

CORPORATE FINANCE

A PRACTICAL APPROACH

SECOND EDITION



Michelle R. Clayman, CFA • Martin S. Fridson, CFA • George H. Troughton, CFA
Foreword by Matthew Scanlan, CFA

CORPORATE FINANCE

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A Practical Approach

Second Edition

Michelle R. Clayman, CFA

Martin S. Fridson, CFA

George H. Troughton, CFA



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FOREWORD

I am honored to introduce this second edition of *Corporate Finance: A Practical Approach*, which promises to be an important and comprehensive discourse on corporate financial management. The significant additions in this edition and revisions to the first edition build on the topic areas introduced in 2008. Furthermore, they bring much-needed practical dimensions to the complex and dynamic aspects of corporate finance.

Certainly, the global financial landscape has changed dramatically since the release of the first edition of this work. The economic drama and financial carnage injected into the marketplace starting in late 2007 have penetrated the very core of financial thought and practice and have challenged long-standing economic beliefs and relationships. The effects on corporate governance, capital structure, and budgeting caused by this extreme market volatility and economic upheaval have moved corporate treasurers and chief financial officers to the front lines in their companies' continuing pursuits of profitability and financial security. Only those institutions that can quickly adapt their financial management and corporate structure to this "new normal" will survive well into the future. The chapters in this edition have been revised to take into consideration some of the profound changes that have affected this new global financial setting. Yet, it is refreshing to note that no matter what economic environment exists in the future, sound, traditional financial management practices will always be essential to the long-term success of any entity.

The authors of these chapters are leading industry practitioners and recognized academic thought leaders. Their unique perspectives and thorough understanding of their respective topic areas are invaluable in providing readers with a factual exposition of the subject matter. In addition, their commonsense approach of highlighting important learning outcomes and incorporating practical problem-solving tools gives readers techniques they can apply in real-world financial settings.

Like the original text, this edition is assembled from readings used in the CFA Program curriculum. The CFA Program is a comprehensive, self-directed, distance learning program administered by CFA Institute. Since the early 1960s, the attainment of the CFA designation has been viewed as a significant achievement in the realm of finance and investment management. Those who enter the CFA Program sit for three consecutive and rigorous examinations that cover a broad range of important financial topics, including accounting, quantitative methods, equity and fixed-income analysis, portfolio management, and ethics. Most who enter this program already possess a strong record of achievement in the financial industry, as well as advanced business degrees, but welcome the additional focus and comprehensive curriculum of this designation program. I am fortunate to have earned the CFA charter and am proud to serve on the Board of Governors of CFA Institute.

WHY THIS TEXT IS IMPORTANT

Competing in the global financial arena has been a far more daunting challenge during this decade than in earlier periods. The scarcity of credit and risk capital following the global financial challenges of the past few years, along with the evolution of emerging economies as formidable players on the world financial stage, demands that businesses operate at utmost efficiency. Optimal financial management and peak operating effectiveness are prerequisites not only for success but also for survival. And in order to successfully commit risk capital, companies must incorporate disciplined, systematic capital-budgeting techniques so as to allocate capital to only those projects with optimal returns. Furthermore, companies must be able to understand the life spans of projects, effectively anticipate cash flow needs, and accurately forecast lean periods in their liquidity to avoid potentially devastating shocks to their financial and market health. Also critical in this new financial environment is the ability to properly analyze the effects of inflation, disinflation, foreign currency shocks, and regulatory risk on existing projects, as well as the ability to recognize capital-budgeting biases and errors. This book offers comprehensive insights into avoiding these common pitfalls.

In particular, the chapter on capital budgeting is instrumental in instilling in the reader the discipline to anticipate extraneous influences on capital planning. Another critical section of the book concerns forecasting and evaluating the weighted average cost of capital that an entity faces. Recent as well as long-term financial history has taught everyone the importance of properly analyzing this crucial financial component. The degree of assumed leverage, tax benefits and implications of using debt over other forms of capitalization, the cost of debt versus common and preferred equity, and the impact of changes in debt ratings—all are essential areas of knowledge for company leaders. The ability to use the cost of capital as an effective discipline in organizational budgeting is yet another key component of continued financial stability.

In addition to the tools and techniques for measuring the cost of capital, the appropriate use of financial leverage is an important topic in this text. Clearly, increased leverage heightens the level of earnings volatility and, ultimately, the cost of equity and the overall risk attached to any company. Properly understanding the prudent use of financial leverage as an earnings-enhancement vehicle is essential. Furthermore, examining the degree of operating leverage and the impact of cost structure on production is a vital component of measuring and evaluating the operating efficiency of any organization. And last but not least, an incredibly large part of ultimately determining the financial competitiveness of a company is successfully anticipating and accounting for the effect of taxes.

A key element of attracting investors and maintaining adequate sources of capital is fully understanding how an entity manages its own equity in the context of dividends and share repurchases. In addition, I cannot overstate the advantages of having a technical grasp of the effects on financial statements of altering dividend policy or engaging in share buybacks or secondary offerings, nor can I overemphasize the commensurate impacts on a company's effective cost of capital and overall financial flexibility. In this environment of heightened investor focus on liquidity and financial health, effective working capital management is a necessity. The text walks the reader through the important steps in successfully monitoring an optimal cash balance, contains a primer on short-term investment instruments, and delves into accounts receivable and inventory management. It also examines the benefits of short-term borrowing versus cash disbursements and other accounts payable strategies.

Finally, the critical steps in a merger and acquisition strategy are defined and analyzed. This segment of the text highlights the effects of the successful use of these approaches on firm competitiveness, scale, and market power and addresses the potential pitfalls of integration and cost management. Finally, this section examines the impact of taxes and regulatory challenges on a potentially successful business combination tactic, as well as discussing when an acquisition posture makes sense.

WHAT HAS CHANGED SINCE THE FIRST EDITION

This second edition provides the reader with comprehensive updates on all topics, especially where new techniques or technologies have emerged, and gears the learning outcomes, descriptions, and end-of-chapter exercises to the new economic realities of this decade. The sections on dividend policy, share repurchases, and capital structure have also been revised and reconstructed. These chapters contain significantly new content as well as updated exercises.

No book can provide a practitioner or student with a no-fail recipe for comprehensive success in financial management, and most entities have discovered that challenges and impacts generally appear from unexpected sources and directions. The authors have tried to create a substantial taxonomy of corporate financial topics with real-world, commonsense applications as well as rigorous problems and exercises that allow readers to test their comprehension of the subjects covered.

This book will become an important resource for a wide array of individuals. Some may ask whether the intricacies of capital budgeting, corporate liquidity, and dividend policy are of interest to a cross section of practitioners, but as many have discovered over the past five years, ignoring the key building blocks of an optimal corporate financial structure and a lean, competitive, and well-capitalized organization can be perilous. Today's corporate landscape, with all its volatility and high barriers to entry, requires that most members of a corporate entity be well schooled in the fundamentals of financial management. Organizations today must deal with formidable foreign competition, an older workforce, and significant capital investments in order to achieve critical scale. A sound understanding of the capital management techniques needed to maintain competitiveness and innovation is a necessity. Students will use this book either as a resource to gain a broad understanding of corporate financial practice or as a useful reference tool for quickly comprehending specific areas of the financial domain.

The long-term performance of all organizations is based on sound decision making by their constituents, whose decisions have wide-ranging implications for the future soundness of their companies. I hope this book will prove to be a valuable resource for present and future members of these organizations.

Matthew Scanlan, CFA
President and CEO
Renaissance Institutional Management LLC
CFA Institute Board of Governors

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We would like to thank the many individuals who played important roles in producing this book.

The standards and orientation of the second edition are a continuation of those set for the first edition. Robert R. Johnson, CFA, former senior managing director of CFA Institute, supported the creation of custom curriculum readings in this area and their revision. Dennis W. McLeavey, CFA, initiated the project during his term as head of Curriculum Development. Christopher B. Wiese, CFA, oversaw final organization, writing, and editing of the first edition for the CFA curriculum.

First edition manuscript reviewers were Jean-Francois Bureau, CFA, Sean D. Carr, Rosita P. Chang, CFA, Jacques R. Gagné, CFA, Gene C. Lai, Asjeet S. Lamba, CFA, Piman Limpaphayom, CFA, and Zhiyi Song, CFA. Chapter authors Pamela P. Drake, CFA, and John D. Stowe, CFA, provided notable assistance at critical junctures. We thank all of the above for their excellent and detailed work.

For this second edition, Gregory Noronha, CFA, was added to the author lineup. Second edition manuscript reviewers were Evan Ashcraft, CFA, David K. Chan, CFA, Lee Dunham, CFA, Philip Fanara, CFA, Usman Hayat, CFA, William Jacobson, CFA, Frank Laatsch, CFA, Murli Rajan, CFA, Knut Reinertz, CFA, Sanjiv Sabherwal, Sandeep Singh, CFA, Frank Smudde, CFA, and Peter Stimes, CFA. Jerald E. Pinto, CFA, director, Curriculum Projects, had primary responsibility for the delivery of the revised chapters.

ABOUT THE CFA INSTITUTE INVESTMENT SERIES

CFA Institute is pleased to provide you with the CFA Institute Investment Series, which covers major areas in the field of investments. We provide this best-in-class series for the same reason we have been chartering investment professionals for more than 45 years: to lead the investment profession globally by setting the highest standards of ethics, education, and professional excellence.

The books in the CFA Institute Investment Series contain practical, globally relevant material. They are intended both for those contemplating entry into the extremely competitive field of investment management as well as for those seeking a means of keeping their knowledge fresh and up to date. This series was designed to be user friendly and highly relevant.

We hope you find this series helpful in your efforts to grow your investment knowledge, whether you are a relatively new entrant or an experienced veteran ethically bound to keep up to date in the ever-changing market environment. As a long-term, committed participant in the investment profession and a not-for-profit global membership association, CFA Institute is pleased to provide you with this opportunity.

THE TEXTS

One of the most prominent texts over the years in the investment management industry has been Maginn and Tuttle's *Managing Investment Portfolios: A Dynamic Process*. The third edition updates key concepts from the 1990 second edition. Some of the more experienced members of our community own the prior two editions and will add the third edition to their libraries. Not only does this seminal work take the concepts from the other readings and put them in a portfolio context, but it also updates the concepts of alternative investments, performance presentation standards, portfolio execution, and, very importantly, individual investor portfolio management. Focusing attention away from institutional portfolios and toward the individual investor makes this edition an important and timely work.

Quantitative Investment Analysis focuses on some key tools that are needed by today's professional investor. In addition to classic time value of money, discounted cash flow applications, and probability material, there are two aspects that can be of value over traditional thinking.

The first involves the chapters dealing with correlation and regression that ultimately figure into the formation of hypotheses for purposes of testing. This gets to a critical skill that challenges many professionals: the ability to distinguish useful information from the overwhelming quantity of available data. For most investment researchers and managers, their

analysis is not solely the result of newly created data and tests that they perform. Rather, they synthesize and analyze primary research done by others. Without a rigorous manner by which to explore research, you cannot understand good research or have a basis on which to evaluate less rigorous research.

Second, the last chapter of *Quantitative Investment Analysis* covers portfolio concepts and takes the reader beyond the traditional capital asset pricing model (CAPM) type of tools and into the more practical world of multifactor models and arbitrage pricing theory.

Fixed Income Analysis has been at the forefront of new concepts in recent years, and this particular text offers some of the most recent material for the seasoned professional who is not a fixed-income specialist. The application of option and derivative technology to the once-staid province of fixed income has helped contribute to an explosion of thought in this area. Professionals have been challenged to stay up to speed with credit derivatives, swaptions, collateralized mortgage securities, mortgage-backed securities, and other vehicles, and this explosion of products has strained the world's financial markets and tested central banks to provide sufficient oversight. Armed with a thorough grasp of the new exposures, the professional investor is much better able to anticipate and understand the challenges our central bankers and markets face.

International Financial Statement Analysis is designed to address the ever-increasing need for investment professionals and students to think about financial statement analysis from a global perspective. The text is a practically oriented introduction to financial statement analysis that is distinguished by its combination of a true international orientation, a structured presentation style, and abundant illustrations and tools covering concepts as they are introduced in the text. The authors cover this discipline comprehensively and with an eye to ensuring the reader's success at all levels in the complex world of financial statement analysis.

Equity Asset Valuation is a particularly cogent and important resource for anyone involved in estimating the value of securities and understanding security pricing. A well-informed professional knows that the common forms of equity valuation—dividend discount modeling, free cash flow modeling, price/earnings modeling, and residual income modeling—can all be reconciled with one another under certain assumptions. With a deep understanding of the underlying assumptions, the professional investor can better understand what other investors assume when calculating their valuation estimates. This text has a global orientation, including emerging markets. The second edition provides new coverage of private company valuation and expanded coverage of required rate of return estimation.

Investments: Principles of Portfolio and Equity Analysis provides an accessible yet rigorous introduction to portfolio and equity analysis. Portfolio planning and portfolio management are presented within a context of up-to-date, global coverage of security markets, trading, and market-related concepts and products. The essentials of equity analysis and valuation are explained in detail and profusely illustrated. The book includes coverage of practitioner-important but often neglected topics, such as industry analysis. Throughout, the focus is on the practical application of key concepts with examples drawn from both emerging and developed markets. Each chapter affords the reader many opportunities to self-check his or her understanding of topics. In contrast to other texts, the chapters are collaborations of respected senior investment practitioners and leading business school teachers from around the globe. By virtue of its well-rounded, expert, and global perspectives, the book should be of interest to anyone who is looking for an introduction to portfolio and equity analysis.

The New Wealth Management: The Financial Advisor's Guide to Managing and Investing Client Assets is an updated version of Harold Evensky's mainstay reference guide for wealth

managers. Harold Evensky, Stephen Horan, and Thomas Robinson have updated the core text of the 1997 first edition and added an abundance of new material to fully reflect today's investment challenges. The text provides authoritative coverage across the full spectrum of wealth management and serves as a comprehensive guide for financial advisors. The book expertly blends investment theory and real-world applications and is written in the same thorough but highly accessible style as the first edition.

Corporate Finance: A Practical Approach is a solid foundation for those looking to achieve lasting business growth. In today's competitive business environment, companies must find innovative ways to enable rapid and sustainable growth. This text equips readers with the foundational knowledge and tools for making smart business decisions and formulating strategies to maximize company value. It covers everything from managing relationships between stakeholders to evaluating merger and acquisition bids, as well as the companies behind them. The second edition of the book preserves the hallmark conciseness of the first edition while expanding coverage of dividend policy, share repurchases, and capital structure.

Through extensive use of real-world examples, readers will gain critical perspective into interpreting corporate financial data, evaluating projects, and allocating funds in ways that increase corporate value. Readers will gain insights into the tools and strategies used in modern corporate financial management.

