding of the intercept and slope is referred to as structural modeling because the model uncovers the structure of the relationship between the dependent variable and the independent variable. A simple linear model facilitates development of a "best fit" line in two-dimensional space, which can be overlaid on a scatter plot of the data to demonstrate unexplained variation in the dependent variable, as shown in Figure B.2.

The scatter plot shows that rent generally rises linearly with floor area. The regression line shown on the chart is the best-fitting straight line, which minimizes the squares of the errors between the data and the line's fit to the data. Differences between actual prices and the regression line can be attributed to one of two causes: (1) randomness in pricing (i.e., the stochastic element of price) or (2) other unaccounted-for variables that are also important in determining rent. Those elements might include unit characteristics such as bedroom counts, bathroom counts, and tenant amenities such as a pool, spa, and exercise facility. Simple linear regression becomes multiple linear regression when more than one independent variable is included in a model to account for additional elements of comparison.

Regression models can either be predictive or structural (i.e., constructed for the purpose of understanding the structure of the relationship among variables). Predictive models are predominant in

Figure B.2 Rent and Floor Area



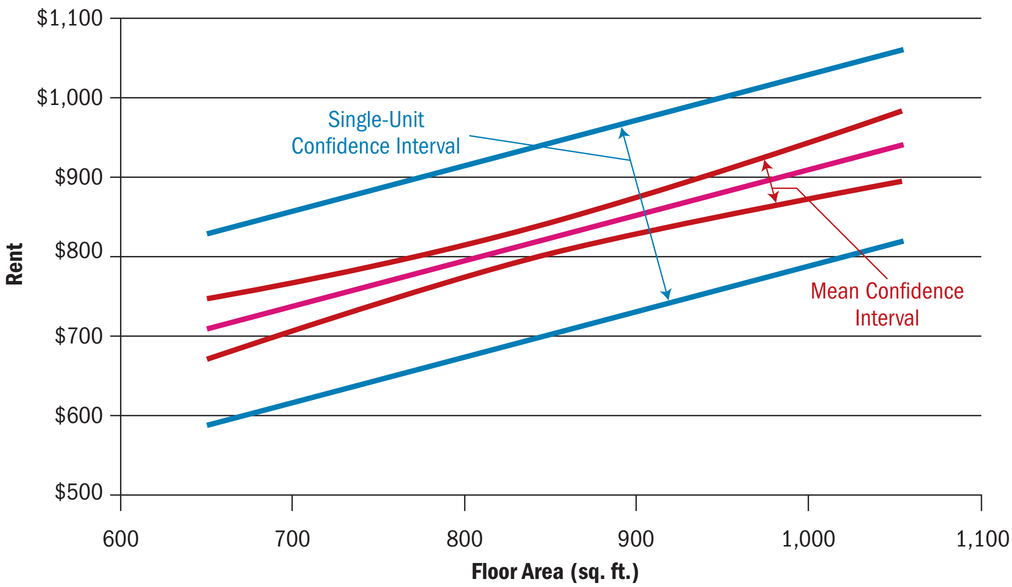
most valuation settings. Two forms of predictive models are generally employed. One form is used to estimate the mean outcome, and the other form estimates a single, specific outcome. The primary difference is that the confidence interval for an estimation of the mean outcome is narrower than the confidence interval for estimation of a single, specific outcome. Furthermore, regression models are not usually employed to estimate outcomes using inputs that are outside the ranges of the independent variables.

For example, assume the appraiser wants to predict rent for an 810-sq.-ft. apartment using the sample data. The predicted mean rent for units of this size and the predicted rent for a single, specific 810-sq.-ft. unit are the same at $800.78. However the confidence interval widths vary considerably, as follows:

95% confidence interval on mean rent of 810-sq.-ft. units:	$780.86 to $820.70
95% confidence interval on rent of a single 810-sq.-ft. unit:	$682.91 to $918.65

SPSS and Minitab are capable of calculating and reporting confidence intervals for the mean and for a single outcome. The confidence intervals for the data are illustrated in Figure B.3 along with the regression line for unit rent. Note that the prediction confidence intervals are narrowest near the mean unit size and grow wider for single units. For this reason, the confidence intervals must be calculated separately for any given value of the independent variable (or values for the independent variables in multiple linear regression). This is a time-consuming process, which is best accomplished electronically in SPSS or Minitab.

Figure B.3 Regression Line with Confidence Intervals for Mean and Single-Unit Rent Estimates



Note also that the limits of the known data are shown at the ends of each plotted line. Beyond the limits of known data, any conclusions drawn by the appraiser will constitute forecasts or predictions and that usable confidence is further reduced or eliminated statistically.

The equations for calculating prediction confidence intervals for simple linear regression are as follows:

Prediction Confidence Interval for the Mean *Y* Outcome

$$\text{Confidence Interval} = \hat{Y}_i \pm t_{n-2} S_{YX} \sqrt{\frac{1}{n} + \frac{(x_i - \bar{x})^2}{\sum_{i=1}^{n} (x_i - \bar{x})^2}}$$

Prediction Confidence Interval for an Individual *Y* Outcome

$$\text{Confidence Interval} = \hat{Y}_i \pm t_{n-2} S_{YX} \sqrt{1 + \frac{1}{n} + \frac{(x_i - \bar{x})^2}{\sum_{i=1}^{n} (x_i - \bar{x})^2}}$$

The confidence intervals widen as they depart from the mean because the numerator $(x_i - \bar{x})^2$ gets larger as the distance of the independent variable from the mean increases. For further clarification, the value symbolized as S_{YX} in these equations is reported as the "Standard Error of the Estimate" in SPSS, "*S*" in Minitab, and "Standard Error" in Excel. The summation $\Sigma\,(x_i - \bar{x})^2$ is often referred to as *SSX* (sum of squares for the *x* variable) and is calculated as $S_{YX} \div S_b$. S_b is reported as "standard error" for the independent *x* variable coefficient in both SPSS and Excel and as "standard deviation" for the independent *x* variable coefficient in Minitab. Given this information, it is possible to calculate confidence intervals by hand for a simple linear regression if the need arises. The confidence interval calculations become more complex with multiple linear regression and are best calculated using statistical software.

Multiple Linear Regression

As stated earlier, additional independent variables can be included in a regression model to account for more than one element of comparison. In real estate appraisal, multiple linear regression is often a more realistic representation of the interplay of the variety of transactional and property characteristics that can affect the value of a predictor variable like *price* or *rent* than simple linear regression can be.

As a demonstration of a multiple linear regression model, suppose that further investigation of the rent data reveals variation in bedroom counts, bath counts, and common amenities. Characteristics such as these can be modeled by use of numerical variables and by the creation of indicator variables (also known as *dummy variables*) to convert categorical data such as common amenities into numerical variables. (Obviously, other elements of comparison may be important such as differences in age and condition, location, access, neighboring land use, and other characteristics. This example is simplified for demonstration purposes.) To create a common amenity variable that indicates the presence of a pool, spa, and exercise facility, units in apartment complexes that have the feature are coded 1 and units in apartment complexes that do not have a pool, spa, and exercise facility are coded 0. Bedroom and bath counts are entered as discrete numerical data. The revised sample data set is shown in Table B.2.

A multiple regression model using Minitab yields the following price equation:

Unit Rent = \$209.06 + \$0.4703 × Living Area (sq. ft.) + \$50.10 × Bedrooms + \$58.27 × Bathrooms + \$79.77 × Pool/Spa/Exercise

t-statistics:	Living Area (sq. ft.)	3.83 (p = .001)
	Bedrooms	2.06 (p = .048)
	Baths	3.45 (p = .002)
	Pool/Spa/Exercise	5.22 (p = .000)

Model F-statistic = 37.80 (p = .000)

R^2 = .830

Adjusted R^2 = .808

This result indicates that living area, bedroom count, bath count, and an amenity consisting of a pool, spa, and exercise facility are all significant in the determination of unit rent. The t-statistics are all significant at $\alpha \leq .05$. The p values stated after the t- and F-statistics are the probabilities of the model result occurring by chance. When the p value is less than .05, then the variable (or model in the case of the F-statistic) is said to be significant at the 5% level (i.e., $\alpha \leq .05$). Here most of the results are significant at the 1% level. The model's F-statistic is also highly significant. This model is preferred to the simple linear regression model because adjusted R^2 has gone up from .545 to .808, despite the loss in degrees of

Table B.2 Rent, Living Area, Room Counts, and Amenities

Rent	Living Area (Sq. Ft.)	Bedrooms	Baths	Pool/Spa/Exercise
$600	650	1	1	0
650	670	1	1	0
695	655	1	2	1
710	755	1	1	0
715	695	1	2	1
730	770	2	1	0
735	840	2	1	0
735	820	2	1	0
760	865	2	1	0
760	760	1	2	0
785	740	1	1.5	1
800	740	1	2	1
800	730	1	2	1
805	890	2	2	0
815	850	2	2	0
820	850	2	2	0
820	740	1	2	1
825	970	2	2	0
825	970	2	2	0
825	770	1	2	1
825	690	1	2	1
850	850	2	1	1
850	970	2	2	0
850	970	2	2	0
850	970	2	2	0
850	805	2	1	1
850	850	2	2	0
860	830	2	2	0
860	790	2	1	1
890	860	2	2	0
890	850	2	2	1
920	970	2	2	0
920	1,030	2	2	0
930	890	2	2	1
970	1,050	2	2.5	0
995	1,000	2	2.5	0

freedom resulting from adding more variables while keeping sample size constant. The expanded multiple linear regression model accounts for 83% of the variation in unit rent, which is a vast improvement over the 55.8% coefficient of determination for the simple linear regression model.

To predict mean rent and a specific unit rent for an 810-sq.-ft. apartment unit having 2 bedrooms, 1½ baths, and use of an on-site pool, spa, and exercise facility, the calculation would be

Unit Rent = \$209.06 + \$0.4703 × 810 + \$50.10 × 2 + \$58.27 × 1.5 + \$79.77 × 1 = \$857.38

Note that the Minitab estimate is \$857.40, which is unaffected by rounding.

The associated 95% confidence intervals derived in Minitab are

95% confidence interval on mean unit rent:	\$827.55 to \$887.24
95% confidence interval on a single unit rent:	\$776.00 to \$938.79

One benefit of the expanded multiple regression model's higher explanatory power is more predictive precision in comparison to the simple linear regression model, as indicated by the tighter confidence intervals for the predicted mean and for a single unit rent prediction.

Another way to develop such a model would be to create indicator (or "dummy") variables for discrete numerical variables such as bedroom counts and bath counts. This allows the rent contributions of these features to vary instead of being constrained to a single linear coefficient. Often the creation of indicator variables to describe discrete numerical variables will improve the model fit. For example, adding dummy variables to reflect 1, 1½, 2, and 2½ bath categories to this model increases R^2 to .854 and adjusted R^2 to .824.

Model Specification

Model specification issues fall into two broad categories for valuation purposes: (1) the functional form of the relationship between the dependent variable and the independent variables and (2) the choice of variables to include in the model.

Functional Form

Functional form issues arise because of a regression model's presumed linear relationship between dependent and independent variables, even though many of these relationships are likely to be curvilinear. (Curvilinear relationships are characterized by curved lines instead of straight lines. Examples include logarithmic curves, exponential curves, inverse curves, and polynomial curves.) Many characteristics of real property are thought to be subject to increasing or diminishing marginal utility. Consider bathroom counts. Keeping floor area and bedroom count constant, adding bathrooms could initially result in increasing marginal utility. However, as more bathrooms are added above some optimum level, the contribution to value begins to diminish. Consider a three-bedroom home with six baths and the contribution to value added by the fourth, fifth, and sixth baths. Other independent variables that may have a curvilinear relationship to price or rent include property age, floor area, lot area, garage stall count, bedroom count, and proximity (i.e., distance) measures. Furthermore, the nature of the functional relationship between these variables and price or rent can vary by market area whether defined geographically (e.g., region of the country) or economically (e.g., market norms).

Because the underlying functional form of the relationship between an independent variable set and a price or rent outcome variable is unknown, regression model builders must search for the functional form that best fits the data being analyzed. This involves variable transformations such as logarithms, exponents, polynomials, reciprocals, and square roots. In some cases a transformation applies to an entire equation. In others, transformations apply only to certain variables.

Examples of transformations of entire equations include a hypothesized multiplicative model and a hypothesized exponential model. Transformations are done in these cases to convert the underlying relationships from a nonlinear form to a linear form that is more amenable to regression analysis. These transformations are illustrated in Figure B.4.

In the transformed multiplicative model, the logs of the independent and dependent variables have a linear relationship, and the exponents of these variables are transformed into the linear regression coefficient estimates. The estimated coefficients can either be placed into the underlying model to directly estimate price (or value), or the linear model can be used to estimate the log of price, which can then be converted to price. This sort of multiplicative model accommodates a variety of variable relationship shapes, depending on the value of the exponents (the βs). Models of this type are used extensively in mass appraisal for property tax assessment. Transformations of exponential models into the log-linear form and the prior log-log transformation are often useful for controlling heteroscedasticity, a concept that is explained later in this appendix.

It is also possible, and often appropriate, to include other variable transformations. For example, one variable may be curvilinear while others are linear in relation to the dependent variable. The curvilinear variable could be modeled in quadratic form (e.g., floor area) while the other variables are modeled in linear form. An estimation model of this sort would be similar to the following:

$$P = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_2^2 + \varepsilon$$

In this case x_2 is entered in a quadratic form. If x_2 represented floor area, a positive coefficient for x_2 along with a negative coefficient for x_2^2 could

Figure B.4 Multiplicative and Exponential Model Transformations

Underlying Multiplicative Price (*P*) Model	Underlying Exponential Price (*P*) Model
$P = \alpha x_1^{\beta_1} x_2^{\beta_2} \varepsilon$	$P = e^{(\alpha + \beta_1 x_1 + \beta_2 x_2 + \varepsilon)}$
Log Transformation to Linear Form	**Log Transformation to Linear Form**
$\ln(P) = \ln \alpha + \beta_1 \ln x_1 + \beta_2 \ln x_2 + \ln \varepsilon$	$\ln(P) = \alpha + \beta_1 x_1 + \beta_2 x_2 + \varepsilon$

indicate price increasing with floor area but at a decreasing rate as the negative x_2^2 variable diminishes the positive contribution of the x_2 variable. The decision to include a quadratic term should be based on whether its inclusion is theoretically supported and it significantly improves the model, which would be shown by a significant *t*-statistic for the coefficient of the squared variable, improvement in adjusted R^2, or both.

Indicator variables are another form of variable transformation—e.g., the dummy variable used in the apartment illustration to indicate the presence of a pool, spa, and exercise facility in the apartment complex. Indicator variables transform categorical variables into numerical variables so that their effects can be included in a regression model. Dummy variables are the simplest single-category form of indicator variables, coded 1 if the observation is included in the category and 0 if it is not. Sometimes more than one category is required to completely exhaust categorical variable possibilities. For example, suppose a data set spans four years (2005 to 2008), and the year of sale is being entered as a set of indicator variables. Dummy variables would be created for the years 2005, 2006, and 2007, each variable coded 1 or 0 depending on the year of sale for each observation, assuming the valuation date is 2008. The year 2008 is accounted for in the model when the variables *2005* = 0, *2006* = 0, and *2007* = 0. As a result no variable is created for 2008. The coefficients of the variables 2005, 2006, and 2007 indicate the adjustments required to account for these earlier transactions. The general rules are

1. Create one less dummy variable than the number of categories.
2. All of the dummy variables from an indicator variable set must be included in the model even though some of them may not be significant. That is, the decision to include or exclude a categorical variable implies that all of the dummy variables related to the categorical variable set must either be included or excluded.[1]

Variable Inclusion

Decisions to include or exclude variables determine whether or not a model is under-specified or over-specified. Two problems arise relating to variable inclusion. First, if relevant variables are excluded from a model, the ability of the model to account for change in the dependent variable is diminished. Second, misspecification leads to biased estimates of population parameters (i.e., the independent variable coefficients) because correlation among independent variables causes the model to adjust coefficient estimates when the model is underspecified or overspecified. Coefficients of variables that are included are altered in the regression model to account for their correlations with relevant variables that are excluded. Conversely, coefficients of relevant variables that are included are altered to account for correlations with irrelevant variables that are included.

1. See Terry Dielman, *Applied Regression Analysis for Business and Economics*, 3rd ed. (Pacific Grove, Calif.: Duxbury, 2001), 406. "[I]ndicator variables are designed to have a particular meaning as a group. They are either all retained in the equation or all dropped from the equation as a group. Dropping individual indicators changes the meaning of the remaining indicators."

The apartment unit rent data illustration demonstrates the effect of underspecification. The model was initially underspecified because it included only one independent variable–*living area*. However, three other variables were found to be significant–*bedroom count*, *bath count*, and *on-site pool/spa/exercise facility*. These additional variables are correlated with *living area*. A correlation matrix (Table B.3) quantifies these relationships.