CHAPTER 1

CORPORATE GOVERNANCE

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LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- Explain corporate governance, describe the objectives and core attributes of an effective corporate governance system, and evaluate whether a company's corporate governance has those attributes.
- Compare major business forms and describe the conflicts of interest associated with each.
- Explain conflicts that arise in agency relationships, including manager-shareholder conflicts and director-shareholder conflicts.
- Describe responsibilities of the board of directors and explain qualifications and core competencies that an investment analyst should look for in the board of directors.
- Explain effective corporate governance practice as it relates to the board of directors, and evaluate the strengths and weaknesses of a company's corporate governance practice.
- Describe elements of a company's statement of corporate governance policies that investment analysts should assess.
- Explain the valuation implications of corporate governance.

1. INTRODUCTION

The modern corporation is a very efficient and effective means of raising capital, obtaining needed resources, and generating products and services. These and other advantages have caused the corporate form of business to become the dominant one in many countries. The corporate form, in contrast to other business forms, frequently involves the separation of ownership and control of the assets of the business. The ownership of the modern, public corporation is typically diffuse; it has many owners, most with proportionally small stakes in

the company, who are distant from, and often play no role in, corporate decisions. Professional managers control and deploy the assets of the corporation. This separation of ownership (shareholders) and control (managers) may result in a number of conflicts of interest between managers and shareholders. Conflicts of interest can also arise that affect creditors as well as other stakeholders such as employees and suppliers. In order to remove or at least minimize such conflicts of interest, corporate governance structures have been developed and implemented in corporations. Specifically, **corporate governance** is the system of principles, policies, procedures, and clearly defined responsibilities and accountabilities used by stakeholders to overcome the conflicts of interest inherent in the corporate form.

The failure of a company to establish an effective system of corporate governance represents a major operational risk to the company and its investors.¹ Corporate governance deficiencies may even imperil the continued existence of a company. Consequently, to understand the risks inherent in an investment in a company, it is essential to understand the quality of the company's corporate governance practices. It is also necessary to continually monitor a company's practices, because changes in management, the composition of its board of directors, the company's competitive and market conditions, or mergers and acquisitions, can affect them in important ways.

A series of major corporate collapses in North America, Europe, and Asia, nearly all of which involved the failure or direct override by managers of corporate governance systems, have made it clear that strong corporate governance structures are essential to the efficient and effective functioning of companies and the financial markets in which they operate. Investors lost great amounts of money in the failed companies. The collapses weakened the trust and confidence essential to the efficient functioning of financial markets worldwide.

Legislators and regulators responded to the erosion of trust by introducing strong new regulatory frameworks. These measures are intended to restore the faith of investors in companies and the markets, and, very importantly, to help prevent future collapses. Nevertheless, the new regulations did not address all outstanding corporate governance problems and were not uniform across capital markets. Thus, we may expect corporate governance-related laws and regulations to further evolve.

The chapter is organized as follows: Section 2 presents the objectives of corporate governance systems and the key attributes of effective ones. Section 3 addresses forms of business and conflicts of interest, and Section 4 discusses two major sources of governance problems. In Section 5 we discuss standards and principles of corporate governance, providing three representative sets of principles from current practice. Section 6 addresses environmental, social, and governance factors. Section 7 touches on the valuation implications of the quality of corporate governance, and Section 8 summarizes the chapter.

2. CORPORATE GOVERNANCE: OBJECTIVES AND GUIDING PRINCIPLES

The modern corporation is subject to a variety of conflicts of interest. This fact leads to the following two major objectives of corporate governance:

¹An **operational risk** is the risk of loss from failures in a company's systems and procedures or from external events.

1. To eliminate or mitigate conflicts of interest, particularly those between managers and shareholders.
2. To ensure that the assets of the company are used efficiently and productively and in the best interests of its investors and other stakeholders.

How then can a company go about achieving those objectives? The first point is that it should have a set of principles and procedures sufficiently comprehensive to be called a corporate governance system. No single system of effective corporate governance applies to all firms in all industries worldwide. Different industries and economic systems, legal and regulatory environments, and cultural differences may affect the characteristics of an effective corporate governance system for a particular company. However, there are certain characteristics that are common to all sound corporate governance structures. The core attributes of an effective corporate governance system are:

- Delineation of the *rights* of shareholders and other core stakeholders.
- Clearly defined manager and director governance *responsibilities* to stakeholders.
- Identifiable and measurable *accountabilities* for the performance of the responsibilities.
- *Fairness* and equitable treatment in all dealings between managers, directors, and shareholders.
- Complete *transparency* and accuracy in disclosures regarding operations, performance, risk, and financial position.

These core attributes form the foundation for systems of good governance, as well as for the individual principles embodied in such systems. Investors and analysts should determine whether companies in which they may be interested have these core attributes.

3. FORMS OF BUSINESS AND CONFLICTS OF INTEREST

The goal of for-profit businesses in any society is simple and straightforward: to maximize their owners' wealth. This can be achieved through strategies that result in long-term growth in sales and profits. However, pursuing wealth maximization involves taking risks. A business itself is risky for a variety of reasons. For example, there may be demand uncertainty for its products and/or services, economic uncertainty, and competitive pressures. Financial risk is present when a business must use debt to finance operations. Thus, continued access to sufficient capital is an important consideration and risk for businesses. These risks, and the inherent conflicts of interests in businesses, increase the need for strong corporate governance.

A firm's ability to obtain capital and to control risk is perhaps most influenced by the manner in which it is organized. Three of the predominant forms of business globally are the sole proprietorship, the partnership, and the corporation. Hybrids of these three primary business forms also exist, but we do not discuss them here because they are simply combinations of the three main business forms. With regard to the three primary business forms, each has different advantages and disadvantages. We will discuss each of them, the conflicts of interest that can arise in each, and the relative need for strong corporate governance associated with each form. However, a summary of the characteristics is provided in Exhibit 1-1.

EXHIBIT 1-1 Comparison of Characteristics of Business Forms

Characteristic	Sole Proprietorship	Partnership	Corporation
Ownership	Sole owner	Multiple owners	Unlimited ownership
Legal requirements and regulation	Few; entity easily formed	Few; entity easily formed	Numerous legal requirements
Legal distinction between owner and business	None	None	Legal separation between owners and business
Liability	Unlimited	Unlimited but shared among partners	Limited
Ability to raise capital	Very limited	Limited	Nearly unlimited
Transferability of ownership	Nontransferable (except by sale of entire business)	Nontransferable	Easily transferable
Owner expertise in business	Essential	Essential	Unnecessary

3.1. Sole Proprietorships

The **sole proprietorship** is a business *owned and operated* by a single person. The owner of the local cleaner, restaurant, beauty salon, or fruit stand is typically a sole proprietor. Generally, there are few, if any, legal formalities involved in establishing a sole proprietorship and they are relatively easy to start. In many jurisdictions, there are few, if any, legal distinctions between the sole proprietor and the business. For example, tax liabilities and related filing requirements for sole proprietorships are frequently set at the level of the sole proprietor. Legitimate business expenses are simply deducted from the sole proprietor's taxable income.

Sole proprietorships are the most numerous form of business worldwide, representing, for example, approximately 70 percent of all businesses in the United States, by number.² However, because they are usually small-scale operations, they represent the smallest amount of market capitalization in many markets. Indeed, the difficulties of the sole proprietor in raising large amounts of capital, coupled with unlimited liability and lack of transferability of ownership, are serious impediments to the growth of a sole proprietorship.

From the point of view of corporate governance, the sole proprietorship presents fewer risks than the corporation because the manager and the owner are one and the same. Indeed, the major corporate governance risks are those faced by creditors and suppliers of goods and services to the business. These stakeholders are in a position to be able to demand the types and quality of information that they need to evaluate risks before lending money to the business or providing goods and services to it. In addition, because they typically maintain direct, recurring business relations with the companies, they are better able to monitor the condition and risks of the business, and to control their own exposure to risk. Consequently, we will not consider sole proprietorships further in this chapter.

²Meggison (1997), 40.

3.2. Partnerships

A **partnership**, which is composed of more than one owner/manager, is similar to a sole proprietorship. For the most part, partnerships share many of the same advantages and disadvantages as the sole proprietorship. Two obvious advantages of a partnership over a sole proprietorship are the pooling together of financial capital of the partners and the sharing of business risk among them. However, even these advantages may not be as important as the pooling together of service-oriented expertise and skill, especially for larger partnerships. Some very large international partnerships operate in such fields as real estate, law, investment banking, architecture, engineering, advertising, and accounting. Note also that larger partnerships may enjoy competitive and economy-of-scale benefits over sole proprietorships.

Partners typically overcome conflicts of interest internally by engaging in partnership contracts specifying the rights and responsibilities of each partner. Conflicts of interest with those entities outside the partnership are similar to those for the sole proprietorship and are dealt with in the same way. Hence, we will not consider these conflicts further in this chapter.

3.3. Corporations

Corporations represent less than 20 percent of all businesses in the United States but generate approximately 90 percent of the country's business revenue.³ The percentage is lower elsewhere, but growing. The **corporation** is a legal entity, and has rights similar to those of a person. For example, a corporation is permitted to enter into contracts. The chief officers of the corporation, the executives or top managers, act as agents for the firm and are legally entitled to authorize corporate activities and to enter into contracts on behalf of the business.

There are several important and striking advantages of the corporate form of business. First, corporations can raise very large amounts of capital by issuing either stocks or bonds to the investing public. A corporation can grant ownership stakes, common stock, to individual investors in exchange for cash or other assets. Similarly, it can borrow money, for example, bonds or other debt from individual or institutional investors, in exchange for interest payments and a promise to pay back the principal of the loan. Shareholders are the owners of the corporation, and any profits that the corporation generates accrue to the shareholders.

A second advantage is that corporate owners need not be experts in the industry or management of the business, unlike the owners of sole proprietorships and partnerships where business expertise is essential to success. Any individual with sufficient money can own stock. This has benefits to both the business and the owners. The business can seek capital from millions of investors, not only in domestic markets but worldwide.

Among the most important advantages of the corporate form is that stock ownership is easily transferable. Transferability of shares allows corporations to have unlimited life. A final and extremely important advantage is that shareholders have limited liability. That is, they can lose only the money they have invested, nothing more.

The corporate form of business has a number of disadvantages, however. For example, because many corporations have thousands or even millions of nonmanager owners, they are subject to more regulation than are partnerships or sole proprietorships. While regulation serves to protect shareholders, it can also be costly to shareholders as well. For example, the corporation must hire accountants and lawyers to deal with accounting and other legal

³Meggison (1997).

documents to comply with regulations. Perhaps the most significant disadvantage with the corporation (and the one most critical to corporate governance) is the difficulty that shareholders have in monitoring management and the firm's operations. As a sole proprietor of a small business, the owner will be able to directly oversee such day-to-day business concerns as inventory levels, product quality, expenses, and employees. However, it is impossible for a shareholder of a large corporation such as General Motors or International Business Machines to monitor business activities and personnel, and to exert any control rights over the firm. In fact, a shareholder of a large firm may not even feel like an owner in the usual sense, especially because corporations are owned by so many other shareholders, and because most owners of a large public corporation hold only a relatively small stake in it.

Agency relationships arise when someone, an agent, acts on behalf of another person, the principal. In a corporation, managers are the agents who act on behalf of the owners, the shareholders. If a corporation has in place a diligent management team that works in the best interests of its shareholders and other stakeholders, then the problem of passive shareholders and bondholders becomes a nonissue. In real life, unfortunately, management may not always work in the stakeholders' best interests. Managers may be tempted to see to their own well-being and wealth at the expense of their shareholders and others to whom they owe a fiduciary duty. This is known as an **agency problem**, or the **principal-agent problem**. The money of shareholders, the principals, is used and managed by agents, the managers, who promise that the firm will pursue wealth-maximizing business activities. However, there are potential problems with these relationships, which we will discuss next.

4. SPECIFIC SOURCES OF CONFLICT: AGENCY RELATIONSHIPS

Conflicts among the various constituencies in corporations have the potential to cause problems in the relationships among managers, directors, shareholders, creditors, employees, and suppliers. However, we will concentrate here on the relationships between (1) managers and shareholders, and (2) directors and shareholders. These two relationships are the primary focus of most systems of corporate governance. However, to the extent that strong corporate governance structures are in place and effective in companies, the agency conflicts among other stakeholders are mitigated as well. For example, managers are responsible for maximizing the wealth of the shareholders and minimizing waste (including excessive compensation and perquisite consumption). To the extent that managers do so, the interests of employees and suppliers are more likely to be met because the probability increases that sufficient funds will be available for payment of salaries and benefits, as well as for goods and services. In this section, we will describe these agency relationships, discuss the problems inherent in each, and will illustrate these agency problems with real-world examples. An understanding of the nature of the conflicts in each relationship is essential to a full understanding of the importance of the provisions in codes of corporate governance.

4.1. Manager–Shareholder Conflicts

From the point of view of investors, the manager–shareholder relationship is the most critical one. It is important to recognize that firms and their managers, the shareholders' agents, obtain operating and investing capital from the shareholders, the owners, in two ways. First, although shareholders have a 100 percent claim on the firm's net income, the undistributed

net income (the earnings remaining after the payment of dividends) is reinvested in the company. We normally term this reinvested income retained earnings. Second, the firm can issue stock to obtain the capital, either through an initial public offering (IPO) if the firm is currently privately owned, or through a seasoned equity offering (SEO) if the firm already has shares outstanding. By whatever means the firm obtains equity capital, shareholders entrust management to use the funds efficiently and effectively to generate profits and maximize investors' wealth.

However, although the manager is responsible for advancing the shareholder's best interests, this may not happen. For example, management may use funds to try to expand the size of the business to increase their job security, power, and salaries without consideration of the shareholders' interests. In addition, managers may also grant themselves numerous and expensive perquisites, which are treated as ordinary business expenses. Managers enjoy these benefits, and shareholders bear the costs. This is a serious agency problem and, unfortunately, there are a number of recent real-world examples of their occurrence in corporations.

Managers also may make other business decisions, such as investing in highly risky ventures, that benefit themselves but that may not serve the company's investors well. For example, managers who hold substantial amounts of executive stock options will receive large benefits if risky ventures pay off, but will not suffer losses if the ventures fail. By contrast, managers whose wealth is closely tied to the company and who are therefore not well diversified may choose to not invest in projects with a positive expected net present value because of excessive risk aversion. The checks and balances in effective corporate governance systems are designed to reduce the probability of such practices.

The cases of Enron (bankruptcy filing: 2001, in the United States) and Tyco (resignation of CEO: 2002, in the United States) make clear that in the absence of the checks and balances of strong and effective corporate governance systems, investors and others cannot necessarily rely upon managers to serve as stewards of the resources entrusted to them. Example 1-1, dealing with Enron, illustrates the problems that can ensue from a lack of commitment to a corporate governance system. Example 1-2, dealing with Tyco, illustrates a case in which there were inadequate checks and balances to the power of a CEO.

EXAMPLE 1-1 Corporate Governance Failure (1)

Enron was one of the world's largest energy, commodities, and services companies. However, it is better known today as a classic example of how the conflicts of interest between shareholders and managers can harm even major corporations and their shareholders. Enron executives, with the approval of members of the board of directors, overrode provisions in Enron's code of ethics and corporate governance system that forbade any practices involving self-dealing by executives. Specifically, Enron's chief financial officer set up off-shore partnerships in which he served as general partner. As an Enron executive, he was able to make deals with these partnerships on behalf of Enron. As a general partner of the partnerships, he received the enormous fees that the deals generated.⁴

⁴See Powers, Trough, and Winokur (2002).