Table B.3 Rent Data Variable Correlations

	Living Area	Bedrooms	Baths	Pool/Spa/Exercise
Living Area	1			
Bedrooms	.780	1		
Baths	.419	.041	1	
Pool/Spa/Exercise	-.493	-.450	-.008	1

Note: Correlation, symbolized as *r*, can range from -1 to +1. Perfect negative correlation is -1, whereas perfect positive correlation is +1. When $r = 0$, two variables are uncorrelated (i.e., independent or orthogonal).

All three of the additional variables are significantly correlated with living area, indicating that omission of these variables from the model would distort the coefficient of the living area variable. This, in fact, occurred. The coefficient of living area was $0.574 per square foot in the simple linear regression model but was reduced to $0.47 in the multiple regression model. The $0.574 coefficient value was distorted by omitting variables that should have been included in the model. The multiple regression model provides a better estimate of unit rent and a less-distorted estimate of the effect of the amount of living area on rent.

In addition, the newly included variables are correlated with each other, sharing some explanatory power. For example, *living area* and *bedrooms* are correlated with *pool/spa/exercise facility*. It appears as though these amenities are more prevalent when the amount of living area is smaller and bedroom counts are lower. As a result of this correlation, the coefficient of the *pool/spa/exercise facility* variable would be distorted if the *living area* and *bedroom count* variables were inadvertently omitted from the model. The multiple regression model provides a better estimate of unit rent and a less-distorted estimate of the contributory value of additional living area, unclouded by the simple regression model's attempt to account for the number of bedrooms and baths and the presence of amenities. Because all four of the variables are significant, all of them should be included in the multiple regression model.

Model Validation

Reference books on statistics offer several suggestions for regression model validation, including

- collecting new data to assess the model's predictive ability on the new data

- comparing results with theory and with previously published empirical studies
- data splitting

Collecting new data is often not a practical option in applied valuation settings. Nevertheless, it is possible and recommended that analysts assess the signs of the variables in the regression equation and compare them with theoretical and intuitive expectations. Staying current on relevant published studies is an obvious priority and needs little discussion. The third option, data splitting, provides the most practical sample-specific and model-specific means of model validation and is worthy of further examination.

Data splitting, which is also known as *cross-validation*, requires that the data set be divided into two subsets: (1) a model-building set and (2) a validation set, usually referred to as a *holdout sample*. The holdout sample, which should be randomly chosen from the full data set, can be a small proportion of the full data set (e.g., 10% to 20%).

Two possible validation routines are recommended. The first routine is to compare the coefficients and significance levels derived from the model-building set with the coefficients and significance levels derived from a regression model using all of the data. The results should be consistent, otherwise a small number of influential observations may be affecting the model disproportionately. The second routine is to use the regression model derived from the model-building set to predict the dependent variable values for the holdout sample. One measure of how well the model predicts is to compute the correlation between the actual values in the holdout sample and the predicted values. The correlation should be high when the model is valid.

If the data set is too small to accommodate data splitting into a model-building sample and a holdout sample, then an alternative, but time-consuming, data-splitting procedure may be employed. The alternative procedure is to remove one observation from the data set, run the regression model with the remaining $n - 1$ observations, use the model to predict the value for the omitted observation, and repeat the procedure by sequentially omitting each observation in turn and reestimating the model and predicting the value for each omitted observation. This procedure will generate n holdout samples of $size = 1$. The predicted value for each holdout observation should correlate highly with the actual observed values. A subroutine in SAS statistical software can automate this procedure. Unfortunately, the procedure cannot be automated in SPSS, Minitab, or Excel.

If the results from these two validation routines are satisfactory, the model is likely to be valid. A final regression model employing all of the data would therefore be appropriate for valuation purposes.[2]

2. See John Neter, William Wasserman, and Michael H. Kutner, *Applied Linear Statistical Models: Regression, Analysis of Variance, and Experimental Designs*, 3rd ed. (Homewood, Ill.: Irwin, 1990), 465-470, for a more complete discussion of model validation.

Data Sufficiency

The thought process involved in making a decision regarding how many data observations are necessary for application of a regression model differs from the calculation of sample size for inferences about a mean, which was presented in Chapter 14. In regard to a regression model, the measure of data sufficiency is based on degrees of freedom–i.e., the relationship between the number of observations (n) and the number of independent variables in the model (k). When the ratio of n to k is too low, the model is considered "overfitted" and the regression outcome is in danger of being data-specific, not representative of the underlying population.

For example, consider a ratio of n to k of 2:1. It is always possible to connect two points with a straight line. In this case the coefficient of determination, R^2, would always be equal to 1 in a simple linear regression model. However, the model may not actually explain anything. Since R^2 and the ability to generalize from a sample to a population are affected by the ratio of n to k, many researchers suggest that the minimum ratio should be in the range of 10 to 15 observations per independent variable,[3] with a ratio of 4:1 to 6:1 as an absolute minimum.[4] One indication of an overfit model due to a ratio of n to k that is too low is an increase in adjusted R^2 as the least-significant variables are removed from the model.

The multiple regression model example using the apartment rent data includes 36 observations (n) and four independent variables (k). The ratio of n to k is 9:1, which is less than optimal but more than the absolute minimum. If additional variables such as *apartment age*, *location*, *condition*, *parking ratio*, and the like were to be added to the regression model, then more data would be required to accommodate the expansion of the model.

Underlying Regression Model Assumptions

In addition to the linearity of the relationship of variables, regression modeling has several other important theoretical underpinnings, generally referred to as the *assumptions of regression*.[5] The additional assumptions are that

- Errors are normally distributed.
- Variance is homoscedastic.
- Errors are independent.
- The explanatory variables are not highly interrelated.

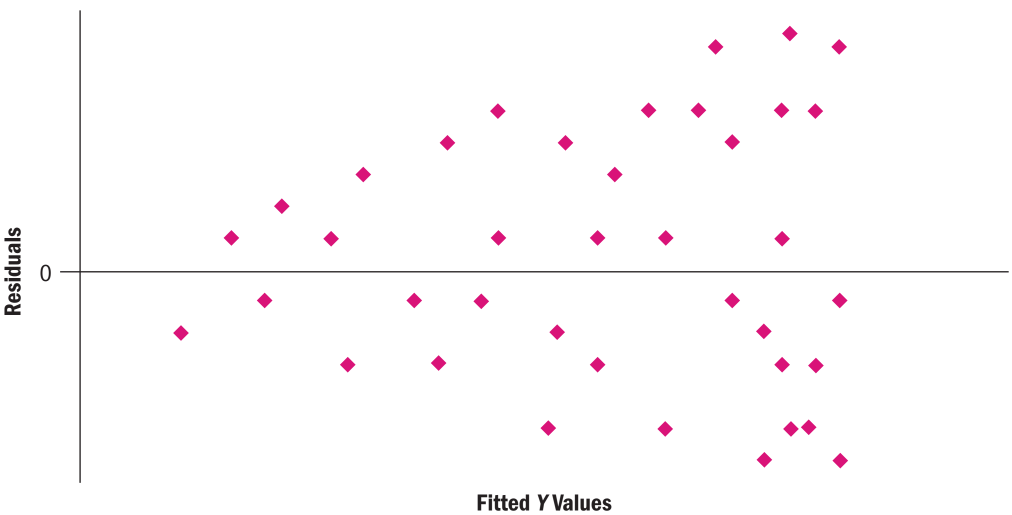
The normality assumption means that the errors around the regression line are normally distributed for each independent variable value.

3. Joseph F. Hair, Rolph E. Anderson, Ronald L. Tatham, and William C. Black, *Multivariate Data Analysis with Readings*, 3rd ed. (New York: Macmillan, 1992), 46.
4. Hair, et al., caution readers that a ratio of 4:1 is an absolute minimum, whereas Neter, et al., refer to a ratio of 6:1 to 10:1 as a minimum.
5. An easy-to-read and understandable text dealing solely with regression modeling is Terry Dielman, *Applied Regression Analysis for Business and Economics*, 3rd ed. (Pacific Grove, Calif.: Duxbury, 2001). The book devotes an entire chapter to identification of and correction for violations of underlying regression model assumptions.

Regression models are fairly resistant to violations of the normality assumption as long as error distributions are not dramatically different from normal.[6] This assumption is important because it is the basis for the validity of the *F*-tests and *t*-tests of model and variable significance, and it provides the mathematical basis for the calculation of confidence intervals. The detrimental effects of non-normality are diminished as sample size increases.

Homoscedasticity refers to variation around the regression line that is equal for all values of the independent variable. When this assumption is violated (i.e., when the data is *heteroscedastic*), significant variable coefficients are apt to appear to be insignificant and confidence intervals will be skewed due to systematic variation in error variance. A simple way to check for violation of the homoscedasticity assumption is by examining a plot of residuals against the independent variables or the fitted values of the dependent variable. The data set is homoscedastic, not heteroscedastic, when the distribution of residuals is similar across the range of each independent variable or the fitted values of the dependent variable. A plot showing systematic narrowing or widening of the range of residual values as the values of an independent variable or fitted values of the dependent variable change is an indication of a model that violates the assumption of homoscedasticity. Figure B.5 shows the residuals (e) plotted against the fitted values of the dependent variable ($\hat{Y}$). Note that the residuals are more tightly packed when the fitted values of the dependent variable are small and less tightly packed when

Figure B.5 Scatter Plot Illustrating Nonconstant Error Variance



6. David M. Levine, Timothy C. Krehbiel, and Mark L. Berenson, *Business Statistics: A First Course*, 3rd ed. (Upper Saddle River, N.J.: Prentice Hall, 2003), 436.

the fitted values are large. The data appear to be heteroscedastic, and error variance is directly related to the value of the dependent variable.

Suggested corrections for violation of this assumption include

- replacing the values of the dependent variable with the natural logarithm of the dependent variable (i.e., a log transformation)
- replacing the values of the dependent variable with the square root of the dependent variable (i.e., a square root transformation)

These two transformations replace the dependent variable with less-variable functional forms. However, the replacement variables are undefined for negative numbers. If the size of the residual is correlated with the values of one of the independent variables, then the values of the correlated independent variable can assist in stabilizing the variance by dividing the regression equation by the correlated independent variable (known as *weighted least squares*). For example, consider a simple regression equation *price* = $\alpha + \beta$ (*size*), where size is measured in square feet. If a plot shows residual variance increasing as size increases, then division of the model by size should correct the heteroscedasticity problem. The resulting regression model would be

$$\frac{Price}{Size} = \alpha \frac{1}{(Size)} + \beta$$

In the new size-weighted equation, α becomes the regression coefficient on the reciprocal of size and β becomes the constant term. The resulting regression model would estimate price per square foot as a function of the reciprocal of size, which can be easily transformed into a price estimate. More precise corrections can often be obtained by raising the independent variable divisor (the *size* variable in this example) to an exponential power. For instance, SPSS includes a weighted least squares procedure that tries numerous exponents and identifies the one that works best.

Violation of the assumption of error independence most often occurs with time-series data. Residuals in sequential time periods may be correlated as a result of occurrences in a prior time period influencing subsequent time periods. This phenomenon is referred to as *serial correlation* or *autocorrelation*. Variable coefficient estimates remain unbiased under conditions of autocorrelation, however the standard errors of the coefficients are biased, which affects the validity of *t*-statistics produced by a regression model. The Durbin-Watson test is one well-known means of testing for first-order autocorrelation (correlation between a residual and the next residual in a time sequence).

High interrelation among independent variables is referred to as *multicollinearity*. When this occurs, the independent variables share explanatory power and consequently the coefficients on the correlated independent variables are biased. Multicollinearity is often difficult to correct. When possible, gathering more data (i.e., increasing *n*) may help. Also, data reduction methods such as factor analysis and the use of proxy variables can be employed to gather correlated variables together into a single representative construct. Ridge regression has also historically been suggested as a means of dealing with multicollinearity.[7]

It is important to note that multicollinearity has no effect on a model's predictive ability, assuming the model is well specified. Multicollinearity does seriously affect structural interpretation of a model's coefficients. If multicollinearity results in inclusion of superfluous variables that would otherwise be excluded, then the loss in degrees of freedom due to their inclusion will lead to a loss of some predictive power. Investigation of the existence of multicollinearity includes analysis of a matrix of independent variable correlation and an examination of regression model multicollinearity diagnostics including variance inflation factors (VIFs). Most statistical packages will generate VIFs, but they are not available in Excel. The general rule of thumb is that no VIF should be greater than 10 and the mean VIF should not be considerably larger than 1.[8] Note that a VIF of 10 equates to multiple correlation of 0.95, which may be excessive in many instances. Some analysts suggest a maximum VIF of 5 as a criterion for multicollinearity, which implies multiple correlation below 0.90.[9] In the multiple regression example using the garden apartment observations, variance inflation factors are 4.7 (*living area*), 3.4 (*bedrooms*), 1.7 (*baths*), and 1.4 (*pool/spa/exercise*).

Misuse of Statistical Methods

Statistical methods are powerful tools for summarizing and describing data. They are also useful for making inferences about population parameters and the construction of predictive models. Unfortunately, they are also easily and frequently misused. Abuse usually falls into one or both of two categories:

- overt attempts to mislead
- ignorance

Manipulating the scale of charts, providing insufficient categories in frequency distributions and related histograms, and intentionally omitting variables in regression models are examples of attempts to mislead. Other practices, such as unknowingly violating the underlying assumptions of regression, using too low a ratio of n to k, and failing to recognize the limitations on sample representativeness, could be the result of simple ignorance.

One rarely discussed problem in appraisal applications of statistical analysis is how well a statistical sample represents the larger population.

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7. See also Graeme J. Newell, "The Application of Ridge Regression to Real Estate Appraisal," *The Appraisal Journal* (January 1982): 116-119; Alan K. Reichert, James S. Moore, and Chien-Ching Cho, "Stabilizing Statistical Appraisal Models Using Ridge Regression," *The Real Estate Appraiser and Analyst* (Fall 1985): 17-22; Doug Sweetland, "Ridge Regression: A Word of Caution," *The Appraisal Journal* (April 1986): 294-300; and Jonathon Mark, "Multiple Regression Analysis: A Review of the Issues," *The Appraisal Journal* (January 1988): 89-109.
8. Neter, et al., 409-410.
9. Hair, et al., 48.

This problem stems from the fact that real property sales are generally not randomly selected from the population they are purported to represent. In some instances, sales are representative even though they have not been randomly selected, and inferences are appropriate. However, in other instances some underlying cause may have had a temporary or location-specific influence on the decision to offer certain properties for sale, and data affected by that influence may not be representative of the market as a whole. In these situations, inferences derived from sales data may not provide a true picture of the overall market.

It is incumbent upon professional analysts to provide charts, tables, and graphs that accurately reflect the data being presented. In addition, those who employ inferential statistical methods should be competent–i.e., educated in inferential methods and experienced with the software being used. The burden of proof of competence and lack of bias ultimately lies with the analyst.

Frequently encountered problems of statistical misuse include

- failure to fully understand the ramifications of violating the assumptions underlying regression models
- failure to test and assess the validity of a regression model and its underlying assumptions
- failure to correct regression models when necessary to adequately comply with the underlying assumptions

Three particularly problematic areas explained earlier are multicollinearity, heteroscedasticity, and autocorrelation. Multicollinearity often results in variable signs that are theoretically or intuitively incorrect and the apparent insignificance of variables that share explanatory power. Heteroscedasticity masks the significance of otherwise significant explanatory variables. Autocorrelation fails to account for historical influence on a time-series variable.

Other common problems result from the misspecification of regression models including "overfitting" where the ratio of n to k is too low, inclusion of irrelevant variables, and omission of important variables. Note that inclusion of any variable, relevant or not, will result in an increase in the coefficient of determination, R^2. Adjusted R^2 provides a test of whether inclusion of an additional variable adds sufficient explanatory power. When adjusted R^2 does not increase with the addition of another variable, the additional variable is most likely irrelevant. (The additional variable should probably be included, however, if there is strong theoretical support for its importance to the relationship being studied.)

In conclusion, credible regression modeling includes an assessment of data sufficiency, a residual analysis, an assessment of which variables should be included in a model, and model validation. Regarding data sufficiency, due to the required ratio of n to k, an analyst often has too few observations to facilitate inclusion of all of the variables known or thought to be important. To ensure credibility the analyst must assess the need for and availability of additional data or explore means of variable reduction such as factor analysis or proxy variables. In addition, the appraiser's workfile should include an analysis of residuals regarding the assumptions underlying any model employed and an assessment of functional form and support for the variables included.

As a final caution, be aware that although modern statistical software is easy to use, its use can contribute to the production of a less-than-credible work product when the steps required to ensure credible model building are overlooked.

Financial Formulas

Financial Calculator Basics

The financial calculator freed mortgage brokers, appraisers, and other real estate professionals from dependence on printed tables of compound interest rates and sinking fund factors. Previously, calculating the present value of an investment or the growth of compound interest involved relatively simple algebraic calculations, assuming the appropriate interest rate or factor could be found in the financial tables. A typical collection of compound interest rate tables, however, would only include quarter-point increments, so calculating the future value of a loan made at an 8.55% annual rate forced the analyst to make an educated guess based on data in the 8½% and 8¾% tables or to use the financial formula $S^n = (1 + i)^n$. In contrast, the analyst who uses a financial calculator can choose any rate or holding period in calculations related to the *six functions of one*, which is a significant advance in flexibility and accuracy over working with financial tables.

Hewlett Packard's HP-12C financial calculator, in particular, is notable for its simplicity and staying power. It has remained relatively unchanged in form and function since its introduction in the early 1980s. The newer HP-12C Platinum calculator includes the ability to toggle between algebraic and Reverse Polish Notation systems and has more memory spaces, but otherwise the more recent version performs the same mathematical and statistical functions.

Reverse Polish Notation (RPN) refers to a mathematical order of operations developed to facilitate chain calculations. In short, numerals are entered before mathematical operators. For example, the sequence of keystrokes used to perform the arithmetic function 5 + 2 on a typical calculator and the output display at each step would be

Keystrokes	Display
5	5
[+]	5 +
2	2
[=]	7

On an RPN calculator, the sequence of keystrokes and output would be

Keystrokes	Display
5	5
[ENTER]	5.00
2	2
[+]	7.00

Compare two sample sequences of keystrokes for a more complex series of calculations, say, for the arithmetic expression (5 + 2) × (12 – 4):

Algebraic Keystrokes	RPN Keystrokes
5	5
[+]	[ENTER]
2	2
[=]	[+]
[STO]	12
12	[ENTER]
[−]	4
4	[−]
[=]	[X]
[X]	
[RCL]	
[=]	

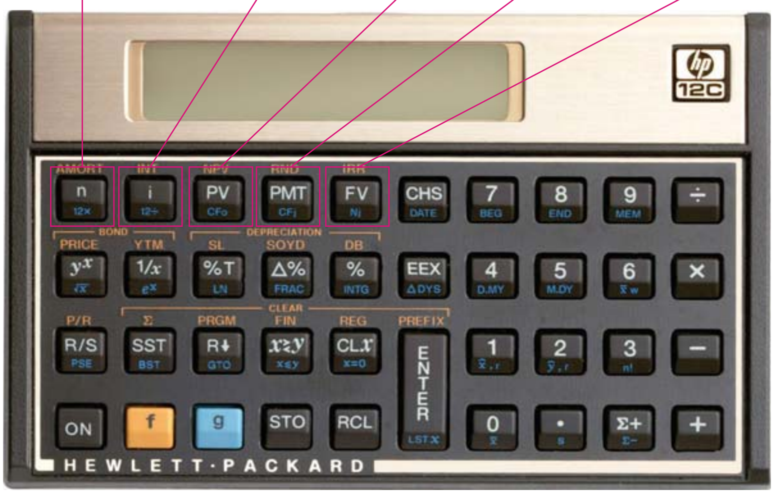
Using the algebraic keystrokes, the interim result of the first parenthetical expression must be stored in the calculator's memory or jotted down on a piece of scrap paper and reentered at the appropriate point in the chain of calculations. An HP-12C, however, automatically stores the displayed figures in continuous storages areas known as *stack registers*. (The function and operation of the storage registers in a financial calculator are explained in detail in the owner's manual.) Note that the route to the answer has no effect on the answer itself.

Performing simple mathematical calculations using Reverse Polish Notation can take some getting used to, but the benefits gained in performing financial analysis on a financial calculator are well worth it. Not only does the calculation using RPN require fewer keystrokes in the example above but, for experienced real estate professionals, the keystrokes become more intuitive than similar calculations would be on a calculator using a different operating system.

Common uses of a financial calculator by real estate professionals include computing mortgage payments (i.e., amortization calculations), discounting cash flows, and, of particular importance to residential appraisers, making cash equivalency adjustments for comparable sales with atypical financing or concessions.

Most of the variables related to the time value of money can be calculated with a few keystrokes. These variables have a prominent place across the top of the HP-12C keypad:

n	**i**	**PV**	**PMT**	**FV**
number of compounding periods	periodic interest rate	present value (lump sum)	periodic payment (recurring)	future value (lump sum)



As an example, consider a fully amortized $150,000 mortgage loan with a 30-year term at a fixed rate of 6.35%. Calculating the monthly payment is straightforward using the HP-12C. The known mortgage terms are input, and the calculator then solves for the variable requested:

Calculation	**Keystrokes**	**Display**
Enter the term of the loan (and convert to number of months)	30 [g] [n]	360.00
Enter the annual interest rate (and convert to the effective monthly interest rate)	6.35 [g] [i]	0.53
Enter the loan amount	150,000 [CHS] [PV]	-150,000.00
Calculate the monthly payment	[PMT]	933.35

An analyst can then compare the result, $933.35, to market rent for a comparable property in the market area and answer the client's question of whether to buy or rent. A sophisticated user can extend the chain of calculations to determine the equity build-up at any point in the term of the loan, change the interest rate at a certain point in the loan term to model refinancing, and make other changes to address many other situations.

Note that other sequences of keystrokes could be used to solve the same problem with the HP-12C. For example, in the sequence of keystrokes above, the annual interest rate could be entered before the term of the loan without affecting the results generated in solving for the payment.

A financial calculator facilitates the calculation of annual, biannual, quarterly, or even daily payments, and allows for quick comparisons of various loan terms. As an example, consider the same loan with annual, end-of-year payments:

Calculation	**Keystrokes**	**Display**
Clear the registers	$\boxed{\text{f}}$ $\boxed{\text{CLx}}$	0.00
Enter the term of the loan (in years)	30 $\boxed{\text{n}}$	30.00
Enter the annual interest rate	6.35 $\boxed{\text{i}}$	6.35
Enter the loan amount	150,000 $\boxed{\text{CHS}}$ $\boxed{\text{PV}}$	1150,000.00
Calculate the monthly payment	$\boxed{\text{PMT}}$	11,308.53

The annual payment, \$11,308.53, works out to be a larger amount than the total of a dozen monthly payments ($12 \times \$933.35 = \$11,200.20$) in the same year even though the same nominal interest rate, 6.35%, is used in both calculations. When annual payments are made, the principal is only reduced at the end of each year, so the amount of interest paid in that year is calculated based on the entire principal balance at the beginning of the year. In contrast, the principal balance (from which the portion of the monthly payment attributable to interest is calculated) drops incrementally in a monthly amortization schedule.[1] As a result, over the course of the year the portion of the \$933.35 monthly payment attributable to the lender's return on the investment (i.e., the interest paid on the loan) becomes smaller. The difference between one annual payment and the total of 12 monthly payments on a loan reflects the time value of money. The cash flows received throughout the year have a higher future value than the income the lender receives at the end of the year because those funds can be reinvested and continue to grow.

More sophisticated analyses with a financial calculator include calculating the payment schedule, yield, and price or present value of balloon mortgages, graduated payment mortgages, wraparound loans, construction loans, and other types of loans. In addition to mortgage analysis, a financial calculator can be used in the application of the income capitalization approach to calculate lease payments, the future value of an investment, discount rates, or other information needed for discounted cash flow analyses.

1. As an illustration of the decrease in interest paid as a portion of the constant monthly payment, consult typical amortization schedules readily available online from lenders, mortgage brokers, and others.

Basic Formulas

Symbols

I = income
R = capitalization rate
V = value
M = mortgage ratio
DCR = debt coverage ratio
F = capitalization factor (multiplier)
GIM = gross income multiplier
$EGIM$ = effective gross income multiplier
NIR = net income ratio

Subscript:

O = overall property
M = mortgage
E = equity
L = land
B = building
LF = leased fee
LH = leasehold

Basic Income/Cap Rate/Value Formulas

$I = R \times V$

$R = I/V$

$V = I/R$

Basic Value/Income/Factor Formulas

$V = I \times F$

$I = V/F$

$F = V/I$

Adaptations for Mortgage/Equity Components

Band of investment (using ratios)

$$R_O = M \times R_M + [(1 - M) \times R_E]$$

$$R_E = \frac{R_O - (M \times R_M)}{1 - M}$$

Equity residual

$$V_O = \frac{I_O - (V_M \times R_M)}{R_E} + V_M$$

$$R_E = \frac{I_O - (V_M \times R_M)}{V_E}$$

Mortgage residual

$$V_O = \frac{I_O - (V_E \times R_E)}{R_M} + V_E$$

Debt coverage ratio

$$R_O = DCR \times M \times R_M$$

$$DCR = \frac{R_O}{M \times R_M}$$

$$M = \frac{R_O}{DCR \times R_M}$$

Cap Rate/Factor Relationships

$$R = 1/F$$

$$R_O = NIR/GIM$$

$$R_O = NIR/EGIM$$

Note: *NIR* may relate to scheduled gross or effective gross income; care should be taken to ensure consistency.

Adaptations for Land/Building Components

Land residual

$$V_O = \frac{I_O - (V_B \times R_B)}{R_L} + V_B$$

$$R_L = \frac{I_O - (V_B \times R_B)}{V_L}$$

Building residual

$$V_O = \frac{I_O - (V_L \times R_L)}{R_B} + V_L$$

$$R_B = \frac{I_O - (V_L \times R_L)}{V_B}$$

Discounted Cash Flow Analysis Formulas

Symbols

PV = present value
CF = cash flow
Y = yield rate
R = capitalization rate
Δ = change
a = annualizer
$1/S_{\overline{n|}}$ = sinking fund factor
$1/n$ = 1/projection period
CR = compound rate of change
V = value

Subscript:
n = projection periods
O = overall property
I = income

Discounted Cash Flows/Present Value (DCF/*PV*)

$$PV = \frac{CF_1}{(1+Y)} + \frac{CF_2}{(1+Y)^2} + \frac{CF_3}{(1+Y)^3} + \dots + \frac{CF_n}{(1+Y)^n}$$

Basic Capitalization Rate/Yield Rate/Value Change Formulas

$$R = Y - \Delta a$$
$$Y = R + \Delta a$$
$$\Delta a = Y - R$$
$$\Delta = \frac{Y - R}{a}$$

Adaptations for Common Income/Value Patterns

Pattern	Premise	Cap Rate (R)	Yield Rate (Y)	Value Change (Δ)
Perpetuity	$\Delta = 0$	$R = Y$	$Y = R$	
Level annuity*	$a = 1/S_{\overline{n|}}$	$R = Y - \Delta 1/S_{\overline{n|}}$	$Y = R + \Delta 1/S_{\overline{n|}}$	$\Delta = \frac{Y-R}{1/S_{\overline{n|}}}$
Straight-line change	$a = 1/n$	$R = Y - \Delta 1/n$	$Y = R + \Delta 1/n$	$\Delta = \frac{Y-R}{1/n}$
Exponential change	$\Delta a = CR$	$R_O = Y_O - CR$	$Y_O = R_O + CR$	$\Delta = (1+CR)^n - 1$

* Inwood premise: $1/S_{\overline{n|}}$ at Y rate; Hoskold premise: $1/S_{\overline{n|}}$ at safe rate

Straight-Line Change* in Income	Straight-Line Change* in Value	Compound Rate of Change
$\$\Delta_I = V \times \Delta 1/n \times Y$	$\$\Delta 1/n = \$\Delta_I / Y$	$CR = \sqrt[n]{FV/PV} - 1$
$\Delta_I = \frac{Y \times \Delta 1/n}{Y - \Delta 1/n}$	$\Delta 1/n = \frac{Y \times \Delta_I}{Y + \Delta_I}$	$CR = Y_O - R_O$

* In these formulas Δ_I is the ratio of one year's change in income to the first year's income.

Six Functions of One

The following formulas may be used to convert the annual constant (R_M) for a monthly payment loan to the corresponding monthly functions.

Function for Monthly Frequency	Formula
Amount of one	$S^n = \dfrac{R_M}{R_M - I}$
Amount of one per month	$S^n = \dfrac{12}{R_M - I}$
Sinking fund factor	$1/S_{\overline{n}\rceil} = \dfrac{R_M - I}{12}$
Present value of one	$1/S^n = \dfrac{R_M - I}{R_M}$
Present value of one per month	$a_{\overline{n}\rceil} = \dfrac{12}{R_M}$
Partial payment	$1/a_{\overline{n}\rceil} = \dfrac{R_M}{12}$

In these formulas, I = nominal interest rate.

Present Value of Level Annuities

The Inwood Premise

The Inwood premise applies to income that is an ordinary level annuity. It holds that the present value of a stream of income is based on a single discount rate. Each installment of income is discounted with a single discount rate, and the total discounted values of the installments are accumulated to obtain the present value of the income stream. The present value of a series of $1 payments can be found in compound interest tables for a given rate and a given period of time. It is assumed that the income will be sufficient to return all investment capital to the investor and to pay the specified return on the investment.

In most mortgages the amount of interest declines gradually over the holding period and is calculated as a specified percentage of the unrecaptured capital. Any excess over the required interest payment is considered a return of capital and reduces the amount of capital remaining in the investment. Because the installments are always the same amount, the principal portion of the payments increases by the same amounts that the interest portion of the payments decreases. It is also valid, but not customary, to see the interest payments as constant, always amounting to the specified return on the original investment, with any excess over the required, fixed-interest payments credited to a hypothetical sinking fund that grows with interest at the same rate to repay the original investment.

An Inwood capitalization rate can be constructed by adding the interest rate to a sinking fund factor ($1/S_{\overline{n}\rceil}$) that is based on the same interest rate and duration as the income stream. The resulting capitalization rate is simply the reciprocal of the ordinary level annuity (present value of one per period) factor found in financial tables. Thus, the Inwood premise is consistent with the use of compound interest tables to calculate the present value of the income stream.

The Inwood premise applies only to a level stream of income. Therefore, the present value of any expected reversion or other benefit not included in the income stream must be added to obtain the total present value of the investment. For example, assume that the net operting income (I_O) of a property is \$10,000 per year for five years. What is the value of the property assuming an overall yield rate (Y_O) of 10% under the Inwood premise?

Solution 1

Apply the *PV* of 1 per period (ordinary level annuity) factor to the I_O:

$$3.79079 \times \$10{,}000 = \$37{,}908 \text{ (rounded)}$$

Solution 2

The general yield capitalization formula can also be used for a level income with a percentage change in value:

$$R_O = Y_O - \Delta_O \, 1/S_{\overline{n}|}$$

Because there is no reversion, the property will lose 100% of its value. Thus, Δ_O is -1.0 and the yield capitalization formula becomes

$$R_O = Y_O + 1/S_{\overline{n}|}$$

With appropriate inputs, this equation represents the Inwood premise. By substituting the data given in the example, R_O can be solved for as follows:

$$R_O = 0.10 + 0.163797$$
$$R_O = 0.263797$$

The value of the property may be estimated using the basic valuation formula:

$$V_O = I_O / R_O$$
$$= \$10{,}000/0.263797$$
$$= \$37{,}908 \text{ (rounded)}$$

Note that the sinking fund factor ($1/S_{\overline{n}|}$) is based on a 10% discount rate, which implies that a portion of the I_O could be reinvested at 10% to replace the investment. It can be said that Y_O represents the return on capital and $1/S_{\overline{n}|}$ represents the return of capital.

The Inwood premise assumes a constant rate of return on capital each year with the return of capital being reinvested in a sinking fund at the same yield rate as Y_O. The amount accumulated in this sinking fund can be used to replace the asset at the end of its economic life. Using the assumptions applied in the preceding example, the net operating income for the first year may be allocated as follows:

I_O	\$10,000.00
Return on Capital (10% of \$37,908)	– \$3,790.80
Return of Capital	\$6,209.20

If the return of capital (\$6,209.20) is placed in a sinking fund earning 10%, the fund will accumulate to \$37,908 over five years. The sinking fund accumulation factor (future value of one per period), $S_{\overline{n}|}$, is applied to the return of capital:

$$6.1051 \times \$6{,}209.20 = \$37{,}908$$

This is the exact amount required to replace the asset.

The Hoskold Premise

The Hoskold premise differs from the Inwood premise in that it employs two separate interest rates:

- a speculative rate, representing a fair rate of return on capital commensurate with the risks involved
- a safe rate for a sinking fund, designed to return all the invested capital to the investor in a lump sum at the termination of the investment

In contrast to the Inwood premise, the Hoskold premise assumes that the portion of net operating income needed to recover or replace capital (the return of capital) is reinvested at a "safe rate"–e.g., the prevailing rate for insured savings accounts or government bonds–which is lower than the "speculative" yield rate (Y_O) used to value the other portion of I_O. Like the Inwood premise, the Hoskold technique was designed to be applied when the asset value of the investment decreases to zero over the holding period. However, Hoskold assumed that funds would have to be set aside at a lower, safe rate to replace the asset at the end of the holding period. Hoskold suggested that this technique might be appropriate for valuing wasting assets such as a mine where the value is reduced to zero as minerals are extracted; thus funds have to be set aside to invest in a new mine once the minerals are totally depleted–i.e., the reversion equals zero.