The partnerships served other useful purposes. For example, they made it possible to hide billions of dollars in Enron debt off of the company's balance sheet, and generated artificial profits for Enron. Thus, disclosure of the company's rapidly deteriorating financial condition was delayed, preventing investors and creditors from obtaining information critical to the valuation and riskiness of their securities. At the same time, Enron executives were selling their own stock in the company.

These egregious breaches of good governance harmed both Enron's outside shareholders and their creditors. The bonds were becoming riskier but the creditors were not informed of the deteriorating prospects. The exorbitant fees the executives paid themselves came out of the shareholders' earnings, earnings that were already overstated by the artificial profits. Investors did not receive full information about the problems in the company until well after the collapse and the company's bankruptcy filing, by which time their stock had lost essentially all of its value.

Most, if not all, of the core attributes of good governance were violated by Enron's managers, but especially the responsibility to deal fairly with all stakeholders, including investors and creditors, and to provide full transparency of all material information on a timely basis.

EXAMPLE 1-2 Corporate Governance Failure (2)

Tyco provides another well-known example of a corporate governance failure. The CEO of Tyco used corporate funds to buy home decorating items, including a \$17,000 traveling toilette box, a \$445 pincushion, and a \$15,000 umbrella stand. He also borrowed money from the company's employee loan program to buy \$270 million-worth of yachts, art, jewelry, and vacation estates. Then, in his capacity as CEO, he forgave the loan. All told, the CEO may have looted the firm, and thereby its shareholders, of over \$600 million.⁵

It is instructive that in court proceedings in the Tyco case, the CEO and his representatives have not argued that he did not do these things, but rather that it was not illegal for him to do so. Tyco is a striking example of excessive perquisite consumption by a CEO.

The role of complete transparency in sound corporate governance, including understandable and accurate financial statements, cannot be overestimated. Without full information, investors and other stakeholders are unable to evaluate the company's financial position and riskiness, whether the condition is improving or deteriorating, and whether insiders are aggrandizing themselves, or making poor business decisions, to the detriment of long-term investors.

⁵Maremont and Cohen (2002), A1.

Two additional cases illustrate how false, misleading, or incomplete corporate disclosure may harm investors and other stakeholders.

EXAMPLE 1-3 Corporate Governance Failure (3)

The Italian firm, Parmalat, was one of the world's largest dairy foods suppliers. The founders and top executives of Parmalat were accused of fictitiously reporting the existence of a \$4.9 billion bank account so that the company's enormous liabilities would appear less daunting.⁶ By hiding the true financial condition of the firm, the executives were able to continue borrowing. The fraud perpetrated by Parmalat's largest shareholders and executives hurt Parmalat's creditors as well as the shareholders. Parmalat eventually defaulted on a \$185 million bond payment in November 2003 and the company collapsed shortly thereafter.

EXAMPLE 1-4 Corporate Governance Failure (4)

During the late 1990s, Adelphia, the fifth-largest provider of cable entertainment in the United States, and the company's founders embarked on an aggressive acquisition campaign to increase the size of the company. During this time, the size of Adelphia's debt more than tripled from \$3.5 billion to \$12.6 billion. However, the founders also arranged a \$2.3 billion personal loan, which Adelphia guaranteed, but this arrangement was not fully disclosed to Adelphia's other stakeholders.⁷ In addition, it is alleged that fictitious transactions were recorded to boost accounting profits.⁸ These actions by Adelphia's owners were harmful to all of Adelphia's nonfounder stakeholders, including investors and creditors. The company collapsed in bankruptcy in 2002.

The severity of the agency problems of the companies discussed in Examples 1-1 through 1-4 does not represent the norm, although the potential for serious conflicts of interest between shareholders and managers is inherent in the modern corporation. Strong corporate governance systems provide mechanisms for monitoring managers' activities, rewarding good performance and disciplining those in a position of responsibility for the company to make sure they act in the interests of the company's stakeholders.

⁶Edmondson (2004).

⁷Nofsinger and Kim (2003), 60–61.

⁸Markon and Frank (2002), A3.

4.2. Director–Shareholder Conflicts

Corporate governance systems rely on a system of checks and balances between the managers and investors in which the board of directors plays a critical role. The purpose of boards of directors in modern corporations is to provide an intermediary between managers and the owners, the shareholders. Members of the board of directors serve as agents for the owners, the shareholders, a mechanism designed to represent the investors and to ensure that their interests are being well served. This intermediary generally is responsible for monitoring the activities of managers, approving strategies and policies, and making certain that these serve investors' interests. The board is also responsible for approving mergers and acquisitions, approving audit contracts and reviewing the audit and financial statements, setting managers' compensation including any incentive or performance awards, and disciplining or replacing poorly performing managers.

The conflict between directors and shareholders arises when directors come to identify with the managers' interests rather than those of the shareholders. This can occur when the board is not independent, for example, or when the members of the board have business or personal relationships with the managers that bias their judgment or compromise their duties to the shareholders. If members of the board have consulting agreements with the company, serve as major lenders to the firm, are members of the manager's family, or are from the circle of close friends, their objectivity may be called into question. Many corporations have been found to have inter-linked boards. For example, one or more senior managers from one firm may serve as directors in the companies of their own board members, frequently on compensation committees. Another ever-present problem is the frequently overly generous compensation paid to directors for their services. Excessive compensation may incline directors to accommodate the wishes of management rather than attend to the concerns of investors.

All of the examples cited in this section involve compliant or less than independent board members. In Section 5, we formulate the most important points to check in evaluating a company's corporate governance system.

5. CORPORATE GOVERNANCE EVALUATION

An essential component of the analysis of a company and its risk is a review of the quality of its corporate governance system. This evaluation requires an assessment of issues relating to the board of directors, managers, and shareholders. Ultimately, the long-term performance of a company is dependent upon the quality of managers' decisions and their commitment to applying sound management practice. However, as one group concerned with the issues observes, "by analyzing the state of corporate governance for a given company, an analyst or shareholder may ascertain whether the company is governed in a manner that produces better management practices, promotes higher returns on shareholder capital, or if there is a governance and/or management problem which may impair company performance."⁹

In the following sections we provide a set of guidelines for evaluating the quality of corporate governance in a company. We reiterate that there is no single system of governance that is appropriate for all companies in all industries worldwide. However, this core set of global best practices is being applied in financial markets in Europe, Asia, and North America. They represent a standard by which corporate practices may be evaluated.

⁹New York Society of Securities Analysts (2003).

The information and corporate disclosure available in a specific jurisdiction will vary widely. However, most large financial markets and, increasingly, smaller ones require a substantial amount of information be provided about companies' governance structures and practices. In addition, a few regulatory jurisdictions will require a subset of the criteria we shall give as part of registration, exchange listing, or other requirements.

The analyst should begin by carefully reviewing the requirements in effect for the company. Information is generally available in the company's required filings with regulators. For example, in the United States, such information is provided in the 10-K report, the annual report, and the Proxy Statement (SEC Form DEF 14A). All of these are filed with the U.S. Securities and Exchange Commission (U.S. SEC), are available on the U.S. SEC website, usually are available on the company's website, and are provided by the company to current investors as well as on request. In Europe, the company's annual report provides some information. However, in an increasing number of EU countries, companies are required to provide a report on corporate governance. This report typically will provide information on board activities and decisions, whether the company has abided by its relevant national code, and explain why it departed from the code, if it has. In addition, the announcement of the company's annual general meeting should disclose the issues on the agenda that are subject to shareholder vote. The specific sources of information will differ by jurisdiction and company.

5.1. The Board of Directors

Boards of directors are a critical part of the system of checks and balances that lie at the heart of corporate governance systems. Board members, both individually and as a group, have the responsibility to:

- Establish corporate values and governance structures for the company to ensure that the business is conducted in an ethical, competent, fair, and professional manner.
- Ensure that all legal and regulatory requirements are met and complied with fully and in a timely fashion.
- Establish long-term strategic objectives for the company with a goal of ensuring that the best interests of shareholders come first and that the company's obligations to others are met in a timely and complete manner.
- Establish clear lines of responsibility and a strong system of accountability and performance measurement in all phases of a company's operations.
- Hire the chief executive officer, determine the compensation package, and periodically evaluate the officer's performance.
- Ensure that management has supplied the board with sufficient information for it to be fully informed and prepared to make the decisions that are its responsibility, and to be able to adequately monitor and oversee the company's management.
- Meet frequently enough to adequately perform its duties, and meet in extraordinary session as required by events.
- Acquire adequate training so that members are able to adequately perform their duties.

Depending upon the nature of the company and the industries within which the company operates, these responsibilities will vary; however, these general obligations are common to all companies.

In summarizing the duties and needs of boards of directors, *The Corporate Governance of Listed Companies: A Manual for Investors*¹⁰ states:

Board members owe a duty to make decisions based on what ultimately is best for the long-term interests of shareowners. In order to do this effectively, board members need a combination of three things: independence, experience and resources.

First, a board should be composed of at least a majority of independent board members with the autonomy to act independently from management. Board members should bring with them a commitment to take an unbiased approach in making decisions that will benefit the company and long-term shareowners, rather than simply voting with management. **Second**, board members who have appropriate experience and expertise relevant to the Company's business are best able to evaluate what is in the best interests of shareowners. Depending on the nature of the business, this may require specialized expertise by at least some board members. **Third**, there need to be internal mechanisms to support the independent work of the board, including the authority to hire outside consultants without management's intervention or approval. This mechanism alone provides the board with the ability to obtain expert help in specialized areas, to circumvent potential areas of conflict with management, and to preserve the integrity of the board's independent oversight function. [Emphasis added]

In the following sections we detail the attributes of the board that an investor or investment analyst must assess.

5.1.1. Board Composition and Independence

The board of directors of a corporation is established for the primary purpose of serving the best interests of the outside shareholders in the company. Other stakeholders including employees, creditors, and suppliers are usually in a more powerful position to oversee their interests in the company than are shareholders. The millions of outside investors cannot, individually or collectively, monitor, oversee, and approve management's strategies and policies, performance, and compensation and consumption of perquisites.

The objectives of the board are to see that company assets are used in the best long-term interests of shareholders and that management strategies, plans, policies, and practices are designed to achieve this objective. In a recent amendment to the *Investment Company Act of 1940* rules, the U.S. SEC argues that a board must be "an independent force in [company] affairs rather than a passive affiliate of management. Its independent directors must bring to the boardroom a high degree of rigor and skeptical objectivity to the evaluation of [company] managements and its plans and proposals, particularly when evaluating conflicts of interest."¹¹

Similarly, the *Corporate Governance Handbook*¹² observes:

Board independence is essential to a sound governance structure. Without independence there can be little accountability. In the words of Professor Jeffrey Sonnenfeld of Yale University, "The highest performing companies have extremely contentious boards that regard dissent as an obligation and that treat no subject as undiscussable."

¹⁰*The Corporate Governance of Listed Companies: A Manual for Investors* (2005), 11.

¹¹*Amendments to Rules Governing the Investment Company Act of 1940*, 17 CFR Part 270 (July 2004): 3.

¹²New York Society of Securities Analysts (2003), 3.

Clearly, for members who are appointed to the board to be in a position to best perform their fiduciary responsibilities to shareholders, at a minimum a majority of the members must be independent of management. However, global best practice now recommends that *at least three-quarters* of the board members should be independent.

Some experts in corporate governance have argued that all members of the board should be independent, eliminating the possibility of any senior executives serving on the board. Those who hold this position argue that the presence of managers in board deliberations may work to the detriment of the best interests of investors and other shareholders by intimidating the board or otherwise limiting debate and full discussion of important matters. Others argue that with appropriate additional safeguards, such potential problems can be overcome to the benefit of all stakeholders.

Independence is difficult to evaluate. Factors that often indicate a lack of independence include:

- Former employment with the company, including founders, executives, or other employees.
- Business relationships, for example, prior or current service as outside counsel, auditors, or consultants, or business interests involving contractual commitments and obligations.
- Personal relationships, whether familial, friendship, or other affiliations.
- Interlocking directorships, a director of another company whose independence might be impaired by the relationship with the other board or company, particularly if the director serves on interlocking compensation committees.
- Ongoing banking or other creditor relationships.

Information on the business and other relationships of board members as well as nominees for the board may be obtained from regulatory filings in most jurisdictions. For example, in the United States, such information is required to be provided in the Proxy Statement, SEC Form DEF 14A, sent to shareholders and filed with the SEC prior to shareholder meetings.

5.1.2. Independent Chairman of the Board

Many, if not most, corporate boards now permit a senior executive of a corporation to serve as the chairman of the board of directors. However, corporate governance experts do not regard such an arrangement to be in the best interests of the shareholders of the company. As the U.S. SEC observes,

This practice may contribute to the [company's] ability to dominate the actions of the board of directors. The chairman of a . . . board can largely control the board's agenda, which may include matters not welcomed by the [company's management] . . . Perhaps more important, the chairman of the board can have a substantial influence on the . . . boardroom's culture. The boardroom culture can foster (or suppress) the type of meaningful dialogue between . . . management and independent directors that is critical for healthy . . . governance. It can support (or diminish) the role of the independent directors in the continuous, active engagement of . . . management necessary for them to fulfill their duties. A boardroom culture conducive to decisions favoring the long-term interest of . . . shareholders may be more likely to prevail when the chairman does not have the conflicts of interest inherent in his role as an executive of the [company]. Moreover, a . . . board may be

more effective when negotiating with the [company] over matters such as the [compensation] if it were not at the same time led by an executive of the [company] with whom it is negotiating.¹³

Not all market participants agree with this view. Many corporate managers argue that it is essential for efficient and effective board functioning that the chairman be the senior executive in the company. They base their arguments on the proposition that only such an executive has the knowledge and experience necessary to provide needed information to the board on questions on strategy, policy, and the operational functioning of the company. Critics of this position counter that it is incumbent upon corporate management to provide all such necessary information to the board. Indeed, many argue that this obligation is the sole reason that one or more corporate managers serve as members of the board.

Whether the company has separate positions for the chief executive and chairman of the board can be determined readily from regulatory filings of the company. If the positions are not separate, an investor may doubt that the board is operating efficiently and effectively in its monitoring and oversight of corporate operations, and that decisions made are necessarily in the best interests of investors and other stakeholders.

Tradition and practice in many countries prescribes a so-called “unitary” board system, a single board of directors. However, some countries, notably Germany, have developed a formal system whose intent is to overcome such difficulties as lack of independence of board members and lack of independence of the chairman of the board from company management. The latter approach requires a tiered hierarchy of boards, a management board responsible for overseeing management’s strategy, planning, and similar functions, and an independent supervisory board charged with monitoring and reviewing decisions of the management board, and making decisions in which conflicts of interest in the management board may impair their independence, for example, in determining managerial compensation.

Clearly, independence of the chairman of the board does not guarantee that the board will function properly. However, independence should be regarded as a necessary condition, even if it is not a sufficient one.

5.1.3. Qualifications of Directors

In addition to independence, directors need to bring sufficient skill and experience to the position to ensure that they will be able to fulfill their fiduciary responsibilities to investors and other stakeholders. Information on directors’ prior business experience and other biographical material, including current and past business affiliations, can generally be found in regulatory filings.

Boards of directors require a variety of skills and experience in order to function properly. These skills will vary by industry although such core skills as knowledge of finance, accounting, and legal matters are required by all boards. Evaluation of the members should include an assessment of whether needed skills are available among the board members. Among the qualifications and core competencies that an investor should look for in the board as a group, and in individual members or candidates for the board, are:

¹³ *Amendments to Rules Governing the Investment Company Act of 1940* (2004): 4.

- Independence (see factors to consider in Section 5.1.1 above).
- Relevant expertise in the industry, including the principal technologies used in the business and in financial operations, legal matters, accounting and auditing; and managerial considerations such as the success of companies with which the director has been associated in the past.
- Indications of ethical soundness, including public statements or writings of the director, problems in companies with which the director has been associated in the past such as legal or other regulatory violations involving ethical lapses.
- Experience in strategic planning and risk management.
- Other board experience with companies regarded as having sound governance practices and that are effective stewards of investors' capital as compared to serving management's interests.
- Dedication and commitment to serving the board and investors' interests. Board members with such qualities will not serve on more than a few boards, have an excellent record of attendance at board meetings, and will limit other business commitments that require large amounts of time.
- Commitment to the needs of investors as shown, for example, by significant personal investments in this or other companies for which he or she serves as a director, and by an absence of conflicts of interest.

Such attributes are essential to the sound functioning of a board of directors and should be carefully considered in any investment decision. Board members may be selected as much for their general stature and name recognition as for the specialized expertise they bring to their responsibilities. However, the skills, knowledge, and experience we have described are essential to effective corporate governance, oversight, and monitoring on behalf of shareholders.

5.1.4. Annual Election of Directors

Members of boards of directors may be elected either on an annual or a staggered basis. In annual votes, every member of the board stands for reelection every year. Such an approach ensures that shareholders are able to express their views on individual members' performance during the year, and to exercise their right to control who will represent them in corporate governance and oversight of the company. Opponents argue that subjecting members to annual reelection is disruptive to effective board oversight over the company.

Those who support election of board members on a staggered basis with reelection of only a portion of the board each year, argue that such a scheme is necessary to ensure continuity of the knowledge and experience in the company essential for good corporate governance. Critics express the view that such a practice diminishes the limited power that shareholders have to control who will serve on the board and ensure the responsiveness of board members to investor concerns, such as poor management performance and practices. They also argue that staggered boards better serve the interests of entrenched managers by making the board less responsive to the needs of shareholders, more likely to align their interests with those of managers, and more likely to resist takeover attempts that would benefit shareholders to the detriment of managers.

Corporate governance best practice generally supports the annual election of directors as being in the best interests of investors. When shareholders can express their views annually, either by casting a positive vote or by withholding their votes for poorly performing directors, directors are thought to be more likely to weigh their decisions carefully, to be better prepared

and more attentive to the needs of investors, and to be more effective in their oversight of management.

Information on directors' terms and the frequency of elections may be obtained by examining the term structure of the board members in regulatory filings.

5.1.5. Annual Board Self-Assessment

Board members have a fiduciary duty to shareholders to oversee management's use of assets, to monitor and review strategies, policies and practices, and to take those actions necessary to fulfill their responsibilities to stakeholders. It is essential that a process be in place for periodically reviewing and evaluating their performance and making recommendations for improvement. Generally, this evaluation should occur at least once annually. The review should include:

- An assessment of the board's effectiveness as a whole.
- Evaluations of the performance of individual board members, including assessments of the participation of each member, with regard to both attendance and the number and relevance of contributions made, and an assessment of the member's willingness to think independently of management and address challenging or controversial issues.
- A review of board committee activities.
- An assessment of the board's effectiveness in monitoring and overseeing their specific functions.
- An evaluation of the qualities the company will need in its board in the future, along with a comparison of the qualities current board members currently have.
- A report of the board self-assessment, typically prepared by the nominations committee, and included in the proxy in the United States and in the corporate governance report in Europe.

The process of periodic self-assessment by directors can improve board and company performance by reminding directors of their role and responsibilities, improving their understanding of the role, improving communications between board members, and enhancing the cohesiveness of the board. Self-assessment allows directors to improve not only their own performance but to make needed changes in corporate governance structures. All of these will lead to greater efficiency and effectiveness in serving investors' and other stakeholders' interests.

The process of self-assessment should focus on board responsibilities and individual members' accountability for fulfilling these responsibilities. It should consider both substantive matters and procedural issues, for example, evaluations of the adequacy and effectiveness of the committee structure. The committees regarded as essential by corporate governance experts include the auditing, nominations, and compensation committees, all of which should be staffed by independent directors who are experts in the relevant areas. (The specific functions of these committees will be considered in later sections.)

The company, however, may need to establish additional committees. For example, for a mutual fund company, these might include a securities valuation committee responsible for setting policies for the pricing of securities, and monitoring the application of the policies by management. For a high technology company, the committees might include one tasked with the valuation of intellectual property, or perhaps, management's success in creating new intellectual property through its investments in research and development.

In evaluating the effectiveness of the corporate governance system and specifically, the board of directors, an investment professional should consider the critical functions specific to

a particular company and evaluate whether or not the board's structure and membership provides adequate oversight and control over management's strategic business decision-making and policy-making.

5.1.6. Separate Sessions of Independent Directors

Corporate governance best practice requires that independent directors of the board meet at least annually, and preferably quarterly, in separate sessions—that is, meetings without the presence of the management, other representatives, or interested persons (for example, retired founders of the company). The purpose of these sessions is to provide an opportunity for those entrusted with the best interests of the shareholders to engage in candid and frank discussions and debate regarding the management of the company, their strategies and policies, strengths and weaknesses, and other matters of concern. Such regular sessions would avoid the suggestion that directors are concerned with specific problems or threats to the company's well-being. Separate sessions could also enhance the board's effectiveness by improving the cooperation among board members, and their cohesiveness as a board, attributes that can strengthen the board in the fulfillment of its responsibilities to shareholders.

Regulatory filings should indicate how often boards have met, and which meetings were separate sessions of the independent directors. The investment professional should be concerned if such meetings appeared to be nonexistent, infrequent, or irregular in occurrence. These could suggest a variety of negative conclusions, including the presence of a “captive,” that is, nonindependent board, inattention or disinterest among board members, lack of cohesion and sense of purpose, or other conditions that can be detrimental to the interests of investors.

5.1.7. Audit Committee and Audit Oversight

The audit committee of the board is established to provide independent oversight of the company's financial reporting, nonfinancial corporate disclosure, and internal control systems. This function is essential for effective corporate governance and for seeing that their responsibilities to shareholders are fulfilled.

The primary responsibility for overseeing the design, maintenance, and continuing development of the control and compliance systems rests with this committee. At a minimum the audit committee must

- Include only independent directors.
- Have sufficient expertise in financial, accounting, auditing, and legal matters to be able to adequately oversee and evaluate the control, risk management, and compliance systems, and the quality of the company's financial disclosure to shareholders and others. It is advisable for at least two members of the committee to have relevant accounting and auditing expertise.
- Oversee the internal audit function; the internal audit staff should report directly and routinely to this committee of the board, and, when necessary report any concerns regarding the quality of controls or compliance issues.
- Have sufficient resources to be able to properly fulfill their responsibilities.
- Have full access to and the cooperation of management.
- Have authority to investigate fully any matters within its purview.
- Have the authority for the hiring of auditors, including the setting of contractual provisions, review of the cost-effectiveness of the audit, approving of nonaudit services provided by the auditor, and assessing the auditors' independence.

- Meet with auditors independently of management or other company interest parties periodically but at least once annually.
- Have the full authority to review the audit and financial statements, question auditors regarding audit findings, including the review of the system of internal controls, and to determine the quality and transparency of financial reporting choices.

Strong internal controls, risk management, and compliance systems are critical to a company's long-term success, the meeting of its business objectives, and enhancing the best interests of shareholders. Nearly all of the major corporate collapses have involved an absence of effective control systems, or the overriding of the systems by management to achieve their own interests and objectives to the detriment of those of investors.

The internal audit function should be entirely independent and separate from any of the activities being audited. Internal auditors should report directly to the chairman of the audit committee of the board of directors. The board should regularly meet with the internal audit supervisor and review the activities and address any concerns.

In evaluating the effectiveness of the board of directors, an investor should review the qualifications of the members of the audit committee, being alert to any conflicts of interest that individual members might have, for example, having previously been employed or otherwise associated with the current auditor or the company, determine the number of meetings held by the committee during the year and whether these meetings were held independent of management. A report on the activities of the audit committee, including a statement on whether the committee met independently and without the presence of management, should be included in the proxy in the United States and in the corporate governance report in Europe.

The audit committee should discuss in the regulatory filings the responsibilities and authority it has to evaluate and assess these functions, any findings or concerns the committee has with regard to the audit, internal control and compliance systems, and corrective action taken.

5.1.8. Nominating Committee

In most corporations, currently, nominations of members of the board of directors and for executive officers of the company are made by members of the board, most often at the recommendation of, or in consultation with, the management of the company. In such circumstances, the criteria for selection of nominees may favor management's best interests at the expense of the interests of shareholders. This is all the more important because in the usual case, shareholders have no authority to nominate slates of directors who might best represent them. Consequently, corporate governance best practice requires that nominees to the board be selected by a nominating committee comprising only independent directors. The responsibilities of the nominating committee are to

- Establish criteria for evaluating candidates for the board of directors.
- Identify candidates for the general board and for all committees of the board.
- Review the qualifications of the nominees to the board and for members of individual committees.
- Establish criteria for evaluating nominees for senior management positions in the company.
- Identify candidates for management positions.
- Review the qualifications of the nominees for management positions.
- Document the reasons for the selection of candidates recommended to the board as a whole for consideration.

Given the pivotal role that the members of the nominating committee have in representing and protecting the interests of investors and other stakeholders, it is essential that the qualifications of these members be carefully reviewed in assessing the long-term investment prospects of a company. Particular attention should be paid to evaluating their independence, the qualities of those selected for senior management positions, and the success of businesses with which they've been associated. This information is available in the regulatory filings of the company.

5.1.9. Compensation Committee

Ideally, compensation should be a tool used by directors, acting on behalf of shareholders, to attract, retain, and motivate the highest quality and most experienced managers for the company. The compensation should include incentives to meet and exceed corporate *long-term* goals, rather than short-term performance targets.

Decisions regarding the amounts and types of compensation to be awarded to senior executives and directors of a company are thought by many corporate governance experts to be the most important decisions to be made by those in a position of trust. Reports abound of compensation that is excessive relative to corporate performance, awarded to executives by compliant boards. The problem has been particularly acute in the United States, but examples are found worldwide.

In recent years, a practice has developed of gauging levels of compensation awards based not upon company objectives and goals but rather by comparison to the highest levels of compensation awarded in other companies. This occurs whether the reference companies are relevant benchmarks or not, and has caused compensation packages in many cases to be unrelated to the performance of the company. Needless to say, such excessive compensation is highly detrimental to the interests of shareholders.

In one well-known case, that of the New York Stock Exchange, the compensation of the chief executive was a substantial proportion of the net earnings of the Exchange and considerably higher than the compensation awarded to senior executives of comparable companies. The facts that have come to light in the case suggest that the compensation committee of the board was not independent as measured by the usual criteria, was not expert in compensation matters and did not seek outside counsel, was not well informed on the details of the compensation package, and acquiesced in management's proposal of its own compensation.¹⁴ This case is currently the subject of extensive legal and regulatory action.

Several different types of compensation awards are in common use today:

- Salary, generally set by contractual commitments between the company and the executive or director.
- Perquisites, additional compensation in the form of benefits, such as insurance, use of company planes, cars, and apartments, services, ranging from investment advice, tax assistance, and financial planning advice to household services.
- Bonus awards, normally based on performance as compared to company goals and objectives.
- Stock options, options on future awards of company stock.
- Stock awards or restricted stock.

¹⁴Thomas (2004a and 2004b).

In general, shareholders would prefer that salary and perquisite awards constitute a relatively small portion of the total compensation award. That is, the fixed, nonperformance-based portion of the award should be adequate, but not excessive. Because these fixed costs must be borne by shareholders regardless of corporate performance, executives should not be automatically rewarded by poor performance. Information on salaries and some perquisites can be found in regulatory filings of companies. For example, in the United States, this information is found in the Proxy Statement in tables and accompanying text. The investor should be alert to the fact that significant amounts of perquisites may not be fully disclosed, as has been shown to be the case in a number of corporate scandals recently in Europe and the United States.

Bonuses should be awarded based solely on exceeding expected performance. They should provide an incentive to motivate managers to achieve the highest and most stable long-term performance, rather than to reward short-term unsustainable “growth” at the expense of the best interests of shareholders. To the extent that management controls the operations of the company as well as corporate disclosure, incentive-based awards require the most diligent monitoring by the members of the compensation committee. Directors must ascertain that management is not manipulating variables within its control, for example, accounting disclosure choices, to artificially achieve performance targets. The investor should examine the bonus awards carefully, evaluating the performance targets for reasonableness, and to make certain that the awards are consistent with the investor’s best interests.

Stock options and stock awards have been argued to better align the interests of managers with those of shareholders by making a portion of the manager’s compensation dependent on the value of the stock. Unfortunately, as recent events have made clear, stock options do not always result in such an alignment of interests. Indeed, until recently, the lack of appropriate accounting recognition of the expense of stock option awards has led to widespread abuse of this form of compensation. Large grants of stock options dilute shareholders’ positions in the company and diminish the value of their holdings.

Appropriate accounting for stock options, that is, expensing in the income statement with assumed conversion to stock in the earnings-per-share calculation, has come to be seen as a litmus test for high quality financial reporting and transparency.¹⁵ Nevertheless, abusive practices involving information manipulation related to stock option grants and option exercise still occur.

In theory, grants of stock options to executives and other employees should be subject to shareholder approval. As a practical matter, however, there are loopholes that permit managers and directors to by-pass such approval, although some jurisdictions have closed some of these loopholes recently.

Stock options’ potential dilutive effect on shareholders can be assessed by a measure known as the “share overhang.” The overhang is simply the number of shares represented by the options, relative to the total amount of stock outstanding. Both of these numbers are readily available in company regulatory filings in most jurisdictions.

In addition, investors should be alert to any provisions permitting the so-called “repricing” of stock options. Repricing means that the company can, with approval of the board of directors, adjust the exercise price of outstanding option grants downward to the current price of the stock. This is done by some companies when the price of the stock has declined

¹⁵In 2003, the International Accounting Standards Board (IASB) issued a standard requiring the fair value expensing of stock options for all companies that use IASB standards. Some 90 countries worldwide adhere to IASB standards.

significantly and the options are out-of-the-money. As is readily apparent, such repricing is inconsistent with the argument that options should serve the interests of managers and shareholders and provide an incentive for managers to strive for excellent long-term corporate performance. The managers may have at-the-money options following repricing, but investors cannot recoup their losses so easily. Abuse in this area has been stemmed somewhat by accounting rule changes that now require that such repriced options be expensed in the income statement, although companies can still cancel the options and reissue them later at a time consistent with the rules, usually six months.