Using the same net operating income, yield, and term set forth in the previous example, assume that a portion of I_O has to be set aside at a 5% safe rate to allow for the recovery of capital at the end of every five-year period. All other assumptions remain the same. This problem may be solved with the same yield capitalization formula applied in the Inwood calculation, but the sinking fund factor ($1/S_{\overline{n}|}$) is based on the safe rate of 5% rather than the yield rate of 10%. Thus, the overall rate is calculated as follows:

$$\begin{aligned} R_O &= Y_O + 1/S_{\overline{n}|} \\ &= 0.10 + 0.180975 \\ &= 0.280975 \end{aligned}$$

Because the sinking fund factor ($1/S_{\overline{n}|}$) is calculated at a 5% rate rather than the 10% rate, the capitalization rate is higher and the value is lower. The value is calculated as:

$$\begin{aligned} V_O &= I_O / R_O \\ &= \$10{,}000/0.280975 \\ &= \$35{,}590 \text{ (rounded)} \end{aligned}$$

The lower value is a result of setting aside the portion of I_O earning 5% to allow for the recovery of capital ($35,590) at the end of five years. The income allocation for the first year can be shown as follows:

I_O	$10,000
Return on Capital (10% of $35,590)	– 3,559
Return of Capital	$6,441

To find the future value of $6,441 at 5% for five years, apply the sinking fund accumulation factor (future value of one per period), $S_{\overline{n}|}$, to the return of capital:

$$5.525631 \times \$6,441 = \$35,590$$

The result is the exact amount required to recover the capital invested.

Present Value of Increasing/Decreasing Annuities

Straight-Line Changes

To obtain the present value of an annuity that has a starting income of d at the end of the first period and *increases h dollars* per period for n periods:

$$PV = (d + h\,n)\,a_{\overline{n}|} - \frac{h\,(n - a_{\overline{n}|})}{i}$$

To obtain the present value of an annuity that has a starting income of d at the end of the first period and *decreases h dollars* per period for n periods, simply make h negative in the formula.

Exponential-Curve (Constant-Ratio) Changes

To obtain the present value of an annuity that starts at $1 at the end of the first period and increases each period thereafter at the rate x for n periods:

$$PV = \frac{1 - (1 + x)^n/(1 + i)^n}{i - x}$$

where i is the periodic discount rate and x is the ratio between the increase in income for any period and the income for the previous period.

To obtain the present value of an annuity that starts at $1 at the end of the first period and decreases each period thereafter at rate x, simply make x negative in the formula.

Rates of Return

Symbols

PV = present value
NPV = net present value
CF = cash flow
i = discount rate (in NPV formula)
n = projection period
IRR = internal rate of return
PI = profitability index
$MIRR$ = modified internal rate of return
$FVCFj$ = future value of a series of cash flows
i = reinvestment rate (in $MIRR$ formula)

Subscript:
0 = at time zero
1 = end of 1st period
2 = end of 2nd period
3 = end of 3rd period
n = end period of series

Net Present Value (*NPV*)

$$NPV = CF_0 + \frac{CF_1}{(1+i)} + \frac{CF_2}{(1+i)^2} + \frac{CF_3}{(1+i)^3} + \ldots + \frac{CF_n}{(1+i)^n}$$

Internal Rate of Return (*IRR*)

Where $NPV = 0$; $IRR = i$

Profitability Index (*PI*)

$$PI = PV/CF_0$$

Modified Internal Rate of Return (*MIRR*)

$$MIRR = \sqrt[n]{\frac{FVCFj}{CF_0}} - 1$$

$$MIRR = \sqrt[n]{\frac{CF_1\,(1+i)^{n-1} + CF_2\,(1+i)^{n-2} + CF_3\,(1+i)^{n-3} + \ldots + CF_n}{CF_0}} - 1$$

Note: In these formulas individual *CF*s may be positive or negative for *PV* and *NPV* solutions; however, CF_0 is treated as a positive value for *PI* and *MIRR* solutions.

Mortgage Interests

Mortgage investments have a great impact on real property value and equity yield rates. Because yield is a significant consideration in the lender's decision to invest in a mortgage interest in real estate, the lender's yield must be understood and often calculated. In the absence of points and any participation or accrual feature, the lender's yield equals the interest rate.

Mortgage information used to value income-producing properties may include

1. The monthly or periodic payments and annual debt service on a level-payment, fully amortized loan
2. The accompanying partial payment factors and annual constants (R_M)
3. The balance outstanding (B) on an amortized loan at any time before it is fully amortized, expressed as a dollar amount or a percentage of the original loan amount
4. The percentage or proportion of the principal amount paid off before full amortization (P)

Mortgage Components

Periodic (Monthly) Payment

The monthly payment factor for a fully amortized, monthly payment loan with equal payments is the direct reduction loan factor, or *monthly constant*, for the loan, given the interest rate and amortization term. Thus, the monthly payment factor for a 30-year, fully amortized, level monthly payment loan at 15.5% interest is 0.013045. This number can be obtained from a direct reduction loan table or by solving for the monthly payment (PMT) on a financial calculator, given the number of periods (n), the interest rate (i), and the principal loan amount.

If the loan had an initial principal amount of $160,000, the monthly payment required to amortize the principal over 30 years and provide interest at the nominal rate of 15.5% on the outstanding balance each month would be

$$\$160{,}000 \times 0.013045 = \$2{,}087.20$$

Annual Debt Service and Loan Constant

Cash flows are typically converted to an annual basis for real property valuation, so it is useful to calculate the amount of annual debt service as well as the monthly payments. For the 30-year, fully amortized, level monthly payment loan of $160,000 at a 15.5% interest rate, the annual debt service is

$$\$2{,}087.20 \times 12 = \$25{,}046.40$$

The annual loan constant is simply the ratio of annual debt service to the loan principal. (The annual loan constant, often called the *mortgage constant*, describes a rate although it is actually the annual debt service per dollar of mortgage loan outstanding, which may be expressed as a dollar amount.) The annual loan constant is expressed as R_M to signify that it is a capitalization rate for the loan or debt portion of the real property investment. For the loan mentioned, the annual loan constant can be calculated as follows:

$$\begin{aligned} R_M &= \frac{\text{Annual Debt Service}}{\text{Loan Principal}} \\ &= \frac{\$25{,}046.40}{\$160{,}000.00} \\ &= 0.156540 \end{aligned}$$

The annual loan constant can also be obtained when the amount of the loan principal is not known. In this case, the monthly payment factor is simply multiplied by 12.

$$\begin{aligned} R_M &= \text{Monthly Payment Factor} \times 12 \\ &= 0.013045 \times 12 \\ &= 0.156540 \end{aligned}$$

Although these figures are rounded to the nearest cent, in actual practice most loan constants are rounded up to make sure that the loan will be repaid during the stated amortization period.

Outstanding Balance

Properties are frequently sold, or loans may be refinanced, before the loan on the property is fully amortized. Furthermore, loans often mature before the completion of loan amortization. In such cases there is an outstanding balance or balloon payment due on the note; from the lender's point of view, this is the loan or debt reversion to the lender.

The outstanding balance (B) on any level-payment, amortized loan is the present value of the debt service over the remaining amortization period discounted at the interest rate. Thus, at the end of 10 years, the balance for the 30-year note discussed above would be the present value of 20 years of remaining payments. The balance is calculated by multiplying the monthly payment by the present value of one per period factor (monthly) for 20 years at the interest rate. The balloon payment, or future value, may be calculated.

$$B = \$2{,}087.20 \times 73.861752$$
$$= \$154{,}164.25$$

Similarly, the outstanding balance at the end of 18 years would be equal to the monthly payment times the present value of one per period factor (monthly) for 12 years at the interest rate.

$$B = \$2{,}087.20 \times 65.222881$$
$$= \$136{,}133.20$$

The outstanding balance on a loan can also be expressed as a percentage of the original principal. This is useful, and sometimes necessary, if dollar amounts are not given or are unavailable. For a 10-year projection with 20 years remaining on the note, the outstanding balance is

$$B = \frac{\$154{,}164.25}{\$160{,}000.00}$$
$$= 0.963527$$

For an 18-year projection with 12 years remaining on the note, the balance is

$$B = \frac{\$136{,}133.20}{\$160{,}000.00}$$
$$= 0.850833$$

A percentage balance can also be calculated as the ratio of the present value of one per period factor for the remaining term of the loan at the specified interest rate divided by the present value of one per period factor for the full term of the loan at the interest rate. This can be expressed as

$$B = \frac{PV\ 1/P\ \text{Remaining Term}}{PV\ 1/P\ \text{Full Term}}$$

In the case of the 30-year, 15.5% loan, the balance for a 10-year projection with 20 years remaining is calculated as

$$B = \frac{73.861752}{76.656729}$$
$$= 0.963539$$

For an 18-year projection with 12 years remaining, the balance would be

$$B = \frac{65.222881}{76.656729}$$
$$= 0.850844$$

These results are similar to those obtained using dollar amounts.

Percentage of Loan Paid Off

It is often necessary to calculate the percentage of the loan paid off before full amortization over the projection period, especially in Ellwood mortgage-equity analysis. The percentage of the loan paid off is expressed as P and is most readily calculated as the complement of B.

$$P = 1 - B$$

For the 30-year note, P is calculated as follows:

$$\begin{aligned} P_{10} &= 1 - 0.963539 \\ &= 0.036461 \\ P_{18} &= 1 - 0.850844 \\ &= 0.149156 \end{aligned}$$

The percentage of the loan paid off prior to full amortization over the projection period (P) can also be calculated directly. There are many different procedures for this operation and they are not all presented here. Calculator users are advised to consult their manuals on the AMORT function.

The simplest, most direct procedure is to calculate P as the ratio of the sinking fund factor for the full term (monthly) divided by the sinking fund factor for the projection period (monthly).

$$P = \frac{1/S_{\overline{n}|}}{1/S_{\overline{n}|_p}}$$

For the 30-year monthly payment note at 15.5%, the calculations are

$$P_{10} = \frac{0.000129}{0.003524} = 0.036606 \qquad P_{18} = \frac{0.000129}{0.000862} = 0.149652$$

Any differences are due to rounding.

Lender's Yield

To illustrate how the lender's yield on a mortgage loan investment is calculated, consider a mortgage loan with the following characteristics.

Loan amount	$100,000
Interest rate	13.5%
Term	25 years
Payment	Monthly
Balance in five years	$96,544
Points	3
Other costs	Borrower to pay all other costs

If the mortgage runs full term, the yield can be obtained using a calculator.

$$\begin{aligned} n &= 300 \\ PMT &= \$1{,}165.65 \\ PV &= \$97{,}000 \text{ (\$100,000 less 3 points, or \$3,000)*} \\ i &= 13.97\% \end{aligned}$$

* Each point is equal to 1% of the loan amount: $100,000 × 0.01 = $1,000.

The lender's yield is greater than the nominal interest rate because of the points paid by the borrower. In effect, the lender only loaned $97,000 ($100,000 – $3,000) but receives a stream of debt service payments based on $100,000. If the mortgage is paid off in five years, the lender's yield is calculated with these figures.

$$n = 60$$
$$PMT = \$1{,}165.65$$
$$PV = \$97{,}000$$
$$FV = \$96{,}544$$
$$i = 14.36\%$$

If there were no points in either of these examples, the yield to the lender would be 13.5% in each case. Points or any other monetary payments that reduce the lender's investment are important considerations in calculating the lender's yield. The lender's yield may be supplemented through the syndication process.

In some depressed markets, lenders may find that the property securing the loan has declined in value to the point that the loan balance exceeds the property's value. In this case there is no longer any equity interest in the property, and the value of the loan may often be calculated based on the actual cash flows to the property rather than the cash flows projected when the loan contract was obtained. To do otherwise would be to estimate the value of the mortgage interest as greater than the value of the property.

Mortgage/Equity Formulas

Symbols

r = basic capitalization rate
Y = yield rate
M = mortgage ratio
C = mortgage coefficient
P = ratio paid off—mortgage
$1/S_{\overline{n}|}$ = sinking fund factor
R = capitalization rate
$S_{\overline{n}|}$ = future value of one per period
Δ = change
J = J factor (changing income)
n = projection period
I_O = net operating income
B = mortgage balance
I = nominal interest rate

Subscript:
E = equity
M = mortgage
P = projection
O = overall property
I = income
1 = 1st mortgage
2 = 2nd mortgage

Basic Capitalization Rate (r)

$$r = Y_E - M\,C$$

$$r = Y_E - (M_1\,C_1 + M_2\,C_2)$$

$$C = Y_E + P\;1/S_{\overline{n}|} - R_M$$

$$P = \frac{R_M - I}{R_{M_p} - I}$$

$$P = 1/S_{\overline{n}|} \times S_{\overline{n}|_p}$$

Capitalization Rates (*R*)

Level income

$$R = Y_E - M\,C - \Delta\,1/S_{\overline{n}|}$$

$$R = r - \Delta\,1/S_{\overline{n}|}$$

J-factor changing income

$$R_O = \frac{Y_E - M\,C - \Delta_O\,1/S_{\overline{n}|}}{1 + \Delta_I\,J}$$

$$R_O = \frac{r - \Delta_O\,1/S_{\overline{n}|}}{1 + \Delta_I\,J}$$

Required Change in Value (Δ)

Level income

$$\Delta = \frac{r - R}{1/S_{\overline{n}|}}$$

$$\Delta = \frac{Y_E - M\,C - R}{1/S_{\overline{n}|}}$$

J-factor changing income

$$\Delta_O = \frac{r - R_O\,(1 + \Delta_I\,J)}{1/S_{\overline{n}|}}$$

$$*\Delta_O = \frac{r - R_O}{R_O\,J + 1/S_{\overline{n}|}}$$

Note: For multiple mortgage situations, insert *M* and *C* for each mortgage.

* This formula assumes value and income change at the same ratio.

Equity Yield (Y_E)

Level income

$$Y_E = R_E + \Delta_E\,1/S_{\overline{n}|}$$

J-factor changing income

$$Y_E = R_E + \Delta_E\,1/S_{\overline{n}|} + \left(\frac{R_O\,\Delta_I}{1 - M}\right)J$$

Change in equity

$$\Delta_E = \frac{\Delta_O + M\,P}{1 - M}$$

$$\Delta_E = \frac{V_O\,(1 + \Delta_O) - B - V_E}{V_E}$$

Assumed mortgage situation

Level income

$$V_O = \frac{I_O + B\,C}{Y_E - \Delta_O\,1/S_{\overline{n}|}}$$

J-factor changing income

$$V_O = \frac{I_O\,(1 + \Delta_I\,J) + B\,C}{Y_E - \Delta_O\,1/S_{\overline{n}|}}$$

Mortgage/Equity Without Algebra Format

Loan Ratio × Annual Constant	=	________
Equity Ratio × Equity Yield Rate	=	+ ________
Loan Ratio × Paid Off Loan Ratio × SFF	=	– ________
Basic Rate (*r*)	=	________
+ Dep or – App × SFF	=	± ________
Capitalization Rate (*R*)	=	________

Note: SFF is sinking fund factor at equity yield rate for projection period. Dep/App is the change in value from depreciation or appreciation during the projection period.

Mortgage-Equity Analysis

L. W. Ellwood was the first to organize, develop, and promulgate the use of mortgage-equity analysis in yield capitalization for real property valuation. He theorized that mortgage money plays a major role in determining real property prices and values. Ellwood saw real property investments as a combination of two components–debt and equity–and held that the return requirements of both components must be satisfied through income, reversion, or a combination of the two. Thus, Ellwood developed an approach for estimating property value that made explicit assumptions as to what a mortgage lender and an equity investor would expect from the property.

In general, mortgage-equity analysis involves estimating the value of a property on the basis of both mortgage and equity return requirements. The value of the equity interest in the property is found by discounting the equity dividends available to the equity investor. The equity yield rate (Y_E) is used as the discount rate. The total value of the property is equal to the present value of the equity position plus the value of the mortgage. This is true whether the value is found using discounted cash flow analysis or yield capitalization formulas that have been developed for mortgage-equity analysis.

Applications

Mortgage-equity analysis can facilitate the valuation process in many ways. It may be used

1. To compose overall rates
2. To analyze and test the capitalization rates obtained with other capitalization techniques
3. As an investment analysis tool to test the values indicated by the sales comparison and cost approaches
4. To analyze a capitalization rate graphically

Given a set of assumptions concerning the net operating income, mortgage (amount, rate, and term), reversion (rate of appreciation or depreciation), equity yield rate, and projection period, mortgage-equity analysis may be employed to estimate the present value of the equity and to arrive at the total property value. The following example illustrates a general approach to mortgage-equity analysis.

Given:

Annual I_O (level)	$25,000
Projection period	10 years
Loan amount	$168,000
Loan terms*	
Interest rate	9%
Amortization term (monthly payments)	25 years
Estimated reversion	$201,600
Equity yield rate	15%

* Contract terms are at current market rates.