Stock grants by companies to executives can be an effective means of motivating them to achieve sustainable, long-term performance objectives. Restricted stock grants, that is, stock awards that cannot be sold or otherwise disposed of for a period of time, or that are contingent upon reaching certain performance goals, can be subject to the same abusive practices as stock option awards, depending upon the terms of the awards. Well-designed restricted stock awards are increasingly used by companies to reward executives for their performance as well as to remunerate lower-level employees. Most jurisdictions require companies to disclose such grants in regulatory filings.

5.1.10. Board's Independent Legal and Expert Counsel

The board of directors should have the ability and sufficient resources to hire such legal and other expert counsel as they require to fulfill their fiduciary duties. In most companies, for example, the corporate counsel also has the responsibility to advise the board of directors. Because the board of directors is charged with overseeing management on behalf of the shareholders, this represents a direct conflict of interest. That is, the corporate counsel cannot be wholly independent with regard to the advice provided to the directors if it also serves, and is paid by, corporate management.

Legal counsel will be needed to help the board assess the company's compliance with legal and regulatory requirements. Outside counsel becomes increasingly important for companies with global operations. Similarly, for example, in high technology companies, the members of the board will likely require the assistance of experts in the particular specialized technologies employed or developed by the company. However, all boards, regardless of the industry, are likely to require additional counsel and should be able to obtain such services when they require it.

The investor should review regulatory filings carefully to determine if the board makes use of independent outside counsel. If the filings are silent on the issue, the analyst or investor should specifically inquire about the board's use of independent counsel. If satisfactory answers are not forthcoming, this should reflect negatively on the board's independence as well as its ability to perform its fiduciary duties.

5.1.11. Statement of Governance Policies

Companies that have a strong commitment to corporate governance frequently supply a statement of their corporate governance policies, variously in their regulatory filings, on their websites, or as part other investor information packets. Investors and investment analysts should assess the following elements of a statement of corporate governance policies:

- Codes of ethics.
- Statements of the oversight, monitoring, and review responsibilities of directors, including internal control, risk management, audit and accounting and disclosure policy, compliance assessment, nominations, compensation awards, and other responsibilities.

- Statements of management's responsibilities to provide complete and timely information to the board members prior to board meetings, and to provide directors with free and unfettered access to control and compliance functions within the company.
- Reports of directors' examinations, evaluations, and findings in their oversight and review function.
- Board and committee performance self-assessments.
- Management performance assessments.
- Training provided to directors prior to joining the board and periodically thereafter.

Obviously, one cannot rely solely on the corporate governance statement for assurance that the company has a sound corporate governance structure. Nevertheless, such disclosures provide investors with a comparison for evaluating company and director performance over time. For example, such disclosures should not be "boilerplate" statements that do not change over time and that provide no real content or information.

5.1.12. Disclosure and Transparency

The purpose of accounting and disclosure is to tell the company's economic story as it is, not as some might want it to be in order to achieve some personal objective. Investors depend critically on the quality, clarity, timeliness, and completeness of financial information in valuing securities and assessing risk. Attempts to hide or otherwise obfuscate essential information can result in the mispricing of securities and the misallocation of capital, reducing the efficiency and effectiveness of markets.

It is worth observing that nearly all of the major corporate collapses in recent years have involved equally massive attempts to hide, obfuscate, or falsify information that could have alerted investors to the seriousness of the financial problems and the impending implosions. Enron attempted to hide its massive and growing debt by moving it off the balance sheet and into "partnerships," run by insiders, for which no information was available. Tyco failed to report billions in "loans" to insiders. WorldCom not only hid \$11 billion in operating expenses by recording them as assets in the balance sheet, but also failed to disclose hundreds of billions of dollars in loans to the chief executive. Parmalat staved off collapse for some time by reporting falsely that the company had nearly \$5 billion in a corporate account with a major international financial institution.

The crisis of the loss of confidence and trust in the broad financial markets globally, rather than just the companies involved, signals the depths of the concern that investors have had about the quality and completeness of the disclosure they are receiving. Not surprisingly, the response has been a major overhaul of legislative, regulatory, and related criminal code provisions in countries in North America and Europe, as well as elsewhere. Such provisions as the requirements in the United States that the chief executive officer and chief financial officer certify the accuracy of financial statements and develop rigorous new systems of internal controls, backed up by new audit attestation requirements and stiffer criminal penalties, make clear the seriousness of the offenses and the public's response to such malfeasance.

However, such changes do not guarantee that those in a position of trust will not again willingly mislead and misinform their investors and others, particularly when they are faced with serious financial difficulties. Consequently, an evaluation of the quality and extent of financial information provided to investors is a crucial element in evaluating the corporate governance structure of a company and the risk borne by an investor in the company's

securities. In assessing the quality of disclosure, some indicators of good quality financial reporting are:¹⁶

- Conservative assumptions used for employee benefit plans.
- Adequate provisions for lawsuits and other loss contingencies.
- Minimal use of off-balance-sheet financing techniques and full disclosure of assets, liabilities, revenues, and expenses associated with such activities.
- Absence of nonrecurring gains.
- Absence of noncash earnings.
- Clear and adequate disclosure.
- Conservative revenue and expense recognition methods.
- Use of LIFO (last in, first out) inventory accounting (during periods of generally rising prices).
- Bad-debt reserves that are high relative to receivables and past credit losses.
- Use of accelerated depreciation methods and short lives.
- Rapid write-off of acquisition-related intangible assets.
- Minimal capitalization of interest and overhead.
- Minimal capitalization of computer software costs.
- Expensing of startup costs of new operations.
- Use of the completed contract method of accounting for contracts.

One area of concern in recent years is the reporting by companies of so-called “pro forma” earnings numbers, earnings before noncash or “nonrecurring” charges. Pro forma earnings have occasionally been dubbed “earnings-before-the-bad-stuff.” Such misleading disclosures have been widely used by companies with poor performance and poor prospects. Unfortunately, some analysts and investors have been willing to accept the deception as reflective of economic reality, frequently to their regret. To survive and flourish long-term, companies must be able to cover all of their costs.

In addition to high-quality financial disclosure, the company should make readily available in its regulatory filings clear and complete information on such items as:

- Governance policies and procedures.
- Reporting lines and organizational structure.
- Corporate strategy, goals, and objectives.
- Competitive threats and other risks and contingencies faced by the company and the potential effect of these on the company’s operations.
- Insider transactions involving executives or other senior employees, and directors.
- Compensation policies and amounts of compensation awarded, including perquisites, for key executives and directors.
- Changes to governance structures, including the corporate charter and bylaws.

The investor should be alert particularly to references to off-balance-sheet or insider transactions that are not accompanied by full disclosure of the effects of the items on the company. The investor should also consider the implications of a lack of disclosure. For example, many large companies maintain fleets of corporate jets for the use of executives and

¹⁶White, Sondhi, and Fried (2003), 637 ff.

other employees. They routinely make such planes available to executives for their private use on holidays. A failure to mention such perquisites should raise questions, not only about this item but about other possible compensation that has not been disclosed.

5.1.13. Insider or Related-Party Transactions

The corporate collapse cases cited above involve egregious insider transactions by senior executives, frequently with the acquiescence of a compliant board of directors. The executives' objective was self-aggrandizement at the expense of shareholders and other stakeholders in the company. This is not a new problem. Indeed, audit standards have required for decades that auditors investigate such items and flag them for users of the statements. However, both the frequency and extent of the theft and fraud, and the losses incurred by investors, employees, and others recently have dismayed even the most seasoned professionals in the financial markets.

The analyst should assess the company's policies concerning related-party transactions, whether the company has entered into any such transactions, and, if so, what the effects are on the company's financial statements. Any related-party transaction should require the prior approval of the board of directors and a statement that such transactions are consistent with company policy. Financial disclosures and related notes in regulatory filings are a source for analysts in researching such transactions.

5.1.14. Responsiveness of Board of Directors to Shareholder Proxy Votes

A clear indicator of the extent to which directors and executives take seriously their fiduciary responsibility to shareholders is the response of the company to shareholder votes on proxy matters. A recent example involves the issue of expensing stock options, which has been put to proxy vote in a sizable number of companies. Shareholders in many of the companies have voted in the majority that the company begin expensing stock options. Very few company managers and directors have responded positively to the votes.

Directors cannot be expected to respond to trivial or frivolous shareholder initiatives, but few such issues carry a large portion of the vote of shareholders. However, when matters related to governance, executive compensation, mergers and acquisitions, or other matters of great importance to investors are put to a vote of the shareholders, and the results of the vote are ignored, the implications are abundantly clear: management and the board are not concerned for or motivated by the best interests of the company's shareholders. An analyst should review all such proxies put to the shareholders, determine the shareholders' consensus as reflected in the relative size of the affirmative vote, and determine the directors' response to the vote as reflected in the actions taken by the board and management. The responsiveness is a clear signal of the board's willingness to act in the best interests of the owners of the company.

5.2. Examples of Codes of Corporate Governance

We provide examples of three codes of corporate governance, one from General Electric, one from the Monetary Authority of Singapore, and a third from an international organization, the Organisation for Economic Co-operation and Development. The first code provides an example for one of the largest globally diversified corporations. The second addresses corporate governance issues for financial institutions, specifically commercial banks and insurers operating in Singapore. The third has a much broader scope, addressing corporate governance issues in any type of firm in any industry, operating in a variety of countries that are members

of the organization. Taken together, these three codes indicate the varying approaches to corporate governance worldwide while also illustrating how the core conflicts of interest between managers and owners are addressed.

5.2.1. General Electric: Governance Principles

General Electric's *Governance Principles* are a particularly good example of a company code of corporate governance. GE established the code to guide not only its managers and board of directors in their activities and decision-making, but to serve as a benchmark by which their performance may be evaluated. The company publishes their *Principles* in a prominent place on their website. A review of these principles will show that many of the major governance concerns discussed above are reflected here. The principles also explicitly address issues such as the company's policy on the adoption of "poison pills" and director education.

EXAMPLE 1-5 General Electric's *Governance Principles*

1. Role of Board and Management

GE's business is conducted by its employees, managers, and officers, under the direction of the chief executive officer (CEO) and the oversight of the board, to enhance the long-term value of the company for its shareowners. The board of directors is elected by the shareowners to oversee management and to assure that the long-term interests of the shareowners are being served. Both the board of directors and management recognize that the long-term interests of shareowners are advanced by responsibly addressing the concerns of other stakeholders and interested parties including employees, recruits, customers, suppliers, GE communities, government officials, and the public at large.

2. Functions of Board

The board of directors has eight scheduled meetings a year at which it reviews and discusses reports by management on the performance of the company, its plans and prospects, as well as immediate issues facing the company. Directors are expected to attend all scheduled board and committee meetings. In addition to its general oversight of management, the board also performs a number of specific functions, including:

- Selecting, evaluating, and compensating the CEO and overseeing CEO succession planning.
- Providing counsel and oversight on the selection, evaluation, development, and compensation of senior management.
- Reviewing, monitoring, and, where appropriate, approving fundamental financial and business strategies and major corporate actions.
- Assessing major risks facing the company—and reviewing options for their mitigation.
- Ensuring processes are in place for maintaining the integrity of the company—the integrity of the financial statements, the integrity of compliance with law and ethics, the integrity of relationships with customers and suppliers, and the integrity of relationships with other stakeholders.

3. Qualifications

Directors should possess the highest personal and professional ethics, integrity, and values, and be committed to representing the long-term interests of the shareowners. They must also have an inquisitive and objective perspective, practical wisdom, and mature judgment. We endeavor to have a board representing diverse experience at policy-making levels in business, government, education, and technology, and in areas that are relevant to the company's global activities.

Directors must be willing to devote sufficient time to carrying out their duties and responsibilities effectively, and should be committed to serve on the board for an extended period of time. Directors should offer their resignation in the event of any significant change in their personal circumstances, including a change in their principal job responsibilities.

Directors who also serve as CEOs or in equivalent positions should not serve on more than two boards of public companies in addition to the GE board, and other directors should not serve on more than four other boards of public companies in addition to the GE board. Current positions in excess of these limits may be maintained unless the board determines that doing so would impair the director's service on the GE board.

The board does not believe that arbitrary term limits on directors' service are appropriate, nor does it believe that directors should expect to be renominated annually until they reach the mandatory retirement age. The board self-evaluation process described below will be an important determinant for board tenure. Directors will not be nominated for election to the board after their 73rd birthday, although the full board may nominate candidates over 73 for special circumstances.

4. Independence of Directors

A majority of the directors will be independent directors, as independence is determined by the board, based on the guidelines set forth below.

All future nonemployee directors will be independent. GE seeks to have a minimum of 10 independent directors at all times, and it is the board's goal that at least two-thirds of the directors will be independent. Directors who do not satisfy GE's independence guidelines also make valuable contributions to the board and to the company by reason of their experience and wisdom.

For a director to be considered independent, the board must determine that the director does not have any direct or indirect material relationship with GE. The board has established guidelines to assist it in determining director independence, which conform to or are more exacting than the independence requirements in the New York Stock Exchange listing requirements (NYSE rules). In addition to applying these guidelines, the board will consider all relevant facts and circumstances in making an independence determination, and not merely from the standpoint of the director, but also from that of persons or organizations with which the director has an affiliation.

The board will make and publicly disclose its independence determination for each director when the director is first elected to the board and annually thereafter for all nominees for election as directors. If the board determines that a director who satisfies the NYSE rules is independent even though he or she does not satisfy all of GE's independence guidelines, this determination will be disclosed and explained in the next proxy statement.

In accordance with the revised NYSE rules, independence determinations under the guidelines in section (a) below will be based upon a director's relationships with GE during the 36 months preceding the determination. Similarly, independence determinations under the guidelines in section (b) below will be based upon the extent of commercial relationships during the three completed fiscal years preceding the determination.

- a. A director will not be independent if:
 - The director is employed by GE, or an immediate family member is an executive officer of GE.
 - The director receives any direct compensation from GE, other than director and committee fees and pension or other forms of deferred compensation for prior service (provided such compensation is not contingent in any way on continued service).
 - An immediate family member who is a GE executive officer receives more than \$100,000 per year in direct compensation from GE.
 - The director is affiliated with or employed by GE's independent auditor, or an immediate family member is affiliated with or employed in a professional capacity by GE's independent auditor.
 - A GE executive officer is on the compensation committee of the board of directors of a company which employs the GE director or an immediate family member as an executive officer.
- b. A director will not be independent if, at the time of the independence determination, the director is an executive officer or employee, or if an immediate family member is an executive officer, of another company that does business with GE and the sales by that company to GE or purchases by that company from GE, in any single fiscal year during the evaluation period, are more than the greater of one percent of the annual revenues of that company or \$1 million.
- c. A director will not be independent if, at the time of the independence determination, the director is an executive officer or employee, or an immediate family member is an executive officer, of another company which is indebted to GE, or to which GE is indebted, and the total amount of either company's indebtedness to the other at the end of the last completed fiscal year is more than 1 percent of the other company's total consolidated assets.
- d. A director will not be independent if, at the time of the independence determination, the director serves as an officer, director or trustee of a charitable organization, and GE's discretionary charitable contributions to the organization are more than one percent of that organization's total annual charitable receipts during its last completed fiscal year. (GE's automatic matching of employee charitable contributions will not be included in the amount of GE's contributions for this purpose.)

5. Size of Board and Selection Process

The directors are elected each year by the shareowners at the annual meeting of shareowners. Shareowners may propose nominees for consideration by the nominating and corporate governance committee by submitting the names and supporting information to: Secretary, General Electric Company, 3135 Easton Turnpike, Fairfield, CT 06828.

The board proposes a slate of nominees to the shareowners for election to the board. The board also determines the number of directors on the board provided that there are at least 10. Between annual shareowner meetings, the board may elect directors to serve until the next annual meeting. The board believes that, given the size and breadth of GE and the need for diversity of board views, the size of the board should be in the range of 13 to 17 directors.

6. Board Committees

The board has established the following committees to assist the board in discharging its responsibilities: (i) audit; (ii) management development and compensation; (iii) nominating and corporate governance; and (iv) public responsibilities. The current charters and key practices of these committees are published on the GE website, and will be mailed to shareowners on written request. The committee chairs report the highlights of their meetings to the full board following each meeting of the respective committees. The committees occasionally hold meetings in conjunction with the full board. For example, it is the practice of the audit committee to meet in conjunction with the full board in February so that all directors may participate in the review of the annual financial statements and Management's Discussion and Analysis of Financial Condition and Results of Operations for the prior year and financial plans for the current year.

7. Independence of Committee Members

In addition to the requirement that a majority of the board satisfy the independence standards discussed in section 4 above, members of the audit committee must also satisfy an additional NYSE independence requirement. Specifically, they may not accept directly or indirectly any consulting, advisory or other compensatory fee from GE or any of its subsidiaries other than their directors' compensation. As a matter of policy, the board will also apply a separate and heightened independence standard to members of both the management development and compensation committee and the nominating and corporate governance committee. No member of either committee may be a partner, member, or principal of a law firm, accounting firm or investment banking firm that accepts consulting or advisory fees from GE or any of its subsidiaries.

8. Meetings of Nonemployee Directors

The board will have at least three regularly scheduled meetings a year for the non-employee directors without management present. The directors have determined that the chairman of the management development and compensation committee will preside at such meetings, and will serve as the presiding director in performing such other functions as the board may direct, including advising on the selection of committee chairs and advising management on the agenda for board meetings. The non-employee directors may meet without management present at such other times as determined by the presiding director.

9. Self-Evaluation

As described more fully in the key practices of the nominating and corporate governance committee, the board and each of the committees will perform an annual self-evaluation. Each November, each director will provide to an independent

governance expert his or her assessment of the effectiveness of the board and its committees, as well as director performance and board dynamics. The individual assessments will be organized and summarized by this independent governance expert for discussion with the board and the committees in December.

10. Setting Board Agenda

The board shall be responsible for its agenda. At the December board meeting, the CEO and the presiding director will propose for the board's approval key issues of strategy, risk, and integrity to be scheduled and discussed during the course of the next calendar year. Before that meeting, the board will be invited to offer its suggestions. As a result of this process, a schedule of major discussion items for the following year will be established. Prior to each board meeting, the CEO will discuss the other specific agenda items for the meeting with the presiding director, who shall have authority to approve the agenda for the meeting. The CEO and the presiding director, or committee chair as appropriate, shall determine the nature and extent of information that shall be provided regularly to the directors before each scheduled board or committee meeting. Directors are urged to make suggestions for agenda items, or additional premeeting materials, to the CEO, the presiding director, or appropriate committee chair at any time.

11. Ethics and Conflicts of Interest

The board expects GE directors, as well as officers and employees, to act ethically at all times and to acknowledge their adherence to the policies comprising GE's code of conduct set forth in the company's integrity manual, "Integrity: The Spirit and the Letter of Our Commitment." GE will not make any personal loans or extensions of credit to directors or executive officers, other than consumer loans or credit card services on terms offered to the general public. No nonemployee director may provide personal services for compensation to GE, other than in connection with serving as a GE director. The board will not permit any waiver of any ethics policy for any director or executive officer. If an actual or potential conflict of interest arises for a director, the director shall promptly inform the CEO and the presiding director. If a significant conflict exists and cannot be resolved, the director should resign. All directors will recuse themselves from any discussion or decision affecting their personal, business, or professional interests. The board shall resolve any conflict of interest question involving the CEO, a vice chairman or a senior vice president, and the CEO shall resolve any conflict of interest issue involving any other officer of the company.

12. Reporting of Concerns to Nonemployee Directors or the Audit Committee

The audit committee and the nonemployee directors have established the following procedures to enable anyone who has a concern about GE's conduct, or any employee who has a complaint about the company's accounting, internal accounting controls or auditing matters, to communicate that concern directly to the presiding director, to the nonemployee directors, or to the audit committee. Such communications may be confidential or anonymous, and may be e-mailed, submitted in writing or reported by phone to special addresses and a toll-free phone number that are published on the company's website. All such communications shall be promptly reviewed by GE's

ombudsman, and any concerns relating to accounting, internal controls, auditing or officer conduct shall be sent immediately to the presiding director and to the chair of the audit committee. All concerns will be reviewed and addressed by GE's ombudsman in the same way that other concerns are addressed by the company. The status of all outstanding concerns addressed to the nonemployee directors, the presiding director or the audit committee will be reported to the presiding director and the chair of the audit committee on a quarterly basis. The presiding director or the audit committee chair may direct that certain matters be presented to the audit committee or the full board and may direct special treatment, including the retention of outside advisors or counsel, for any concern addressed to them. The company's integrity manual prohibits any employee from retaliating or taking any adverse action against anyone for raising or helping to resolve an integrity concern.

13. Compensation of the Board

The nominating and corporate governance committee shall have the responsibility for recommending to the board compensation and benefits for nonemployee directors. In discharging this duty, the committee shall be guided by three goals: compensation should fairly pay directors for work required in a company of GE's size and scope; compensation should align directors' interests with the long-term interests of shareowners; and the structure of the compensation should be simple, transparent and easy for shareowners to understand. As discussed more fully in the key practices of the nominating and corporate governance committee, the committee believes these goals will be served by providing 40 percent of nonemployee director compensation in cash and 60 percent in deferred stock units. At the end of each year, the nominating and corporate governance committee shall review nonemployee director compensation and benefits.

14. Succession Plan

The board shall approve and maintain a succession plan for the CEO and senior executives, based upon recommendations from the management development and compensation committee.

15. Annual Compensation Review of Senior Management

The management development and compensation committee shall annually approve the goals and objectives for compensating the CEO. That committee shall evaluate the CEO's performance in light of these goals before setting the CEO's salary, bonus, and other incentive and equity compensation. The committee shall also annually approve the compensation structure for the company's officers, and shall evaluate the performance of the company's senior executive officers before approving their salary, bonus, and other incentive and equity compensation.

16. Access to Senior Management

Nonemployee directors are encouraged to contact senior managers of the company without senior corporate management present. To facilitate such contact, nonemployee directors are expected to make two regularly scheduled visits to GE businesses a year without corporate management being present.

17. Access to Independent Advisors

The board and its committees shall have the right at any time to retain independent outside auditors and financial, legal or other advisors, and the company shall provide appropriate funding, as determined by the board or any committee, to compensate such independent outside auditors or advisors, as well as to cover the ordinary administrative expenses incurred by the board and its committees in carrying out their duties.

18. Director Education

The general counsel and the chief financial officer shall be responsible for providing an orientation for new directors. Each new director shall, within three months of election to the board, spend a day at corporate headquarters for personal briefing by senior management on the company's strategic plans, its financial statements, and its key policies and practices. In addition, directors shall be provided with continuing education on subjects that would assist them in discharging their duties, including regular programs on GE's financial planning and analysis, compliance and corporate governance developments; business-specific learning opportunities through site visits and Board meetings; and briefing sessions on topics that present special risks and opportunities to the company.

19. Policy on Poison Pills

The term "poison pill" refers to the type of shareowner rights plan that some companies adopt to make a hostile takeover of the company more difficult. GE does not have a poison pill and has no intention of adopting a poison pill because a hostile takeover of a company of our size is impractical and unrealistic. However, if GE were ever to adopt a poison pill, the board would seek prior shareowner approval unless, due to timing constraints or other reasons, a committee consisting solely of independent directors determines that it would be in the best interests of shareowners to adopt a poison pill before obtaining shareowner approval. If the GE board of directors were ever to adopt a poison pill without prior shareowner approval, the board would either submit the poison pill to shareowners for ratification, or would cause the poison pill to expire, without being renewed or replaced, within one year.

5.2.2. Monetary Authority of Singapore: Guidelines and Regulations on Corporate Governance

In February 2003, the Monetary Authority of Singapore (MAS) established principles of corporate governance for the banks and insurers that fall within its regulatory purview. The code, *Guidelines and Regulations on Corporate Governance*,¹⁷ defines and explains corporate governance as:

... The processes and structures by which the business and affairs of an Institution are directed, managed and controlled. [p. 6]

¹⁷These guidelines expand and build upon the *Code of Corporate Governance*, issued in 2001 by the Corporate Governance Committee, established by the Ministry of Finance, the Authority, and the Attorney-General's Chambers.

The MAS makes clear that the key element in an effective system of corporate governance rests with the board of directors, and that its primary duties are to shareholders and depositors, or, in the case of an insurer, the policyholders:

The board of directors is responsible for directing the management of the Institution. Besides its obligations to the shareholders, the board of directors of an Institution has a duty to act in the best interest of the Institution and to ensure that the Institution has sufficient resources to meet its obligations to other stakeholders, in particular a bank's depositors or an insurer's policyholders

The Monetary Authority of Singapore has the following 13 principles to guide the banks and insurers within its regulatory authority in compliance with the corporate governance standards in its *Guidelines and Regulations on Corporate Governance*:

- Principle 1: Every Institution should be headed by an effective Board.
- Principle 2: There should be a strong and independent element on the Board which is able to exercise objective judgment on corporate affairs independently from management and substantial shareholders.
- Principle 3: The Board should set and enforce clear lines of responsibility and accountability throughout the Institution.
- Principle 4: There should be a formal and transparent process for the appointment of new directors to the Board.
- Principle 5: There should be a formal assessment of the effectiveness of the Board as a whole and the contribution by each director to the effectiveness of the Board.
- Principle 6: In order to fulfill their responsibilities, Board members should be provided with complete, adequate, and timely information prior to board meetings and on an ongoing basis by the management.
- Principle 7: There should be a formal and transparent procedure for fixing the remuneration packages of individual directors. No director should be involved in deciding his own remuneration.
- Principle 8: The level and composition of remuneration should be appropriate to attract, retain, and motivate the directors to perform their roles and carry out their responsibilities.
- Principle 9: The Board should establish an Audit Committee with a set of written terms of reference that clearly sets out its authority and duties.
- Principle 10: The Board should ensure that there is an adequate risk management system and sound internal controls.
- Principle 11: The Board should ensure that an internal audit function that is independent of the activities audited is established.
- Principle 12: The Board should ensure that management formulates policies to ensure dealings with the public, the Institution's policyholders and claimants, depositors, and other customers are conducted fairly, responsibly, and professionally.
- Principle 13: The Board should ensure that related party transactions with the Institution are made on an arm's-length basis.

These principles are supported by requirements for extensive disclosures regarding companies' implementation and of the standards and their procedures for continuous monitoring of compliance. It is notable that the Monetary Authority does not require that a majority of the board members be independent, but that only one-third meet such a test.

5.2.3. Organisation for Economic Co-operation and Development: OECD Principles of Corporate Governance

The Organisation for Economic Co-operation and Development (OECD)¹⁸ issued its code, *OECD Principles of Corporate Governance* (OECD Principles), which applies to all Member countries. These countries comprise a number of different legislative, regulatory, and market systems.

The OECD observes that its Principles “represent the first initiative by an intergovernmental organisation to develop the core elements of a good corporate governance regime. As such, the Principles can be used as a benchmark by governments as they evaluate and improve their laws and regulations.” The Preface to the OECD Principles states:

A good corporate governance regime helps to assure that corporations use their capital efficiently. Good corporate governance helps, too, to ensure that corporations take into account the interests of a wide range of constituencies as well as of the communities within which they operate, and that their boards are accountable to the company and the shareholders. This, in turn, helps to assure that corporations operate for the benefit of society as a whole. It helps to maintain the confidence of investors—both foreign and domestic—and to attract more “patient,” long-term capital . . . **Common to all good corporate governance regimes, however, is a high degree of priority placed on the interests of shareholders, who place their trust in corporations to use their investment funds wisely and effectively.** [Emphasis added]

Despite the application of the OECD Principles to a wide variety of regimes, the OECD provides a special emphasis on the rights and fair treatment of shareholders. This characteristic, although considered to be a fundamental requirement for good systems of corporate governance, is not frequently found in either corporate codes or those of other business organizations. For example, the General Electric code is silent on shareholder rights although it acknowledges in the first principle that managers and the directors have an obligation to attend to the interests of shareholders. The Monetary Authority of Singapore's code takes a similar approach.

¹⁸Issued in 1999, and subsequently revised, the OECD Principles are intended to be adopted by each of the OECD Member countries, which include: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.

EXAMPLE 1-6 OECD Principles of Corporate Governance

I. The Rights of Shareholders

The corporate governance framework should protect shareholders' rights.

- A. Basic shareholder rights include the right to: (1) secure methods of ownership registration; (2) convey or transfer shares; (3) obtain relevant information on the corporation on a timely and regular basis; (4) participate and vote in general shareholder meetings; (5) elect members of the board; and (6) share in the profits of the corporation.
- B. Shareholders have the right to participate in, and to be sufficiently informed on, decisions concerning fundamental corporate changes such as:
 - 1. Amendments to the statutes, or articles of incorporation or similar governing documents of the company;
 - 2. The authorisation of additional shares; and
 - 3. Extraordinary transactions that in effect result in the sale of the company.
- C. Shareholders should have the opportunity to participate effectively and vote in general shareholder meetings and should be informed of the rules, including voting procedures, that govern general shareholder meetings:
 - 1. Shareholders should be furnished with sufficient and timely information concerning the date, location and agenda of general meetings, as well as full and timely information regarding the issues to be decided at the meeting.
 - 2. Opportunity should be provided for shareholders to ask questions of the board and to place items on the agenda at general meetings, subject to reasonable limitations.
 - 3. Shareholders should be able to vote in person or in absentia, and equal effect should be given to votes whether cast in person or in absentia.
- D. Capital structures and arrangements that enable certain shareholders to obtain a degree of control disproportionate to their equity ownership should be disclosed.
- E. Markets for corporate control should be allowed to function in an efficient and transparent manner.
 - 1. The rules and procedures governing the acquisition of corporate control in the capital markets, and extraordinary transactions such as mergers, and sales of substantial portions of corporate assets, should be clearly articulated and disclosed so that investors understand their rights and recourse. Transactions should occur at transparent prices and under fair conditions that protect the rights of all shareholders according to their class.
 - 2. Anti-take-over devices should not be used to shield management from accountability.
- F. Shareholders, including institutional investors, should consider the costs and benefits of exercising their voting rights.