Using these assumptions, cash flow to the equity investor can be projected as follows:

Annual Cash Flow from Operations—Years 1–10	
Annual Net Operating Income	$25,000
Annual Debt Service	– 16,918
Equity Dividend	$8,082

Cash Flow from Reversion—Year 10	
Estimated Resale Price	$201,600
Mortgage Balance	− 139,002
Cash Flow from Reversion	$62,598

Using the present value factor for a 15% yield rate and a 10-year holding period, the present value of the cash flows to the equity investor may be calculated as follows:

Years	Cash Flow	Present Value Factor	Present Value
1–10	$8,082	5.018769*	$40,562
10	$62,598	0.247185†	+ 15,473
Present Value of Equity			$56,035

* Ordinary level annuity (present value of one per period) factor

† Reversion (present value of one) factor

The total property value can now be found by adding the present value of the equity to the present value of the loan.[2]

Present Value of the Equity	$56,035
Present Value of the Loan	+ 168,000
Total Value	$224,035

This example illustrates a fairly straightforward application of mortgage-equity analysis. The present value of the equity was easily calculated by discounting the dollar estimates of the cash flows. The assumptions in this example were simplified in several ways. First, the income was assumed to be level. In a more complex situation, income may be expected to change over the holding period. Second, the loan amount was specified in dollars.[3] If the loan amount were assumed to be based on a loan-to-value ratio, the dollar amount of the loan would depend on the property value being calculated. In such a case the cash flows to the equity investor could not be specified in dollars and discounted as they were in the example. Third, the resale price was specified in dollars.[4] Investors often assume that property values will change by a specified percentage amount over the holding period (see Chapter 24). Thus, the resale price depends on the property value being calculated. Finally, in the preceding example the total property value is greater than the loan amount. If the opposite were true, the value of the loan could not exceed the combined debt and equity interests in the property.

When either the loan amount or the resale price depends on the value of the property, the cash flows cannot be projected in dollar amounts and discounted. An alternative procedure must be used to solve for the present value. One such alternative is to use a yield capitalization

2. Because the loan is assumed to be at current market rates, the face amount of the loan is equal to the value of the loan to the lender.
3. This might be the case if the property were being valued subject to an existing loan. Such a situation is illustrated later in this appendix. Alternatively, the dollar amount may have resulted from a separate calculation of the maximum amount that could be borrowed to meet a minimum debt coverage ratio.
4. This situation might occur if there is a purchase option in a lease that the appraiser believes will be exercised. Alternatively, a dollar estimate may be the result of a separate estimate of the resale price calculated by applying a capitalization rate to the income at the end of the holding period.

formula that has been developed to solve this type of problem.[5] This is what L. W. Ellwood did when he developed the Ellwood equation, which is illustrated in the following section.

Mortgage-Equity Formula

The general mortgage-equity formula is:

$$R_O = \frac{Y_E - M\,(Y_E + P\,1/S_{\overline{n}|} - R_M) - \Delta_O\,1/S_{\overline{n}|}}{1 + \Delta_I\,J}$$

where:

R_O = overall capitalization rate
Y_E = equity yield rate
M = loan-to-value ratio
P = percentage of loan paid off
$1/S_{\overline{n}|}$ = sinking fund factor at the equity yield rate
R_M = mortgage capitalization rate or mortgage constant
Δ_O = change in total property value
Δ_I = total ratio change in income
J = J factor (This symbol is discussed later in this appendix.)

The part of the formula represented as $Y_E - M\,(Y_E + P\,1/S_{\overline{n}|} - R_M)$ can be referred to as the *basic capitalization rate* (r). It satisfies the lender's requirement and adjusts for amortization. It also satisfies the investor's equity yield requirement before any adjustment is made for income and value changes. Therefore, the basic rate starts with an investor's yield requirement and adjusts it to reflect the effect of financing. The resulting basic capitalization rate is a building block from which an overall capitalization rate can be developed with additional assumptions.

If level income and no change in property value are anticipated, the basic rate will be identical to the overall capitalization rate. The last part of the numerator, $\Delta_O\,1/S_{\overline{n}|}$, allows the appraiser to adjust the basic rate to reflect an expected change in overall property value. If the value change is positive, referred to as *property appreciation*, the overall capitalization rate is reduced to reflect this anticipated monetary benefit; if the change is negative, referred to as *depreciation*, the overall capitalization rate is increased.

Finally, the denominator, $1 + \Delta_I\,J$, accounts for any change in income. The J factor is always positive. Thus, if the change in income is positive, the denominator will be greater than one and the overall rate will be reduced. If the change in income is negative, the overall rate will be increased. For level-income applications, $\Delta = 0$, so the denominator is $1 + 0$, or 1.

Akerson Format

The mortgage-equity procedure developed by Charles B. Akerson substitutes an arithmetic format for the algebraic equation in the Ellwood formula.[6] This format is applicable to level-income situations; when

5. For a discussion of this procedure, see Jeffrey D. Fisher, "Using Circular Reference in Spreadsheets to Estimate Value," *The Quarterly Byte*, vol. 5, no. 4 (Fourth Quarter 1989).
6. The format was first presented by Charles B. Akerson in "Ellwood without Algebra," *The Appraisal Journal* (July 1970): 325-335.

modified with the J or K factor, it can also be applied to changing-income situations.

The Akerson format for level-income situations is

Loan Ratio × Annual Constant	=	________
Equity Ratio × Equity Yield Rate	=	+ ________
Loan Ratio × % Paid Off in Projection Period × $1/S_{\overline{n}\rceil}$	=	− ________
Basic Rate (r)	=	________
+ Dep or − App × $1/S_{\overline{n}\rceil}$	=	± ________
Overall Capitalization Rate	=	________

where $1/S_{\overline{n}\rceil}$ is the sinking fund factor at the equity yield rate for the projection period and dep/app denotes the change in value from property depreciation or appreciation during the projection period.

Level-Income Applications

Mortgage-equity analysis can be used to value real property investments with level income streams or variable income streams converted to level equivalents using overall capitalization rates and residual techniques.

Use of Overall Capitalization Rates

In the simplest application of the mortgage-equity formula and the Akerson format, a level income and a stable or changing overall property value are assumed. The following example illustrates the application of the mortgage-equity formula using an overall capitalization rate applied to a level flow of income.

I_O (level)	\$25,000
Projection period	10 years
Loan terms	
Interest rate	9%
Amortization term (monthly payments)	25 years
Loan-to-value ratio	75%
Property value change	20% gain
Equity yield rate	15%

The overall rate is calculated as follows:

$$R_O = \frac{Y_E - M\,(Y_E + P\,1/S_{\overline{n}\rceil} - R_M) - \Delta_O\,1/S_{\overline{n}\rceil}}{1 + \Delta_I\,J}$$

$$R_O = \frac{0.15 - 0.75\,(0.15 + 0.1726 \times 0.04925 - 0.1007) - (0.20 \times 0.04925)}{1 + 0 \times J}$$

$$R_O = \frac{0.15 - 0.75\,(0.057801) - 0.009850}{1}$$

$$R_O = \frac{0.15 - 0.043350 - 0.009850}{1}$$

$$R_O = \frac{0.096800}{1}$$

$$R_O = 0.0968 \text{ (rounded)}$$

The capitalized value of the investment is \$25,000/0.0968 = \$258,264.

Using the same data and assumptions, an identical value can be derived by applying the Akerson format:

0.75×0.100704	$= \quad 0.075528$
0.25×0.15	$= + 0.037500$
$-0.75 \times 0.172608 \times 0.049252$	$= - 0.006376$
Basic Rate (r)	$= \quad 0.106652$
0.20×-0.049252	$= - 0.009850$
R_0	$= \quad 0.096802$
The capitalized value is \$25,000/0.0968	= \$258,264

The answer derived in this example is virtually the same as the answer that would be derived using DCF analysis. In fact, it is possible to check the answer found with the Ellwood formula by discounting the implied cash flows. This is true because the dollar amount of the loan and resale price are approximately the same in both examples. That is, the implied amount of the loan is 75% of \$224,014, or approximately \$168,000, and the implied resale price is 90% of \$224,014, or approximately \$201,600. It is important to realize, however, that this was not known until the problem was solved. The examples were designed to produce the same answer to demonstrate that both problems are based on the same concepts of discounted cash flow analysis.

Use of Residual Techniques

Land and building residual techniques can be applied with land and building capitalization rates based on mortgage-equity procedures. The general mortgage-equity formula or the Akerson format is applied to derive a basic rate, which is used to develop land and building capitalization rates.

For example, assume that a commercial property is expected to produce level annual income of \$15,000 per year over a 10-year term. Mortgage financing is available at a 75% loan-to-value ratio, and monthly payments at 11% interest are made over an amortization term of 25 years. The land is currently valued at \$65,000 and is forecast to have a value of \$78,000 at the end of the projection period, indicating a 20% positive change in land value. The building is expected to have no value at the end of the projection period, and the equity yield rate is 15%.

The first step in valuing this property is to derive the basic rate (r) using the Ellwood Formula:

$$r = Y_E - M\,(Y_E + P\ 1/S_{\overline{n}|} - R_M)$$
$$r = 0.15 - 0.75\,(0.15 + 0.137678 \times 0.049252 - 0.117614)$$
$$= 0.15 - 0.029375$$
$$= 0.120625$$

The Akerson format can also be used to derive the basic rate:

0.75×0.117614	$= \quad 0.088211$
0.25×0.15	$= + 0.037500$
$0.75 \times 0.137678 \times 0.049252$	$= - 0.005086$
Basic Capitalization Rate (r)	$= \quad 0.120625$

Next, the land and building capitalization rates are calculated. To solve for the land capitalization rate, R_L, the calculations are

$$\begin{aligned} R_L &= r - \Delta_L\, 1/S_{\overline{n}|} \\ &= 0.120625 - (0.20 \times 0.049252) \\ &= 0.120625 - 0.009850 \\ &= 0.110775 \end{aligned}$$

The building capitalization rate, R_B, is calculated as follows:

$$\begin{aligned} R_B &= r - \Delta_B\, 1/S_{\overline{n}|} \\ &= 0.120625 - (-1.0 \times 0.049252) \\ &= 0.120625 + 0.049252 \\ &= 0.169877 \end{aligned}$$

These rates can be used to value the property with the building residual technique:

I_O		\$15,000
Land Income		
($V_L \times R_L$) = \$65,000 × 0.110775	–	7,200
Residual Income Attributable to Building		\$7,800
Capitalized Value of Building		
($I_B \div R_B$) = \$7,800/0.169877		\$45,916
Plus Land Value	+	65,000
Indicated Property Value		\$110,916

When the rates are used in the land residual technique, a similar property value is indicated:

I_O		\$15,000
Building Income		
($V_B \times R_B$) = \$46,000 × 0.169877	–	7,814
Residual Income Attributable to Land		\$7,186
Capitalized Value of Land		
($I_L \div R_L$) = \$7,186/0.110775		\$64,870
Plus Building Value	+	46,000
Indicated Total Property Value		\$110,870

Changing-Income Applications

The general mortgage-equity formula can be applied to income streams that are forecast to change on a curvilinear or exponential-curve (constant-ratio) basis by using a *J* factor for curvilinear change or a *K* factor for constant-ratio change. The *J* factor, used in the stabilizer $(1 + \Delta_I J)$, may be obtained from precomputed tables or calculated with the *J*-factor formula.[7] The *K* factor, an income adjuster or stabilizer used to convert a changing income stream into its level equivalent, can be calculated with the *K*-factor formula.[8]

7. Before the advent of financial calculators, present value and future value problems were solved using precomputed tables of compound interest factors. Although the tables are no longer used in everyday practice, they remain useful for checking results of calculations made with calculators and computers and in teaching the mathematics of finance. See James J. Mason, ed., comp., *American Institute of Real Estate Appraisers Financial Tables*, rev. ed. (Chicago: American Institute of Real Estate Appraisers, with tables computed by Financial Publishing Company, 1982), 461-473.
8. Charles B. Akerson, *Capitalization Theory and Techniques: Study Guide*, 3rd ed., ed. David C. Lennhoff (Chicago: Appraisal Institute, with tables computed by Financial Publishing Company, 2000), T-47 to T-52.

Use of the *J* Factor

The *J*-factor formula for curvilinear income reflects an income stream that changes from time zero in relation to a sinking fund accumulation curve. The formula is

$$J = 1/S_{\overline{n}|} \times \left(\frac{n}{1 - 1/(1+Y)^n} - \frac{1}{Y}\right)$$

where:

$1/S_{\overline{n}|}$ = sinking fund factor at equity yield rate
n = projection period
Y = equity yield rate

Consider the facts set forth in the level annuity example, but assume a 20% increase in income. Note that the *J* factor is applied to the income in the year prior to the first year of the holding period.

$$\begin{aligned} R_O &= \frac{0.15 - 0.75\ (0.15 + 0.172608 \times 0.049252 - 0.100704) - (0.20 \times 0.049252)}{1 + (0.20 \times 0.3259)} \\ &= \frac{0.15 - 0.043348 - 0.009850}{1 + 0.0652} \\ &= \frac{0.096802}{1.0652} \\ &= 0.09088 \end{aligned}$$

The capitalized value is $25,000/0.09088 = $275,088.

The net operating incomes for the projection period that are implied by the curvilinear *J*-factor premise are calculated in the following table.

Period	1st Year Adjustment*		$S_{\overline{n}|}$		Periodic Adjustment		Base I_O†		I_O
1	$246.26	×	1/1.000000	=	$246	+	$25,000	=	$25,246
2	$246.26	×	1/0.465116	=	$529	+	$25,000	=	$25,529
3	$246.26	×	1/0.287977	=	$855	+	$25,000	=	$25,855
4	$246.26	×	1/0.200265	=	$1,230	+	$25,000	=	$26,230
5	$246.26	×	1/0.148316	=	$1,660	+	$25,000	=	$26,660
6	$246.26	×	1/0.114237	=	$2,156	+	$25,000	=	$27,156
7	$246.26	×	1/0.090360	=	$2,725	+	$25,000	=	$27,725
8	$246.26	×	1/0.072850	=	$3,380	+	$25,000	=	$28,380
9	$246.26	×	1/0.059574	=	$4,134	+	$25,000	=	$29,134
10	$246.26	×	1/0.049252	=	$5,000	+	$25,000	=	$30,000

* This adjustment was derived by multiplying I_O ($25,000) by the assumed increase in I_O (20%); the resulting figure ($5,000) was then multiplied by the sinking fund factor for the anticipated 15% equity yield rate over the 10-year projection period ($1/S_{\overline{n}|} = 0.049252$).

† The base I_O is the income for the year prior to the beginning of the projection period.

Mathematical proof of the example is provided below.

Valuation of Equity

Period	Net Operating Income		Debt Service		Cash to Equity		*PVF* at 15%		*PV*
1	$25,246	–	$20,772	=	$4,474	×	0.869565	=	$3,890
2	$25,529	–	$20,772	=	$4,757	×	0.756144	=	$3,597
3	$25,855	–	$20,772	=	$5,083	×	0.657516	=	$3,342
4	$26,230	–	$20,772	=	$5,458	×	0.571753	=	$3,121
5	$26,660	–	$20,772	=	$5,888	×	0.497177	=	$2,927
6	$27,156	–	$20,772	=	$6,384	×	0.432328	=	$2,760
7	$27,725	–	$20,772	=	$6,953	×	0.375937	=	$2,614
8	$28,380	–	$20,772	=	$7,608	×	0.326902	=	$2,487
9	$29,134	–	$20,772	=	$8,362	×	0.284262	=	$2,377
10	$30,000	–	$20,772	=	$9,228	×	0.247185	=	$2,281
					$159,400*	×	0.247185	=	$39,401
Value of equity at 15%								=	$68,797
Check: $275,088 × 0.25 = $68,772									

* The reversion is calculated as follows:

Resale ($275,088 × 1.20)	=	$330,106
Loan Balance ($275,088 × 0.75)(1 – 0.1726)	=	– $170,706
Equity Proceeds	=	$159,400

Use of the *K* Factor

The *K*-factor formula, which is applied to income that changes on an exponential-curve (constant-ratio) basis, is expressed as

$$K = \frac{1 - (1 + C)^n / S^n}{(Y - C)\, a_{\overline{n}|}}$$

where:

K = factor
C = constant-ratio change in income
S^n = future value factor
Y = equity yield rate
$a_{\overline{n}|}$ = present value factor for ordinary level annuity

When the general mortgage-equity formula is used to derive an overall capitalization rate applicable to an income expected to change on a constant-ratio basis, *K* is substituted for the denominator $(1 + \Delta_I J)$. The following example is based on the same property used for the level-income and *J*-factor examples, but it assumes that net operating income will increase by 2% per year, on a compound basis. This property can be valued using the *K* factor in the mortgage-equity formula.

$$R_O = \frac{Y_E - M\,[Y_E + P\,1/S_{\overline{n}|} - R_M] - \Delta_O\,1/S_{\overline{n}|}}{K}$$

$$R_O = \frac{0.15 - 0.75\,(0.15 + 0.172608 \times 0.049252 - 0.100704) - (0.20 \times 0.049252)}{1.070877}$$

$$= 0.090395$$

The capitalized value of the investment is $25,000/0.090395 = $276,564.