II. The Equitable Treatment of Shareholders

The corporate governance framework should ensure the equitable treatment of all shareholders, including minority and foreign shareholders. All shareholders should have the opportunity to obtain effective redress for violation of their rights.

- A. All shareholders of the same class should be treated equally.
 - 1. Within any class, all shareholders should have the same voting rights. All investors should be able to obtain information about the voting rights attached to all classes of shares before they purchase. Any changes in voting rights should be subject to shareholder vote.
 - 2. Votes should be cast by custodians or nominees in a manner agreed upon with the beneficial owner of the shares.
 - 3. Processes and procedures for general shareholder meetings should allow for equitable treatment of all shareholders. Company procedures should not make it unduly difficult or expensive to cast votes.
- B. Insider trading and abusive self-dealing should be prohibited.
- C. Members of the board and managers should be required to disclose any material interests in transactions or matters affecting the corporation.

III. The Role of Stakeholders in Corporate Governance

The corporate governance framework should recognise the rights of stakeholders as established by law and encourage active co-operation between corporations and stakeholders in creating wealth, jobs, and the sustainability of financially sound enterprises.

- A. The corporate governance framework should assure that the rights of stakeholders that are protected by law are respected.
- B. Where stakeholder interests are protected by law, stakeholders should have the opportunity to obtain effective redress for violation of their rights.
- C. The corporate governance framework should permit performance-enhancing mechanisms for stakeholder participation.
- D. Where stakeholders participate in the corporate governance process, they should have access to relevant information.

IV. Disclosure and Transparency

The corporate governance framework should ensure that timely and accurate disclosure is made on all material matters regarding the corporation, including the financial situation, performance, ownership, and governance of the company.

- A. Disclosure should include, but not be limited to, material information on:
 - 1. The financial and operating results of the company.
 - 2. Company objectives.
 - 3. Major share ownership and voting rights.
 - 4. Members of the board and key executives, and their remuneration.
 - 5. Material foreseeable risk factors.
 - 6. Material issues regarding employees and other stakeholders.
 - 7. Governance structures and policies.
- B. Information should be prepared, audited, and disclosed in accordance with high quality standards of accounting, financial and nonfinancial disclosure, and audit.
- C. An annual audit should be conducted by an independent auditor in order to provide an external and objective assurance on the way in which financial statements have been prepared and presented.
- D. Channels for disseminating information should provide for fair, timely, and cost-efficient access to relevant information by users.

V. The Responsibilities of the Board

The corporate governance framework should ensure the strategic guidance of the company, the effective monitoring of management by the board, and the board's accountability to the company and the shareholders.

- A. Board members should act on a fully informed basis, in good faith, with due diligence and care, and in the best interest of the company and the shareholders.
- B. Where board decisions may affect different shareholder groups differently, the board should treat all shareholders fairly.
- C. The board should ensure compliance with applicable law and take into account the interests of stakeholders.
- D. The board should fulfill certain key functions, including:
 - 1. Reviewing and guiding corporate strategy, major plans of action, risk policy, annual budgets and business plans; setting performance objectives; monitoring implementation and corporate performance; and overseeing major capital expenditures, acquisitions and divestitures.
 - 2. Selecting, compensating, monitoring, and, when necessary, replacing key executives and overseeing succession planning.
 - 3. Reviewing key executive and board remuneration, and ensuring a formal and transparent board nomination process.
 - 4. Monitoring and managing potential conflicts of interest of management, board members and shareholders, including misuse of corporate assets and abuse in related party transactions.
 - 5. Ensuring the integrity of the corporation's accounting and financial reporting systems, including the independent audit, and that appropriate systems of control are in place, in particular, systems for monitoring risk, financial control, and compliance with the law.
 - 6. Monitoring the effectiveness of the governance practices under which it operates and making changes as needed.
 - 7. Overseeing the process of disclosure and communications.
- E. The board should be able to exercise objective judgement on corporate affairs independent, in particular, from management.
 - 1. Boards should consider assigning a sufficient number of nonexecutive board members capable of exercising independent judgement to tasks where there is a potential for conflict of interest. Examples of such key responsibilities are financial reporting, nomination, and executive and board remuneration.
 - 2. Board members should devote sufficient time to their responsibilities.
- F. In order to fulfill their responsibilities, board members should have access to accurate, relevant and timely information.

This code, and its predecessor variants, is not only among the earliest efforts to establish guidelines for good governance, but with its global reach has had wide influence on the development of other codes and regulatory frameworks.

6. ENVIRONMENTAL, SOCIAL, AND GOVERNANCE FACTORS

Investors now understand that nontraditional business factors—specifically, a company’s environmental, social, and governance (ESG) risk exposures—may be as critical to the company’s long-term sustainability as more traditional concerns. Indeed, many major financial institutions and portfolio managers routinely integrate ESG analyses into their equity valuations and other investment decisions.¹⁹ Those analysts who fail to consider ESG factors in their valuations may well be assuming far greater long-term risks than they or their clients realize.²⁰

ESG factors range from those associated with climate change (for example, carbon-based greenhouse gas emissions resulting from a company’s operations) to labor rights, public and occupational health issues, and the soundness of the company’s governance structures.²¹

The risks resulting from exposure to these various issues include the following:

- **Legislative and regulatory risk:** The risk that governmental laws and regulations directly or indirectly affecting a company’s operations will change with potentially severe adverse effects on the company’s continued profitability and even its long-term sustainability.

For example, in the United States, a law enacted in California in 2004 requires a 30 percent reduction in carbon dioxide emissions by 2016 for all new automobiles sold in the state. Other states, including Connecticut, Maine, Massachusetts, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Vermont, and Washington, are following California’s example.²² These states currently represent more than half of all U.S. automobile sales. Consequently, manufacturers that fail to meet the standards can expect to suffer a reduction in revenues and earnings as well as market power. Given strong industry competition, the effects of the changes in the laws on companies operating in the industry could be severe.

Other national and global efforts have brought rapid changes in operations for companies in affected countries. For example, the Kyoto Protocol is a 1997 amendment to the United Nations Framework Convention on Climate Change (UNFCCC). The Protocol now covers more than 160 countries, not including the United States and Australia, and over 60 percent of greenhouse gas emissions. The agreement calls for staged reductions in emissions of carbon dioxide and five other greenhouse gases for those countries that have ratified the agreement. The Protocol also provides for emissions credit trading for those signatories, principally in emerging countries, that could not otherwise afford the investment.

Companies in most industries are likely to be affected to at least some degree by these mandated changes, although the effects will vary widely across industries. Even within industries with the greatest exposures, companies that have invested in newer, more up-to-date technologies are likely to be affected less by the changes than their competitors. Thus, investors who consider ESG factors and who monitor regulatory and legislative developments for the companies they follow will be better equipped to make sound investment decisions.

¹⁹See, for example, Anderson and Gardiner (2006).

²⁰*The Materiality of Social, Environmental and Corporate Governance Issues to Equity Pricing: 11 Sector Studies by Brokerage House Analysts* (2004).

²¹*Ibid.*

²²Anderson and Gardiner, 7.

- **Legal risk:** The risk that failures by company managers to effectively manage ESG factors will lead to lawsuits and other judicial remedies, resulting in potentially catastrophic losses for the company.

All areas of ESG can, and sometimes do, lead to such lawsuits. The actions can be brought by employees for workplace issues and contractual defaults, by shareholders for management or director governance or other lapses that impair shareholder value, or by government attorneys for abridgement of federal or state laws.

An investor can begin to analyze the potential for such risks in a particular company by reviewing regulatory filings for the particular jurisdictions in which the company operates. Many such filings, such as the U.S. SEC required disclosures in the Form 10-K Business, Risks, and Legal Proceedings sections, as well as the Management Discussion and Analysis of Financial Condition and Results of Operations, require substantial discussion of possible legal risk exposures. For those companies that provide them, the GRI reports may include useful insights.²³ However, an analyst should make an independent assessment of the company and carefully consider the nature of a company's operations to evaluate the possible scope of such exposures and their potential effects. The business press may also be a good source of information regarding such risks on both the company of immediate interest as well as other companies in the same industry.

- **Reputational risk:** This particular source of risk has risen in importance as ESG factors are increasingly recognized as a potentially major source of risk. Specifically, companies whose managers have demonstrated a lack of concern for managing ESG factors in the past, so as to eliminate or otherwise mitigate risk exposures, will suffer a diminution in market value relative to other companies in the same industry that may persist for a long period of time.
- **Operating risk:** The risk that a company's operations may be severely affected by ESG factors, even to the requirement that one or more product lines or possibly all operations might be shut down.

An example of such a risk is that deriving from the industrial use of benzene, a powerful carcinogen and one of the most toxic chemicals known. Because of its use as both a building block in the plastics and rubber industry, as well as its more general use as an industrial solvent, benzene was widely used in industry and was dispersed into the air, drinking water, and soil. Billions of pounds of the chemical were produced and used annually.

Once studies confirmed the harmful effects of the chemical, the U.S. Environmental Protection Agency (EPA) moved, for example, under the 1974 Safe Drinking Water Act to set targets for acceptable levels in water. The EPA Maximum Contaminant Level for benzene in drinking water was set at five parts per billion. Thus, companies that had previously relied on extensive use of benzene in their operations had either to modify their operations to ensure that no benzene escaped into the environment, or to cease those operations that used benzene altogether.

- **Financial risk:** The risk that ESG factors will result in significant costs or other losses to the company and its shareholders. Any of the above sources of risk can affect a company and its financial health, sometimes severely.

²³The Global Reporting Initiative (GRI) promotes systematic reporting of economic, environmental, and social performance. The website for the GRI is www.globalreporting.org.

In summary, investors are well advised to consider the potential effects of ESG factors on companies in which they invest and to carefully analyze all sources of information relevant to such risk exposures. These analyses may alert the analyst to risk factors that should be incorporated into company valuations.

7. VALUATION IMPLICATIONS OF CORPORATE GOVERNANCE

The relative quality, strength, and reliability of a company's corporate governance system have direct and profound implications for investors' assessments of investments and their valuations. As we have seen in the massive corporate collapses in recent years, most or all of an investor's capital can be lost suddenly if a company fails to establish an effective corporate governance system with the appropriate checks and balances.

Weak corporate governance systems pose the following risks to the value of investments in the company:

- *Accounting risk*—The risk that a company's financial statement recognition and related disclosures, upon which investors base their financial decisions, are incomplete, misleading, or materially misstated.
- *Asset risk*—The risk that the firm's assets, which belong to investors, will be misappropriated by managers or directors in the form of excessive compensation or other perquisites.
- *Liability risk*—The risk that management will enter into excessive obligations, committed to on behalf of shareholders, that effectively destroy the value of shareholders' equity; these frequently take the form of off-balance-sheet obligations.
- *Strategic policy risk*—The risk that managers may enter into transactions, such as mergers and acquisitions, or incur other business risks, that may not be in the best long-term interest of shareholders, but which may result in large payoffs for management or directors.

Not surprisingly, a growing body of evidence indicates that companies with sound corporate governance systems show higher profitability and investment performance measures, including returns, relative to those assessed to have weaker structures. For example, a joint study of Institutional Shareholder Services (ISS) and Georgia State University²⁴ found that the best-governed companies, as measured by the ISS Corporate Governance Quotient, generated returns on investment and equity over the period under study that were 18.7 percent and 23.8 percent, respectively, better than those of companies with poor governance. Similarly, a study of U.S. markets, conducted by researchers at Harvard University and the University of Pennsylvania²⁵ found that portfolios of companies with strong shareholder-rights protections outperformed portfolios of companies with weaker protections by 8.5 percent per year. A study of European firms found annual mean return differences of 3.0 percent.²⁶

²⁴See Brown and Caylor (2004).

²⁵See Gompers, Ishii, and Metrick (2003). The authors compared the investment performance of some 1,500 U.S.-listed companies against a corporate governance index the authors constructed from 24 distinct governance rules.

²⁶Bauer and Guenster (2003). This study used Deminor Ratings as the basis for determining companies' relative corporate governance quality (www.deminor.org).

This phenomenon is not limited to developed markets. Even before the collapse of Enron, a Malaysia-based analyst found that investors in emerging markets overwhelmingly preferred companies with good governance.²⁷ Of the 100 largest emerging markets companies his firm followed, those with the best governance, based on management discipline, transparency, independence, accountability, responsibility, fairness, and social responsibility, generated three-year U.S. dollar returns of 267 percent, compared with average returns of 127 percent. The disparity in five-year returns was even greater, at 930 percent versus an average of 388 percent.

The conclusion from these and other studies is that good corporate governance leads to better results, both for companies and for investors. Therefore, investors and analysts should carefully evaluate the corporate governance structures of companies they are considering as investments and should continue to monitor the systems once the investments are made.

8. SUMMARY

Corporate governance is an essential concern for investors and investment analysts. This chapter has presented the attributes of an effective corporate governance system and the types of practices that should raise investors' concerns. This chapter has made the following points:

- Corporate governance is the system of principles, policies, procedures, and clearly defined responsibilities and accountabilities, used by stakeholders to eliminate or minimize conflicts of interest.
- The objectives of a corporate governance system are (1) to eliminate or mitigate conflicts of interest among stakeholders, particularly between managers and shareholders, and (2) to ensure that the assets of the company are used efficiently and productively and in the best interests of the investors and other stakeholders.
- The failure of a company to establish an effective system of corporate governance represents a major operational risk to the company and its investors. To understand the risks inherent in an investment in a company, it is essential to understand the quality of the company's corporate governance practices.
- The core attributes of an effective corporate governance system are:
 - a. Delineation of the rights of shareholders and other core stakeholders
 - b. Clearly defined manager and director governance responsibilities to the stakeholders
 - c. Identifiable and measurable accountabilities for the performance of the responsibilities
 - d. Fairness and equitable treatment in all dealings between managers, directors, and shareholders
 - e. Complete transparency and accuracy in disclosures regarding operations, performance, risk, and financial position
- The specific sources of conflict in corporate agency relationships are
 - a. Manager–shareholder conflicts—Managers may, for example:
 - Use funds to try to expand the size of a business even when this is not in the best interests of shareholders
 - Grant themselves numerous expensive perquisites that are treated as ordinary business expenses

²⁷In Gill (2001), the author points out that CLSA assigned corporate governance ratings to 495 companies in 25 markets.