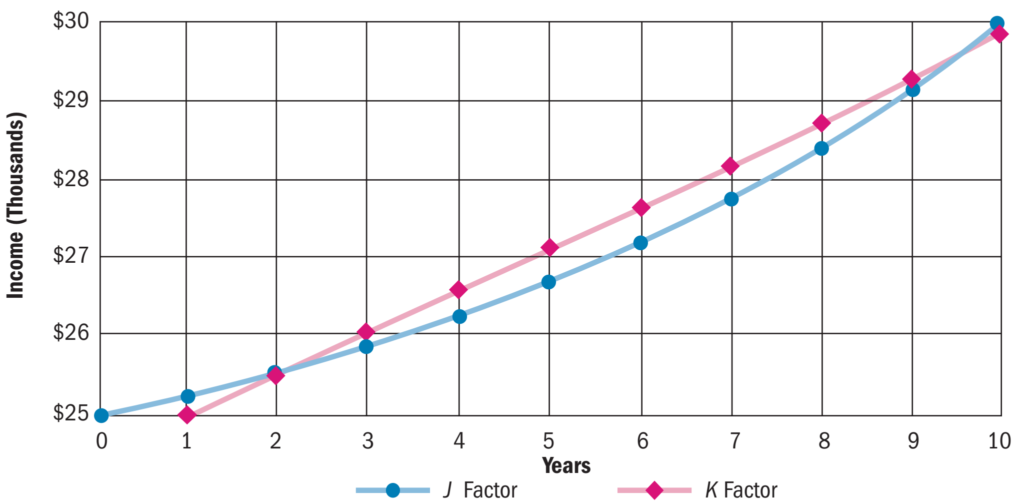
Note that the indicated values based on the *J*-factor and *K*-factor premises are very close, i.e., $275,088 and $276,564. The indicated value based on a level-income assumption is much lower, i.e., $238,264. This is because all of the yield has to occur on resale, not in increased income.

Based on the income data in Table C.1, *J*-factor and *K*-factor income patterns are plotted on the graph in Figure C.1. Both examples assume a 20% increase in overall property value. In the *J*-factor example, income is projected to increase by 20%. In the *K*-factor example, income is projected to increase at a constant ratio of 2% per year. Under the *J*-factor assumption, the value of the property is $275,088 and the R_O is 9.088%. Under the *K*-factor assumption, the value of the property is $276,569, and the R_O is 9.039%.

Table C.1 *J*-Factor Income Pattern and *K*-Factor Income Pattern

	J Factor	*K* Factor
Year 1	$25,246	$25,000
Year 2	$25,529	$25,500
Year 3	$25,855	$26,010
Year 4	$26,230	$26,530
Year 5	$26,660	$27,060
Year 6	$27,156	$27,602
Year 7	$27,725	$28,154
Year 8	$28,380	$28,717
Year 9	$29,134	$29,291
Year 10	$30,000	$29,877

Figure C.1 *J*-Factor and *K*-Factor Income Pattern Curves



Solving for Equity Yield

Given an actual or proposed equity sale price and a forecast of equity benefits, an equity yield rate can be estimated. When level income is forecast, a formula is used. The calculations can be performed by iteration or with the financial functions of a calculator. When income is expected to change on a curvilinear basis or a constant-ratio basis, formulas must be used to solve for the yield. A calculator cannot be used to solve the problem conveniently, and the iteration technique is too time-consuming.

Level-Income Example

Consider a property that is purchased for $250,000. The net operating income is forecast to remain level at $35,000 per year, and the buyer believes that property value will decline 15% over a five-year ownership period. The mortgage amount is $200,000 and monthly payments are at 10% interest with an amortization term of 20 years. The investment forecast is outlined below:

Purchase		Holding Period	
Sale Price	$250,000	I_O	$35,000
Mortgage	– 200,000	Debt Service	– 23,161*
Equity	$50,000	Equity Dividend	$11,839

Resale After 5 Years	
Sale Price	$212,500
Mortgage Balance	– 179,605†
Equity Reversion	$32,895
Original Equity	– 50,000
Equity Change	-$17,105

* $200,000 × 0.115803 mortgage constant

† Unamortized portion of $200,000 mortgage at end of 5-year projection period

$$R_E \text{ (Equity Capitalization Rate)} = \frac{\$11{,}839}{\$50{,}000} = 0.236780$$

$$\Delta_E \text{ (Equity Change)} = \frac{-\$17{,}105}{\$50{,}000} = -0.342100$$

The equity yield rate may now be computed through iteration or by using the formula and interpolation. Iteration is performed using the formula

$$Y_E = R_E + \Delta_E \ 1/S_{\overline{n}|}$$

Because the sinking fund factor for five years at the Y_E rate cannot be identified without knowing Y_E, a trial-and-error procedure must be used to develop Y_E. Without discounting, the 34.21% equity decline over the five-year holding period would subtract 6.84% each year from the equity capitalization rate of 23.67%. Consequently, Y_E will be less than 23.67% and more than 16.83% (23.67% – 6.84%).

The first computation is performed with a Y_E of 18%. When the correct equity yield rate is applied, the equation will balance.

Estimated Y_E	R_E	+	Δ_E	×	$1/S_{\overline{n}\rceil}$	=	Indicated Y_E
0.1800	0.2368	+	(-0.3425)	×	0.139778	=	0.1889
0.2000	0.2368	+	(-0.3425)	×	0.134380	=	0.1908
0.1900	0.2368	+	(-0.3425)	×	0.137050	=	0.1899

Therefore, $Y_E = 0.1900$, or 19.0%.

This procedure for computing Y_E is correct because Y_E is defined as the rate that makes the present value of the future equity benefits equal to the original equity. The future benefits in this case are the equity dividend of \$11,839 per year for five years and the equity reversion of \$32,895 at the end of the five-year period.

If Y_E is 19%, the present value of the two benefits can be computed.

$$\begin{aligned} \$11{,}839 \times 3.057635 &= \quad \$36{,}199 \\ \$32{,}895 \times 0.419049 &= + \underline{\quad 13{,}785} \\ &\qquad \$49{,}984 \end{aligned}$$

Thus, the equity yield rate has been proven to be 19.0%. Precision to 0.03% represents a level of accuracy in keeping with current practice and the normal requirements of the calculation. This example is based on level income, but the same procedure can be applied to changing income streams by incorporating *J* and *K* factors into the formula.

J-Factor Premise Example

Consider the information set forth in the previous example, but assume that income is expected to decline 15% according to the *J*-factor premise.

$R_O = \$35{,}000/\$250{,}000 = 0.14$ $\qquad$ $M = \$200{,}000/\$250{,}000 = 0.80$

$$Y_E = R_E + \frac{\Delta_E}{S_{\overline{n}\rceil}} + \frac{R_O\,\Delta_I}{1 - M}\,J$$

Try 15%,

$$0.2368 + -0.3421 \times 0.1483 + \frac{0.14 \times -0.15}{0.2} \times 0.4861 = 0.135$$

Try 12%,

$$0.2368 + -0.3421 \times 0.1574 + \frac{0.14 \times -0.15}{0.2} \times 0.5077 = 0.130$$

Try 13%,

$$0.2368 + -0.3421 \times 0.1543 + \frac{0.14 \times -0.15}{0.2} \times 0.5004 = 0.131472$$

Therefore, $Y_E = 13.15\%$ (rounded).

K-Factor Premise Example

Consider the same information, but assume that income is expected to decrease at a compound rate of 3% per year, indicating a constant-ratio change in income.

$$Y_E = R_E + \Delta_E\, 1/S_{\overline{n}\rceil} + \frac{R_O\,(K - 1)}{1 - M}$$

Try 13%,

$$0.2368 + \text{-}0.3421 \times 0.1543 + \frac{0.14 \times (0.9487 - 1)}{0.2} = 0.148$$

Try 15%,

$$0.2368 + \text{-}0.3421 \times 0.1483 + \frac{0.14 \times (0.9497 - 1)}{0.2} = 0.151$$

Therefore, $Y_E = 15.1\%$.

Rate Analysis

Rate analysis allows an appraiser to test the reasonableness of the value conclusions derived through the application of overall capitalization rates. Once an overall capitalization rate has been developed with mortgage-equity analysis or another technique, its reliability and consistency with market expectations of equity yield and value change can be tested using Ellwood graphic analysis.

To create a graph for rate analysis, the appraiser chooses equity yield rates that cover a realistic range of rates expected and demanded by investors. It is often wise to include a rate that is at the low end of the range of market acceptance as well as a rate at the high end of the range. For the analysis to be useful to the client, the range of yield rates chosen should be in line with investors' perceptions of the market.

In most real estate investments, there is no assurance that the investment can be liquidated at the convenience of the equity investor or on the terms dictated by the investor. For example, in the early 1990s most liquidity evaporated from the market. Moreover, in negotiating a purchase price, the prospects for profit within a plausible range of possibilities may be greater than the chance of achieving a specific equity yield rate, which cannot be determined until the property is resold. However, the appraiser's value judgments can easily be subjected to realistic tests. The appraiser should ask the following questions:

- What resale prices correspond to various yield levels?
- Can the property suffer some loss in value and still produce an acceptable profit?
- How sensitive is the equity yield rate to possible fluctuations in value?
- What percentage of the investor's return is derived from annual cash flows, and what percentage comes from the reversion? (Reversion is generally considered riskier.)
- What prospective equity yield rates can be inferred from the overall capitalization rates found in the marketplace?

Many of these questions focus on the relationship between the change in property value and the equity yield rate. The unknown variable in rate analysis is the change in property value (Δ_O). The formula for the required change in property value in a level-income application is

$$\Delta_O = \frac{r - R_O}{1/S_{\overline{n|}}}$$

Level-Income Example

Consider an investment that will generate stable income and has an overall capitalization rate of 10%. The purchase can be financed with a 75% loan at 10% interest amortized over 25 years with level monthly payments. If the investment is held for 10 years, what levels of depreciation or appreciation should be expected with equity yield rates of 9%, 12%, and 15%?

To solve this problem the appraiser must first find the basic rate (r) and the sinking fund factor for each equity yield rate. The Ellwood Tables[9] are the source of the following figures:

Y_E	r	$1/S_{\overline{n\|}}$
9%	0.096658	0.065820
12%	0.105185	0.056984
15%	0.113584	0.049252

When the difference between r and the overall rate (R_O) is divided by the corresponding sinking fund factor, the result is the expected change in property value. If r is greater than R_O, a value increase is indicated; if r is less than R_O, a value loss is indicated. Analysis of the 10% overall capitalization rate is shown below:

$$Y_E = \frac{r - R_O}{1/S_{\overline{n|}}}$$

9%	-0.0508 (5.1% depreciation)
12%	0.0910 (9.1% appreciation)
15%	0.2758 (27.6% appreciation)

The formula produces answers consistent with the notion that a loss is negative and a gain is positive. In some texts the numerator in this formula is expressed as $R_O - r$. Use of this formula results in a change of sign–i.e., positive answers indicate depreciation and negative answers indicate appreciation.

J-Factor Premise

A similar analysis can be performed when income is presumed to change commensurately with value according to the *J*-factor premise. In this case the expected change in overall property value is calculated by dividing ($r - R_O$) by ($R_O J + 1/S_{\overline{n|}}$).

Graphic Rate Analysis

Various systems have been developed to employ mortgage-equity concepts in graphic rate analysis. The graphic analysis of capitalization rates is a helpful analytical tool used by practicing appraisers and investment analysts. Rate analysis in graphic or tabular form is particularly use-

9. L. W. Ellwood, *Ellwood Tables for Real Estate Appraising and Financing*, 4th ed. (Cambridge, Mass.: Ballinger Publishing Co., 1977).

ful in interpreting market data. Although analyzing a market-oriented overall capitalization rate cannot reveal a property's eventual equity yield rate or resale price, the analysis can reveal combinations of Y_E and Δ_O implicit in the overall rate. Thus, an appraiser can use rate analysis to decide whether a particular combination of Y_E and Δ_O is consistent with market behavior.

The accompanying figures illustrate two types of graphic analysis. Figure C.2 shows Ellwood-style graphic analysis, with time on the horizontal axis and the percentage change in property value on the vertical axis. Figure C.3 illustrates another type of graphic analysis with the equity yield rate on the horizontal axis and the percentage change in value on the vertical axis. Graphs like these can be constructed manually by plotting three or more key points and connecting the points with a smooth curve; they can also be constructed using a computer.

The graph in Figure C.2 shows change in value and income under the *J*-factor premise with respect to time for equity yield rates of 5%, 10%, 15%, 20%, and 25%. It is assumed that $R_O = 0.11$, $I = 0.125$, $R_M = 0.135$, $M = 0.7$, and $\Delta_O = \Delta_I$.

The graph in Figure C.3 shows the change in value and income under the *J*-factor premise for equity yield rates ranging from 5% to 25% over a 10-year holding period. Again, it is assumed that $R_O = 0.11$, $I = 0.125$, $R_M = 0.135$, $M = 0.7$, and $\Delta_O = \Delta_I$.

After a graph is created, it must be interpreted by the appraiser. Usually the appraiser determines the range of property value changes (Δ_O) anticipated by the market and then forms an opinion as to the reasonableness of the overall capitalization rate. If the value changes are in line with the expectations of market participants and there is nothing unusual about the subject property, the overall rate being tested may be reasonable. If the value changes are not within the range expected by the marketplace, the overall capitalization rate should either be considered unreasonable and in need of further analysis or must be explained and accounted for.

Rate Extraction

Rate extraction is a technique that allows an appraiser to infer the market's expectation of yield and change in property value from a market-oriented overall capitalization rate. The key is to determine what assumptions about the yield rate and the change in property value are consistent with the overall capitalization rates derived from comparable sales. Although a specific yield rate or change in value cannot be identified using this approach, an analyst can determine what change in property value is needed to produce a given yield rate. That is, for each assumed yield rate, there is only one assumption about the change in property value that can be used with that rate to obtain the overall capitalization rate implied by comparable sales.

The following example illustrates this technique. The subject property is an apartment complex. Data on three comparable properties is given.

Figure C.2 Ellwood-style Graphic Analysis

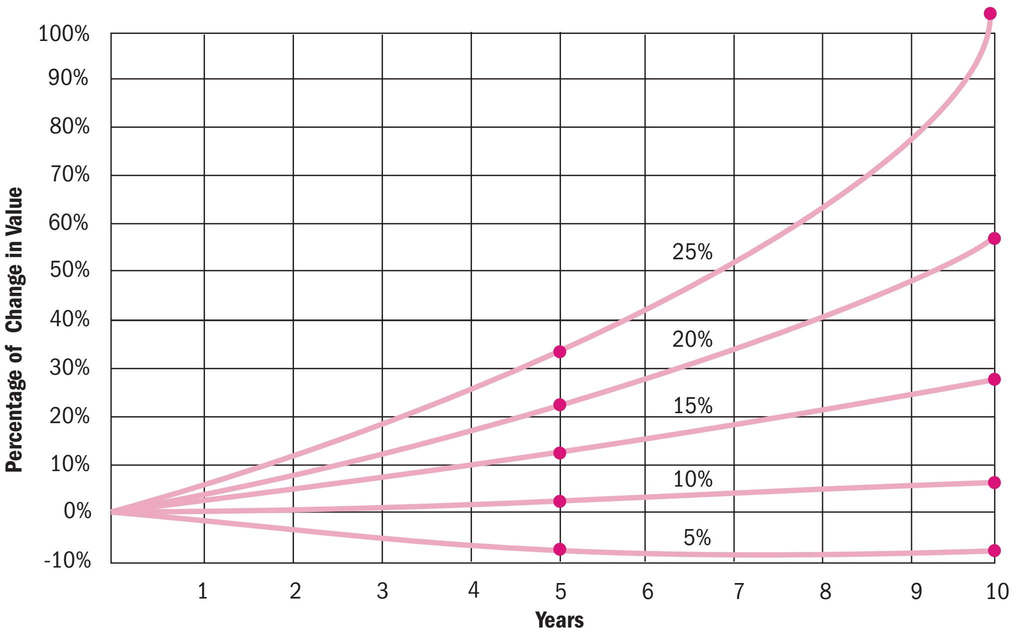
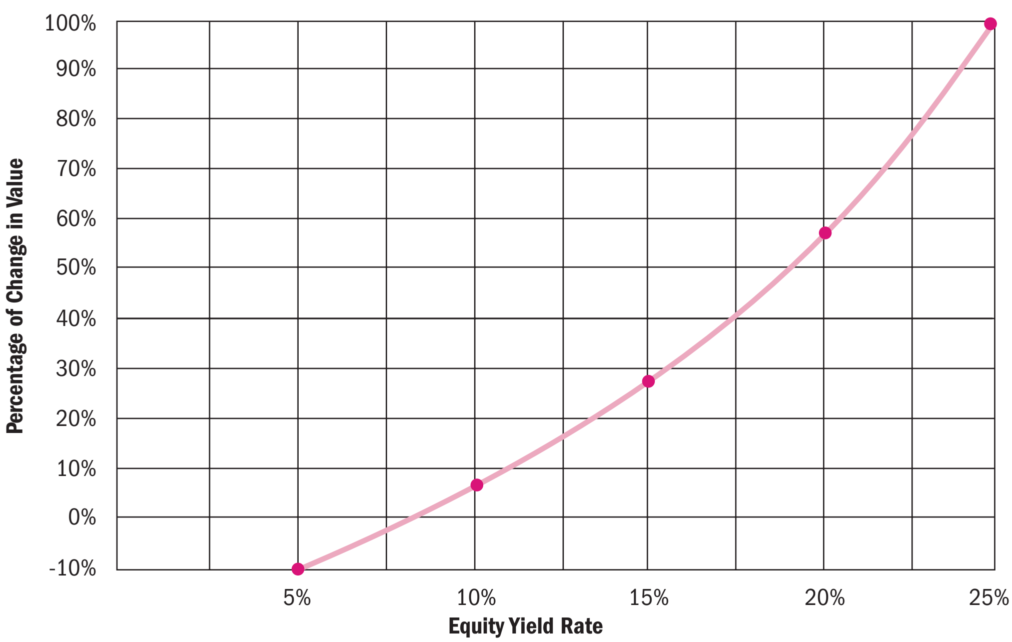


Figure C.3 Alternative Graphic Analysis



Factual Data on Three Apartment Complexes	Sale 1	Sale 2	Sale 3
Number of units	240	48	148
Sale price	$4,678,000	$811,000	$3,467,000
Cash down payment	$1,300,000	$462,145	$1,370,000
Gross income	$594,540	$126,240	$507,120
I_O	$368,600	$71,500	$293,400

Comparative Factors	Sale 1	Sale 2	Sale 3
Price per unit	$19,492	$16,896	$23,426
Gross income per unit			
Annually	$2,477	$2,638	$3,426
Monthly	$206	$219	$285
Gross income multiplier (*GIM*)	7.870	6.420	6.830
Overall capitalization rate (R_O)	0.079	0.088	0.085
Loan-to-value ratio (*M*)	0.722	0.430	0.605
Mortgage constant (R_M)	0.107	0.127	0.136
Percent paid off (*P*)	-0.125	0.016	0.032
Equity capitalization rate (R_E)	0.006	0.059	0.006
Debt coverage ratio (*DCR*)	1.021	1.610	1.030

Using the mortgage-equity *J*-factor formula, pairs of Y_E and Δ_O can be extracted for each comparable sale. The formula for change in income and value is

$$\Delta_{O=I} = \frac{Y_E - M\,(Y_E + P \times 1/S_{\overline{n}|} - R_M) - R_O}{R_O\,J + 1/S_{\overline{n}|}}$$

The overall rate for each of the sales can be used in this formula to solve for the combinations of Y_E and Δ_O that would produce that overall capitalization rate. This data is shown in the following table:

Calculated Required Changes for the Three Sales (Five-Year Projection)

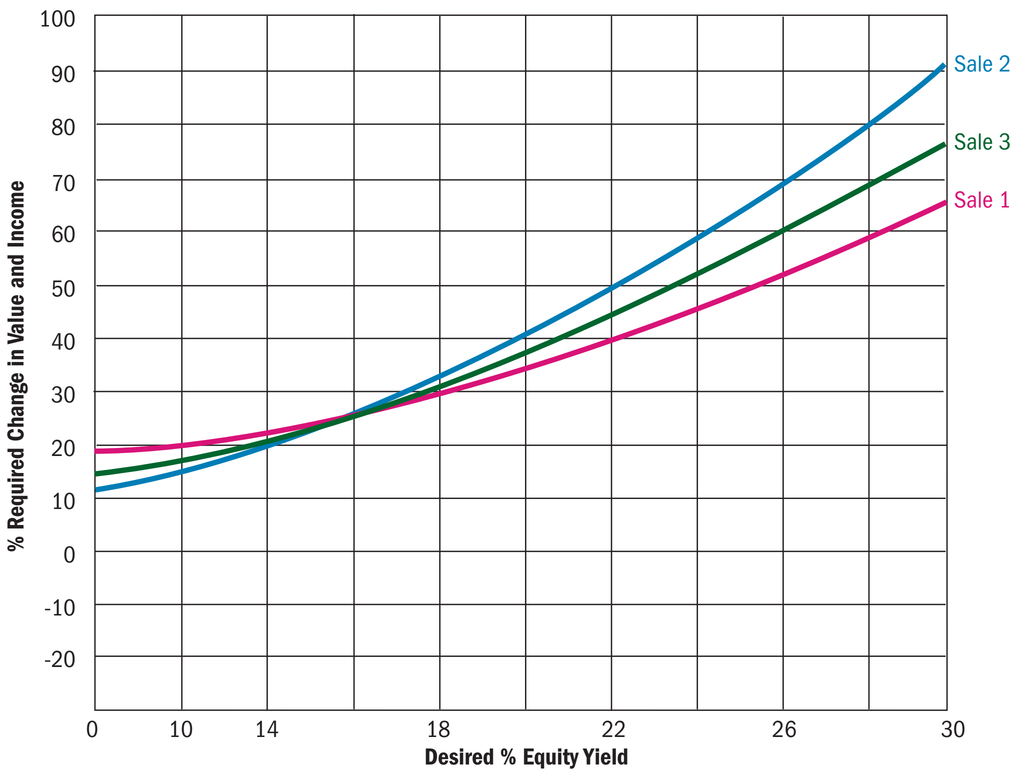
	% $\Delta_{O=I}$		
%Y_E	Sale 1	Sale 2	Sale 3
10	19.9	10.7	16.1
12	23.2	16.8	20.8
14	26.7	23.3	25.7
16	30.5	30.3	31.0
18	34.5	37.8	36.6
20	38.8	45.8	42.7
22	43.4	54.3	49.1
24	48.3	63.4	55.9
26	53.7	73.2	63.2
28	59.0	83.4	70.9
30	64.9	94.6	79.2

Note that the rate of change in property value is assumed to equal the rate of change in income. This reflects the appraiser's belief that this assumption is consistent with market perceptions. The relationship between equity yield and change in value and income can now be graphed (see Figure C.4).

Once the graph is completed, the appraiser can draw certain conclusions. If the sales used accurately reflect market perceptions, every pair of equity yield rate and change in property value is a perfect pair. When the figures are inserted into the mortgage-equity formula to derive an overall capitalization rate, the resulting value estimate will be market-oriented.

In this case any pair of Y_E and Δ_O that does not coincide with the lines on the graph is not market-oriented. The lines have different slopes and cross at some point because each sale has a different loan-to-value ratio (M). Furthermore, because of the differences in the loan-to-value ratios, some variation in the yield rate that equity investors would require for each of the sales would be expected. For example, Sale 1 had the highest loan-to-value ratio and, therefore, probably had the highest required yield rate because of its greater risk. The curves indicate reasonable assumptions about yield rates and changes in value that are consistent with the prices paid for comparable sales and the manner in which they were financed.

Figure C.4 Relationship Between Equity Yield and Total Change in Value and Income



The graph can also be used to reflect the most likely pair of Y_E and Δ_O for developing an overall capitalization rate. By verifying current investor perceptions of the yield anticipated for the type of property being appraised, the appraiser can determine the necessary property value change. Then, with the mortgage-equity formula, the overall capitalization rate can be calculated. This overall rate will reflect typical investor assumptions for both yield and change in property value.

Compound Interest (Future Value of One)

This factor reflects the amount to which an investment or deposit will grow in a given number of time periods, including the accumulation of interest at the effective rate per period. It is also known as the *amount of one*.

$$S^n = (1 + i)^n$$

where: S^n = future value factor
i = effective rate of interest
n = number of compounding periods

and $S^n = (e)^{in}$ for continuous compounding

where: S^n = future value factor
i = nominal rate of interest
n = number of years
e = 2.718282

This factor is used to solve problems dealing with compound growth.

When money is invested or deposited at the beginning of a period in an account that bears interest at a fixed rate, it grows according to the interest rate and the number of compounding (conversion) periods that remains in the account. To illustrate how and why this growth occurs, consider an investment of $1.00, a nominal interest rate of 10% with annual compounding, and an investment holding period of five years.

Original investment	$1.00
Interest, first year at 10%	0.10
Accumulation, end of 1 year	$1.10
Interest, second year at 10%	0.11
Accumulation, end of 2 years	$1.21
Interest, third year at 10%	0.121
Accumulation, end of 3 years	$1.331
Interest, fourth year at 10%	0.1331
Accumulation, end of 4 years	$1.4641
Interest, fifth year at 10%	0.14641
Accumulation, end of 5 years	$1.61051

One dollar grows to $1.61051 in five years with interest at 10%, so the future value of one factor at 10% annually for five years is 1.610510; $1,000 would grow 1,000 times this amount to $1,610.51 over the same five years at the same 10% annual rate. When interest is not collected or withdrawn as it is earned, it is added to the capital amount and additional interest accumulates in subsequent periods. This process is called *compounding*.

The results of compounding can be calculated with the formula $(1+i)^n$, where n is the number of compounding periods and i is the interest rate per period.

n			
1	$1.10 \times 1 = 1.10^1$	=	1.10
2	$1.10 \times 1.10 = 1.10^2$	=	1.21
3	$1.10 \times 1.10 \times 1.10 = 1.10^3$	=	1.331
4	$1.10 \times 1.10 \times 1.10 \times 1.10 = 1.10^4$	=	1.461
5	$1.10 \times 1.10 \times 1.10 \times 1.10 \times 1.10 = 1.10^5$	=	1.61051

Thus, the factors in Figure C.5, the amount of one or the future value of one, reflect the growth of $1.00 accumulating at interest for the number of compounding periods shown at the left and right sides of each page of tables. For example, the 10% annual column reveals a factor of 2.593742 for 10 periods. This means that $1.00 deposited at 10% interest compounded annually for 10 years will grow to $1.00 × 2.593742, or just over $2.59. In other words, $1.10^{10} = 2.593742$. The factors for seven and eight years indicate that $1.00 (or any investment earning 10% per year) will double in value in approximately 7.5 years. Similarly, an investment of $10,000 made 10 years ago, earning no periodic income during the 10-year holding period, must be liquidated in the current market at $10,000 × 2.593742, or $25,937.42, to realize a 10% return on the original investment.

This factor reflects the growth of the original deposit measured from the beginning deposit period. Thus, at the end of the first period at a rate of 10%, the original $1.00 has grown to $1.10 and the factor is 1.100000, as shown above.

Reversion Factors (Present Value of One)

This factor is the present value of $1 (or other currency) to be collected at a given future time discounted at the effective interest rate for the number of periods between now and the date of collection. It is the reciprocal of the corresponding compound interest factor.

$$1/S^n = \frac{1}{(1+i)^n}$$

where:
$1/S^n$ = present value factor
i = effective rate of interest
n = number of compounding periods

and

$$1/S^n = \frac{1}{(e)^{in}} \text{ for continuous compounding}$$

where:
$1/S^n$ = present value factor
i = nominal rate of interest
n = number of years
$e = 2.718282$

Figure C.5 Compound Interest Table for 10%

10% RATE i n	1 AMOUNT OF \$1 The amount to which \$1 will grow with compound interest	2 AMOUNT OF \$1 PER PERIOD The amount to which \$1 per period will grow with compound interest	3 SINKING FUND FACTOR The amount per period which will grow with compound interest to \$1	4 PRESENT WORTH OF \$1 What \$1 due in the future is worth today	5 PRESENT WORTH OF \$1 PER PERIOD What \$1 payable periodically is worth today	6 PARTIAL PAYMENT The installment to repay \$1 with interest	10% RATE i n
1	1.100 000	1.000 000	1.000 000	.909 091	.909 091	1.100 000	1
2	1.210 000	2.100 000	.476 190	.826 446	1.735 537	.576 190	2
3	1.331 000	3.310 000	.302 115	.751 315	2.486 852	.402 115	3
4	1.464 100	4.641 000	.215 471	.683 013	3.169 865	.315 471	4
5	1.610 510	6.105 100	.163 797	.620 921	3.790 787	.263 797	5
6	1.771 561	7.715 610	.129 607	.564 474	4.355 261	.229 607	6
7	1.948 717	9.487 171	.105 405	.513 158	4.868 419	.205 405	7
8	2.143 589	11.435 888	.087 444	.466 507	5.334 926	.187 444	8
9	2.357 948	13.579 477	.073 641	.424 098	5.759 024	.173 641	9
10	2.593 742	15.937 425	.062 745	.385 543	6.144 567	.162 745	10
11	2.853 117	18.531 167	.053 963	.350 494	6.495 061	.153 963	11
12	3.138 428	21.384 284	.046 763	.318 631	6.813 692	.146 763	12
13	3.452 271	24.522 712	.040 779	.289 664	7.103 356	.140 779	13
14	3.797 498	27.974 983	.035 746	.263 331	7.366 687	.135 746	14
15	4.177 248	31.772 482	.031 474	.239 392	7.606 080	.131 474	15
16	4.594 973	35.949 730	.027 817	.217 629	7.823 709	.127 817	16
17	5.054 470	40.544 703	.024 664	.197 845	8.021 553	.124 664	17
18	5.559 917	45.599 173	.021 930	.179 859	8.201 412	.121 930	18
19	6.115 909	51.159 090	.019 547	.163 508	8.364 920	.119 547	19
20	6.727 500	57.274 999	.017 460	.148 644	8.513 564	.117 460	20
21	7.400 250	64.002 499	.015 624	.135 131	8.648 694	.115 624	21
22	8.140 275	71.402 749	.014 005	.122 846	8.771 540	.114 005	22
23	8.954 302	79.543 024	.012 572	.111 678	8.883 218	.112 572	23
24	9.849 733	88.497 327	.011 300	.101 526	8.984 744	.111 300	24
25	10.834 706	98.347 059	.010 168	.092 296	9.077 040	.110 168	25
26	11.918 177	109.181 765	.009 159	.083 905	9.160 945	.109 159	26
27	13.109 994	121.099 942	.008 258	.076 278	9.237 223	.108 258	27
28	14.420 994	134.209 936	.007 451	.069 343	9.306 567	.107 451	28
29	15.863 093	148.630 930	.006 728	.063 039	9.369 606	.106 728	29
30	17.449 402	164.494 023	.006 079	.057 309	9.426 914	.106 079	30
31	19.194 342	181.943 425	.005 496	.052 099	9.479 013	.105 496	31
32	21.113 777	201.137 767	.004 972	.047 362	9.526 376	.104 972	32
33	23.225 154	222.251 544	.004 499	.043 057	9.569 432	.104 499	33
34	25.547 670	245.476 699	.004 074	.039 143	9.608 575	.104 074	34
35	28.102 437	271.024 368	.003 690	.035 584	9.644 159	.103 690	35
36	30.912 681	299.126 805	.003 343	.032 349	9.676 508	.103 343	36
37	34.003 949	330.039 486	.003 030	.029 408	9.705 917	.103 030	37
38	37.404 343	364.043 434	.002 747	.026 735	9.732 651	.102 747	38
39	41.144 778	401.447 778	.002 491	.024 304	9.756 956	.102 491	39
40	45.259 256	442.592 556	.002 259	.022 095	9.779 051	.102 259	40
41	49.785 181	487.851 811	.002 050	.020 086	9.799 137	.102 050	41
42	54.763 699	537.636 992	.001 860	.018 260	9.817 397	.101 860	42
43	60.240 069	592.400 692	.001 688	.016 600	9.833 998	.101 688	43
44	66.264 076	652.640 761	.001 532	.015 091	9.849 089	.101 532	44
45	72.890 484	718.904 837	.001 391	.013 719	9.862 808	.101 391	45
46	80.179 532	791.795 321	.001 263	.012 472	9.875 280	.101 263	46
47	88.197 485	871.974 853	.001 147	.011 338	9.886 618	.101 147	47
48	97.017 234	960.172 338	.001 041	.010 307	9.896 926	.101 041	48
49	106.718 957	1057.189 572	.000 946	.009 370	9.906 296	.100 946	49
50	117.390 853	1163.908 529	.000 859	.008 519	9.914 814	.100 859	50
51	129.129 938	1281.299 382	.000 780	.007 744	9.922 559	.100 780	51
52	142.042 932	1410.429 320	.000 709	.007 040	9.929 599	.100 709	52
53	156.247 225	1552.472 252	.000 644	.006 400	9.935 999	.100 644	53
54	171.871 948	1708.719 477	.000 585	.005 818	9.941 817	.100 585	54
55	189.059 142	1880.591 425	.000 532	.005 289	9.947 106	.100 532	55
56	207.965 057	2069.650 567	.000 483	.004 809	9.951 915	.100 483	56
57	228.761 562	2277.615 624	.000 439	.004 371	9.956 286	.100 439	57
58	251.637 719	2506.377 186	.000 399	.003 974	9.960 260	.100 399	58
59	276.801 490	2758.014 905	.000 363	.003 613	9.963 873	.100 363	59
60	304.481 640	3034.816 395	.000 330	.003 284	9.967 157	.100 330	60
n	$S^n = (1+i)^n$	$S_{\overline{n}\rceil} = \frac{S^n - 1}{i}$	$\frac{1}{S_{\overline{n}\rceil}} = \frac{i}{S^n - 1}$	$\frac{1}{S^n} = \frac{1}{(1+i)^n}$	$a_{\overline{n}\rceil} = \frac{1 - 1/S^n}{i}$	$\frac{1}{a_{\overline{n}\rceil}} = \frac{i}{1 - 1/S^n}$	n

$$S = 1 + i$$

The use of precomputed tables of loan factors has largely been supplanted by the use of financial calculators and computer applications. The tables remain useful to illustrate the mathematics of finance, particularly the relative rates of change of loan factors over time for different interest rates.

Tables for additional interest rates can be found in various publications:

- Charles B. Akerson, *The Appraiser's Workbook*, 2nd ed. (Chicago: Appraisal Institute, 1996).
- Charles B. Akerson and David C. Lennhoff, ed., *Capitalization Theory and Techniques: Study Guide*, 3rd ed. (Chicago: Appraisal Institute, with tables computed by Financial Publishing Company, 2009).
- L. W. Ellwood, *Ellwood Tables for Real Estate Appraising and Financing*, 4th ed. (Cambridge, Mass.: Ballinger Publishing Co., 1977).
- James J. Mason, ed., comp., *American Institute of Real Estate Appraisers Financial Tables*, rev. ed. (Chicago: American Institute of Real Estate Appraisers, with tables computed by Financial Publishing Company, 1982), 461–473.

This factor is used to solve problems that involve compound discounting.

As demonstrated in the discussion of future value, \$1.00 compounded annually at 10% will grow to \$1.610151 in five years. Accordingly, the amount that will grow to \$1.00 in five years is \$1.00 divided by 1.61051, or \$0.62092. In the 10% table, the present value of one factor for five years is 0.620921. In other words, \$1.00 to be collected five years from today has a present value of \$0.620921 when discounted at 10% per year. And \$10,000 to be collected five years from today, discounted at the same 10% annual rate, has a present value of \$10,000 × 0.620921, or \$6,209.21. The \$10,000 sum to be received in five years is a reversion.

Ordinary Level Annuity (Present Value of One per Period)

This factor represents the present value of a series of future installments or payments of \$1 (or other currency) per period for a given number of periods discounted at an effective interest rate. It is commonly referred to as the Inwood coefficient.

$$a_{\overline{n}|} = \frac{1 - 1/S^n}{i}$$

where:

$a_{\overline{n}|}$ = level annuity factor

$1/S^n$ = present value factor

i = rate of interest yield

This factor is used in solving problems that deal with the compound discounting of cash flows that are level or effectively level.

Finding the present value of a future income stream is a discounting procedure in which future payments are treated as a series of reversions. The present value of a series of future receipts may be quickly ascertained using the precomputed present value of one per period factors for the selected discount rate provided the receipts are all equal in amount, equally spaced over time, and receivable at the end of each period.

If, for example, 10% per year is a fair rate of interest or discount, it would be justifiable to pay \$0.909091 (i.e., the annual present value of \$1 at 10%) for the right to receive \$1.00 one year from today. Assuming that the cost of this right is \$0.909091, the \$1.00 received at the end of the year could be divided between principal and interest as follows.

Return of Principal	\$0.90909
Interest on Principal for 1 Year @ 10%	0.09091
Total Received	\$1.00000

If approximately \$0.91 is the present value of the right to receive \$1.00 of income one year from today at 10% interest, the present value of the right to receive \$1.00 two years from today is less. According to the present value formula, the present value of \$1.00 to be received two years from today is \$0.826446. The present value of \$1.00 payable at the end of two years can be confirmed with these calculations.

Return on Principal	$0.82645*
Interest for First Year at 10% on $0.82645	0.08264
	$0.90909
Interest for Second Year at 10% on $0.90909	0.09091
Total Principal Repayment + Interest Received	$1.00000

* Present value factor, 0.826446 × $1.00 = $0.82645 (rounded).

Similarly, the present value of the right to receive $1.00 at the end of three years is $0.751315. At the end of four years it is $0.683013, and at the end of the fifth year it is $0.620921. The present value of these rights to receive income at one-year intervals for five years is accumulated as the present value of $1.00 per year. This is known as the *compound interest valuation premise*, also referred to as the *ordinary annuity factor*. Therefore, the sum of the five individual rights to receive $1.00 each year, payable at the end of the year, for five years is $3.790787 (i.e., the 10% annual present value of one per period factor for five years).

Sum of Individual Present Values of $1.00 Payable at the End of the Period	
Present Value of $1.00 Due in 1 Year	$0.909091*
Present Value of $1.00 Due in 2 Years	0.826446*
Present Value of $1.00 Due in 3 Years	0.751315*
Present Value of $1.00 Due in 4 Years	0.683013*
Present Value of $1.00 Due in 5 Years	0.620921*
Total Present Value of $1.00 per Year for 5 Years	$3.790786**

* 10% present value of one factor.

** 10% present value of one per period factor is 3.790787; the difference is due to rounding.

The present value of one per period table for five annual discounting periods ($n = 5$) gives a factor that represents the total of the present values of a series of periodic amounts of $1.00, payable at the end of each period. The calculation presented above is unnecessary because multiplying $1.00 by the factor for the present value of $1 per year for five years produces the same present value ($1.00 × 3.790787 = $3.790787).

For appraisal purposes, the present value of one per period factor may be multiplied by a periodic income with the characteristics of an ordinary annuity to derive the present value of the right to receive that income stream. The future payments of income provide for recapture of, and interest on, this present value. Present value factors are multipliers and perform the same function as capitalization rates.

The 10% ordinary annuity factor for five years, 3.790787, represents the present value of each $1.00 of annual end-of-year collection based on a nominal annual discount rate of 10%. Tables and formulas for semiannual, quarterly, and monthly payments are also available. The ordinary annuity factor for semiannual payments in the 10% nominal annual rate table is 7.721735. If payment continues for five years, each $1.00 of semiannual payment represents $10.00 received but reflects only $7.72 of the discounted present value of monthly payments for five years. In the table for a 10% nominal rate, the monthly factor is 47.065369, indicating that the present value of an ordinary annuity income stream of 60 monthly payments of \$1.00 each discounted at a nominal rate of 10% is 47.065369 × \$1.00, or about \$47.07.

Based on a 10% nominal rate, semiannual payments would involve an effective rate of 5%. In the 5% annuity table, the factor for 10 periods is 7.721735; this is the same factor shown in the 10% semiannual table for a five-year period. Thus, annuity factors for more frequent payment periods can be derived using nominal annual rate tables. Preprogrammed financial calculators can be used to facilitate these calculations.

In computing the present value of an annuity income stream, it may be desirable to assume that periodic payments are made at the beginning rather than the end of each payment period. The present value of an annuity payable in advance is equal to the present value of an ordinary annuity in arrears multiplied by the base (i.e., 1 plus the effective interest rate for the discounting period: $1 + i$). Thus, the present value of semiannual payments in advance over a five-year period discounted at a nominal rate of 10% becomes \$1.00 × 7.721735 × 1.05 = \$8.107822, or \$8.11, compared to \$7.72 as computed for payments received at the end of each payment period.

Ordinary Annuities Changing in Constant Amounts

Present Value of Annual Payments Starting at One and Changing in Constant Amounts

$$PVF = (1 + h\,n)\,a_{\overline{n}|} - \frac{h\,(n - a_{\overline{n}|})}{i}$$

where:

PVF = present value factor

h = annual increase or decrease after first year*

n = number of years

$a_{\overline{n}|}$ = PVF for ordinary level annuity

i = rate of interest yield

* h is positive for an increase and negative for a decrease

This factor is used to solve problems dealing with the compound discounting of cash flows that are best represented by a straight-line pattern of change.

This factor is similar to the ordinary level annuity table, but the annual receipts are converted into constant dollar amounts. For instance, assume that the amount to be received one year from today is \$10,000, additional future receipts are expected to increase \$1,000 per year for the next nine years, and 15% per year is a fair rate of interest. According to the 15% annual present value of one factor, it would be justifiable to pay \$67,167 for the right to receive \$10,000 one year from today and nine additional payments growing at \$1,000 per year for nine additional years. The table for 15% indicates that the factor to be applied to the initial receipt is 6.7167.

Year	Income	×	Present Value Factor	=	Present Value
1	$10,000	×	0.869565	=	$8,695.65
2	11,000	×	0.756144	=	8,317.58
3	12,000	×	0.657516	=	7,890.19
4	13,000	×	0.571753	=	7,432.79
5	14,000	×	0.497177	=	6,960.48
6	15,000	×	0.432328	=	6,484.92
7	16,000	×	0.375937	=	6,014.99
8	17,000	×	0.326902	=	5,557.33
9	18,000	×	0.284262	=	5,116.72
10	19,000	×	0.247185	=	4,696.52
Present value					$67,167.17

$$\frac{\text{Present Value}}{\text{Initial Receipt}} = \text{Factor}$$

$$\frac{\$67,167.17}{\$10,000.00} = 6.7167$$

Ordinary Annuities Changing in Constant Ratio

Present Value of Annual Payments Starting at One and Changing in Constant Ratio

$$PVF = \frac{1 - \left(\frac{1+x}{1+i}\right)^n}{i - x}$$

where:

PVF = present value factor

x* = constant ratio change in income

n = number of years

i = rate of interest or yield

* x is positive for an increase and negative for a decrease

This factor is used to solve problems dealing with the compound discounting of cash flows that are best represented by an exponential-curve pattern of change.

Sinking Fund Factors

Periodic Payment to Grow to One

This factor represents the level periodic investment or deposit required to accumulate to $1 (or other unit of currency) in a given number of periods including interest at the effective rate. It is commonly known as the amortization rate and is the reciprocal of the corresponding sinking fund accumulation factor.

$$1/S_{\overline{n}|} = \frac{i}{S^n - 1}$$

where:
$1/S_{\overline{n}|}$ = sinking fund factor
i = effective rate of interest
n = number of compounding periods
S^n = future value factor

This factor is used to solve problems that involve calculating required sinking fund deposits or providing for the change in capital value in investment situations where the income or payments are level.

When deposits are made at the end of each compounding period, sinking fund factors reflect the fractional portion of $1.00 that must be deposited periodically at a specified interest rate to accumulate to $1.00 by the end of the series of deposits.

If $10,000 is to be accumulated over a 10-year period and annual deposits are compounded at 10% interest, the factor shown on the 10-year line of the annual column in the 10% sinking fund table indicates that each annual deposit must amount to $10,000 × 0.062745, or $627.45.

Sinking Fund Accumulation Factors

Future Value of Periodic Payments of One

The future value of periodic payments of one factor represents the total accumulation of principal and interest on a series of deposits or installments of $1 (or other currency) per period for a given number of periods with interest at the effective rate per period. It is also known as the *amount of one per period*. It is the reciprocal of the corresponding sinking fund factor.

$$S_{\overline{n}|} = \frac{S^n - 1}{i}$$

where:
$S_{\overline{n}|}$ = sinking fund accumulation factor
i = effective rate of interest
S^n = future value factor

This factor is used to solve problems that involve the growth of sinking funds or the calculation of capital recovery in investment situations where the income or payments are level.

Sinking fund accumulation factors are similar to the future value of one (amount of one) factors except that deposits are periodic (in a series) and are assumed to be made at the end of the first compounding period and at the end of each period thereafter. Thus, the initial deposit, which is made at the end of the first period, has earned no interest and the factor for this period is 1.000000.

If compounding at 10% per year for 10 years is assumed, a factor of 15.937425 reveals that a series of 10 deposits of $1.00 each made at the end of each year for 10 years will accumulate to $1.00 × 15.937425, or almost $15.94.

Direct Reduction Loan Factors

Monthly Payment and Annual Constant per One of Loan

Payment: $1/a_{\overline{n}|} = \dfrac{i}{1 - 1/S^n}$

Annual constant: $R_M = 12/a_{\overline{n}|}$

where: $1/a_{\overline{n}|}$ = direct reduction loan factor

$1/S^n$ = present value factor

i = effective rate of interest

R_M = annual constant

Part paid off: $P = \dfrac{R_M - 12i}{R_{M_p} - 12i}$

where: R_M = actual annual constant

R_{M_p} = annual constant for projection period

i = effective rate of interest

This factor is used to solve problems dealing with monthly payment, direct reduction loans. Payments and constants for quarterly, semiannual, and annual payment loans can be obtained by calculating the reciprocals of the present value of one per period factors.

These factors, which are known as *mortgage constants for loan amortization*, reflect the amount of ordinary annuity payment that \$1.00 will purchase. They indicate the periodic payment that will extinguish the debt and pay interest on the declining balance of the debt over the life of the payments. The mortgage constant may be expressed in terms of the periodic payments. A mortgage constant related to a monthly payment is the ratio of the monthly payment amount to the original amount of the loan. Whether payments are monthly, semiannual, or annual, the mortgage constant is usually expressed in terms of the total payments in one year as a percentage of the original loan amount. This is called the *annual constant* and is represented by the symbol R_M. As the loan is paid off and the outstanding balance is reduced, a new annual mortgage constant can be calculated as the ratio of total annual payments to the unpaid balance of the loan at that time.

A loan of \$10,000 to be amortized in 10 annual end-of-year payments at a mortgage interest rate of 10% would require level annual payments of \$10,000 × 0.162745, the 10% direct reduction annual factor for 10 years. If monthly payments were made at 10% over 10 years, the amount of each payment would be \$132.15 (i.e., \$10,000 × 0.013215). The annual mortgage constant in this case would be 0.158580, or 12 × 0.013215.

Direct reduction factors consist of the interest rate plus the sinking fund factor at the specific point in time. They are reciprocals of the corresponding ordinary level-annuity factors.

Interrelationships Among the Factors

Note that mathematical relationships exist among the formulas for the various factors. These relationships can be useful in understanding the factors and solving appraisal problems. For example, appraisers should know that the factors in the ordinary level annuity and direct reduction loan tables are reciprocals; the factors in the ordinary level annuity table can be used as multipliers instead of using the direct reduction loan factors as divisors.

Reciprocals

The factors in some of the tables are reciprocals of those in other tables. This is indicated by their formulas.

Future Value of One and Reversion Factors

$$S^n \text{ and } \frac{1}{S^n}$$

The reversion factor at 12% for 10 years with annual compounding is 0.321973, which is the reciprocal of the future value of one factor.

$$0.321973 = 1/3.105848$$

Sinking Fund Accumulations and Sinking Fund Factors

$$S_{\overline{n}|} \text{ and } 1/S_{\overline{n}|}$$

The sinking fund factor at 12% for 10 years with annual compounding is 0.056984, which is the reciprocal of the sinking fund accumulation factor.

$$0.056984 = 1/17.548735$$

Ordinary Level Annuity and Direct Reduction Loan Factors

$$a_{\overline{n}|} \text{ and } 1/a_{\overline{n}|}$$

The direct reduction loan factor at 12% for 10 years with annual compounding is 0.176984, which is the reciprocal of the ordinary level annuity factor.

$$0.056984 = 1/17.548735$$
$$0.176984 = 1/5.650223$$

Summations

Ordinary Level Annuity Factors

An ordinary level annuity factor represents the sum of the reversion factors for all periods up to and including the period being considered. For example, the ordinary level annuity factor for five years at 12% with annual compounding is 3.604776, which is the sum of all the reversion factors for Years 1 through 5.

$$\begin{array}{r} 0.892857 \\ 0.797194 \\ 0.711780 \\ 0.635518 \\ \underline{0.567427} \\ 3.604776 \end{array}$$

Direct Reduction Loan Factors

A direct reduction loan factor represents the sum of the interest, yield, or discount rate stated at the top of the table and the sinking fund factor. For example, the direct reduction loan factor at 12% for 10 years with monthly compounding is 0.1721651, which is the sum of 0.12 plus the monthly sinking fund factor of 0.0043471 times 12 (0.12 + 0.0521651 = 0.1721651).

Conversely, the sinking fund factor can be obtained by subtracting the interest rate from the direct reduction loan factor. The sinking fund factor at 12% for 10 years with monthly compounding is 0.1721651 – 0.12 = 0.0521651. In addition, the interest rate can be obtained by subtracting the sinking fund factor from the direct reduction loan factor. Given a mortgage constant of 0.1721651 with monthly compounding for 10 years, the interest rate is 0.1721651 – 0.0521651 = 0.12000, or 12.0%.

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