- b. Director–shareholder conflicts—Directors may, for example, identify with the managers’ interests rather than those of the shareholders as a result of personal or business relationships with the manager.
- The responsibilities of board members, both individually and as a group, are to
 - a. Establish corporate values and governance structures for the company to ensure that the business is conducted in an ethical, competent, fair, and professional manner
 - b. Ensure that all legal and regulatory requirements are met and complied with fully and in a timely fashion
 - c. Establish long-term strategic objectives for the company with a goal of ensuring that the best interests of shareholders come first and that the company’s obligations to others are met in a timely and complete manner
 - d. Establish clear lines of responsibility and a strong system of accountability and performance measurement in all phases of a company’s operations
 - e. Hire the chief executive officer, determine the compensation package, and periodically evaluate the officer’s performance
 - f. Ensure that management has supplied the board with sufficient information for it to be fully informed and prepared to make the decisions that are its responsibility, and to be able to adequately monitor and oversee the company’s management
 - g. Meet regularly to perform its duties and in extraordinary session as required by events
 - h. Acquire adequate training so that members are able to adequately perform their duties
- An investor or investment analyst must assess
 - a. Board composition and independence
 - b. Whether the chairman of the board is independent
 - c. The qualifications of the directors
 - d. Whether the board is elected on an annual or staggered basis
 - e. Board self-assessment practices
 - f. The frequency of separate sessions of independent directors
 - g. The audit committee and audit oversight
 - h. The nominating committee
 - i. The compensation committee and compensation awards to management
 - j. The use (or not) of independent legal and expert counsel
- Companies committed to corporate governance often provide a statement of corporate governance policies. Analysts should assess: the code of ethics; statements of the oversight, monitoring, and review responsibilities of directors; statements of management’s responsibilities with respect to information and access of directors to internal company functions; reports of directors’ examinations, evaluations, and findings; board and committee self-assessments; management self-assessments; and training policies for directors.
- Weak corporate governance systems give rise to risks including accounting risk, asset risk, liability risk, and strategic policy risk. Such risks may compromise the value of investments in the company.

PROBLEMS

1. Which of the following *best* defines the concept of corporate governance?
 - A. A system for monitoring managers' activities, rewarding performance, and disciplining misbehavior.
 - B. Corporate values and governance structures that ensure the business is conducted in an ethical, competent, fair, and professional manner.
 - C. A system of principles, policies, and procedures used to manage and control the activities of a corporation so as to overcome conflicts of interest inherent in the corporate form.
2. Which of the following is an example of a conflict of interest that an effective corporate governance system would mitigate or eliminate?
 - A. A majority of the board is independent of management.
 - B. Directors identify with the managers' interests rather than those of the shareholders.
 - C. Directors have board experience with companies regarded as having sound governance practices.
3. Which of the following *best* describes the corporate governance responsibilities of members of the board of directors?
 - A. Establish long-term strategic objectives for the company.
 - B. Ensure that at board meetings no subject is undiscussable and dissent is regarded as an obligation.
 - C. Ensure that the board negotiates with the company over all matters such as compensation.
4. Which of the following is *least likely* to be useful in evaluating a company's corporate governance system for investment analysis purposes?
 - A. Assess issues related to the board, managers, and shareholders.
 - B. Review the company's regulatory filings and financial information provided to shareholders.
 - C. Flag items such as egregious use of insider transactions for users of the financial statements.
5. The objectives of an effective system of corporate governance include all of the following *except*:
 - A. ensure that the assets of the company are used efficiently and productively.
 - B. eliminate or mitigate conflicts of interest among stakeholders.
 - C. ensure complete transparency in disclosures regarding operations, performance, risk, and financial position.
6. All of the following are core attributes of an effective corporate governance system *except*:
 - A. fairness and accuracy in identifying inherent conflicts of interest.
 - B. clearly defined governance responsibilities for managers and directors.
 - C. delineation of shareholders and other core stakeholders' rights.

7. All of the following are examples of conflicts of interest that an effective corporate governance system should address *except* relationships between:
 - A. managers and shareholders.
 - B. managers and directors.
 - C. managers and institutional analysts.
8. All of the following are true of an effective system of corporate governance *except*:
 - A. the system must be continually monitored especially with changes in management and the board.
 - B. a single system of effective corporate governance applies to all firms worldwide.
 - C. there are a number of common characteristics of all sound corporate governance structures.

The following information relates to Questions 9–14.

Jane Smith, CFA, has recently joined Zero Asset Management, Inc. (Zero) as a board member. Since Smith is also outside council for Zero, she is already very familiar with Zero's operations and expects to begin contributing good ideas right away. Zero is a publicly traded investment management firm that historically focused on mutual fund management. Although there is current market opportunity to add a new type of mutual fund, the board recently decided against adding the fund. Instead, the board decided to expand its business to include a hedge fund operation within the existing corporation.

Bill Week, CEO of Zero, has publicly stated that he is willing to bet the company's future on hedge fund management. Week is the founder of Zero, as well as chairman of the board, and maintains a controlling interest in the company.

Like the rest of Zero, the firm's new hedge fund is quantitatively driven and index based. The fund has been set up in a separate office with new systems so that the analysts and managers can create a unique hedge fund culture. Trading and execution are the only operations that remain with Zero. The fund is run by one of Zero's most successful portfolio managers.

Smith learns that although none of the board members sit on other companies' boards, most have at one point or another worked at Zero and so they are very familiar with Zero's operations. A board member has attempted to make the health insurance and retirement concerns of the board members an agenda item, without success to date. Smith eagerly anticipates the next board meeting as they are always in a luxurious setting.

At the board meeting, Smith asks a number of questions about Zero's corporate governance system. The board becomes concerned by Smith's questions and decides to hire an independent consultant to review their corporate governance responsibilities. The consultant starts his analysis by stating that a corporate governance system relies upon checks and balances among managers, directors, and investors. Smith asks if Zero has the proper systems in place. The consultant says that he has looked at conflicts of interest and has one more area to review in order to verify that the board is meeting its major objectives. Concerned about the company's stock price, Smith asks the consultant what work he has done concerning Zero's corporate disclosures for investment professionals. The consultant indicates that he has reviewed Zero's regulatory filings for clear and complete information, as well as the company's policies regarding related party transactions.

9. All of the following indicate Zero's board's lack of independence *except*:
 - A. personal relationships.
 - B. service of the outside counsel as a board member.
 - C. lack of interlocking directorships.
10. Which of the following is the most effective action for the board to take to address their oversight responsibilities concerning the hedge fund's proxy voting?
 - A. Establish corporate values and governance structure for the company.
 - B. Establish long-term strategic objectives that are met and fully complied with.
 - C. Perform adequate training so that employees are able to perform their duties.
11. Which of the following omissions best describes a corporate governance shortcoming of Zero's board of directors? The board's failure to:
 - A. address the potential conflicts of interest between managing the firm's hedge fund and its mutual fund business.
 - B. meet the market opportunity for a new kind of mutual fund.
 - C. establish the hedge fund operation in a separate corporation.
12. Given that Zero's directors all previously worked at the company, which of the following would you recommend for a more effective system of corporate governance?
 - A. Ensure that assets are used efficiently and productively and in the best interests of investors and stakeholders.
 - B. Eliminate or mitigate conflicts of interest among stakeholders, particularly between managers and shareholders.
 - C. Identify and measure accountabilities for the performance of the board's responsibilities.
13. Which of the following best describes the objectives of Zero's board that the consultant has not yet reviewed? The board should ensure:
 - A. that the assets of the company are used efficiently and productively and in the best interests of the investors and other stakeholders.
 - B. that material foreseeable risk factors are addressed and considered.
 - C. compliance with applicable laws and take into account the interest of stakeholders.
14. Which of the following is the most critical activity that an analyst can engage in to assess the quality of the corporate governance system at Zero, among those that the consultant did not review?
 - A. Look for vague references to off-balance-sheet or insider information.
 - B. Identify the responsiveness of the board to shareholder proxy votes.
 - C. Evaluate the quality and extent of financial information provided to investors.

The following information relates to Questions 15–19.

Shelley Newcome is the new CEO for a publicly traded financial services company, Asset Management Co. (AMC). Newcome is new to the corporate governance requirements of a publicly traded company, as she previously worked for a family office that invested in private equity.

At her first board meeting, the company's first in six months, she asks a director what the objectives of corporate governance should be. The director tells her that the most important objective he can think of is to eliminate or mitigate conflicts of interest among stakeholders.

One of Newcome's first steps as CEO is to fly to New York City in order to address a group of Wall Street analysts. Newcome is happy to discover that AMC provides her, and other senior management, with a company jet to attend such meetings.

At the opening of the meeting, Newcome is surprised to hear that most of the analysts are extremely interested in learning about AMC's corporate governance system. One analyst indicates that he has studied several of AMC's competitors and found that they share a set of critical and core attributes. The analyst goes on to note that like its competitors, AMC has included in its corporate governance system the following attributes: the rights of shareholders and other core stakeholders are clearly delineated; there is complete transparency and accuracy in disclosures regarding operations, performance, risk, and financial position; and identifiable and measurable accountabilities for the performance of responsibilities. The analyst also says that in order to verify that the board is meeting its major objectives he has looked at AMC's conflicts of interest and has one more area to review.

Newcome then asks the analyst why his corporate governance evaluation of AMC is so important. The analyst responds by saying that his decision whether or not to invest in AMC, and ultimately the long-term performance of the company, is dependent upon the quality of AMC's managers' decisions and the skill they use in applying sound management practices.

Closing the meeting, Newcome is delayed by one analyst who complains about the difficulties of flying these days and how he has to get to the airport hours ahead of time. The analyst goes on to say that he reviewed AMC's regulatory filings and was happy to see that the company does not spend its money on frivolous perquisites like executive jets.

15. Which of the following would *best* complete the objectives of corporate governance for the CEO?
 - A. Ensure that assets of the company are used efficiently and productively and in the best interests of investors and other stakeholders.
 - B. Clearly define governance responsibilities for both managers and directors.
 - C. Establish clear lines of responsibility and a strong system of accountability and performance measurement in all phases of a company's operations.
16. On the basis of the Wall Street analyst comments about AMC's corporate governance system, which of the following would be *most* effective for AMC to attract investors' interest?
 - A. Implement a corporate governance system in which business activity is encouraged and rewarded, and that leads to innovation.
 - B. Establish a corporate governance system that overcomes inherent conflicts of interest since they represent a major operational risk to investors and the continued existence of the company.
 - C. Provide full transparency of all material information on a timely basis to all investment analysts.
17. Which of the following is a core attribute that the Wall Street analyst left out of his analysis of AMC?
 - A. Corporate governance systems rely on checks and balances among managers, directors, and investors.
 - B. Fairness in all dealings between managers, directors, and shareholders.
 - C. Complete, accurate, and transparent disclosure of loans to private equity funds.

18. Based on the information provided in the case, which of the following corporate disclosures could investment professionals use to evaluate the quality of the corporate governance system at AMC?
 - A. Inclusion of all vague references to off-balance-sheet or insider transactions in board minutes.
 - B. Failure to disclose executive perquisites such as the use of corporate jets by senior management.
 - C. Provide other compensation that has not been disclosed to investment analysts.
19. Which of the following is an example of a corporate governance responsibility that AMC's board of directors has failed to meet?
 - A. Ensure that the board adequately monitors and oversees the company's management.
 - B. Ensure that management has supplied the board with sufficient information for it to be fully informed.
 - C. Meet regularly to perform its duties.

CHAPTER 2

CAPITAL BUDGETING

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LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- Describe the capital budgeting process, including the typical steps of the process, and distinguish among the various categories of capital projects.
- Describe the basic principles of capital budgeting, including cash flow estimation.
- Explain how the evaluation and selection of capital projects is affected by mutually exclusive projects, project sequencing, and capital rationing.
- Calculate and interpret the results using each of the following methods to evaluate a single capital project: net present value (NPV), internal rate of return (IRR), payback period, discounted payback period, average accounting rate of return (AAR), and profitability index (PI).
- Explain the NPV profile, compare NPV and IRR methods when evaluating independent and mutually exclusive projects, and describe the problems associated with each of the evaluation methods.
- Describe the relative popularity of the various capital budgeting methods and explain the relation between NPV and company value and stock price.
- Describe the expected relations among an investment's NPV, company value, and stock price.
- Calculate the yearly cash flows of an expansion capital project and a replacement capital project, and evaluate how the choice of depreciation method affects those cash flows.
- Explain the effects of inflation on capital budgeting analysis.
- Evaluate and select the optimal capital project in situations of (1) mutually exclusive projects with unequal lives, using either the least common multiple of lives approach or the equivalent annual annuity approach, and (2) capital rationing.
- Explain how sensitivity analysis, scenario analysis, and Monte Carlo simulation can be used to estimate the standalone risk of a capital project.

- Explain the procedure for determining the discount rate to be used in valuing a capital project and calculate a project's required rate of return using the capital asset pricing model (CAPM).
- Describe the types of real options and evaluate the profitability of investments with real options.
- Explain capital budgeting pitfalls.
- Calculate and interpret accounting income and economic income in the context of capital budgeting.
- Distinguish among and evaluate a capital project using the economic profit, residual income, and claims valuation models.

1. INTRODUCTION

Capital budgeting is the process that companies use for decision making on capital projects—those projects with a life of a year or more. This is a fundamental area of knowledge for financial analysts for many reasons:

- First, capital budgeting is very important for corporations. Capital projects, which make up the long-term asset portion of the balance sheet, can be so large that sound capital budgeting decisions ultimately decide the future of many corporations. Capital decisions cannot be reversed at a low cost, so mistakes are very costly. Indeed, the real capital investments of a company describe a company better than its working capital or capital structures, which are intangible and tend to be similar for many corporations.
- Second, the principles of capital budgeting have been adapted for many other corporate decisions, such as investments in working capital, leasing, mergers and acquisitions, and bond refunding.
- Third, the valuation principles used in capital budgeting are similar to the valuation principles used in security analysis and portfolio management. Many of the methods used by security analysts and portfolio managers are based on capital budgeting methods. Conversely, there have been innovations in security analysis and portfolio management that have also been adapted to capital budgeting.
- Finally, although analysts have a vantage point outside the company, their interest in valuation coincides with the capital budgeting focus of maximizing shareholder value. Because capital budgeting information is not ordinarily available outside the company, the analyst may attempt to estimate the process, within reason, at least for companies that are not too complex. Further, analysts may be able to appraise the quality of the company's capital budgeting process; for example, on the basis of whether the company has an accounting focus or an economic focus.

This chapter is organized as follows: Section 2 presents the steps in a typical capital budgeting process. After introducing the basic principles of capital budgeting in Section 3, in Section 4 we discuss the criteria by which a decision to invest in a project may be made. Section 5 presents a crucial element of the capital budgeting process: organizing the cash flow information that is the raw material of the analysis. Section 6 looks further at cash flow analysis. Section 7 demonstrates methods to extend the basic investment criteria to address economic alternatives and risk. Finally, Section 8 compares other income measures and valuation models that analysts use to the basic capital budgeting model.

2. THE CAPITAL BUDGETING PROCESS

The specific capital budgeting procedures that a manager uses depend on the manager's level in the organization, the size and complexity of the project being evaluated, and the size of the organization. The typical steps in the capital budgeting process are as follows:

- *Step 1, Generating Ideas.* Investment ideas can come from anywhere, from the top or the bottom of the organization, from any department or functional area, or from outside the company. Generating good investment ideas to consider is the most important step in the process.
- *Step 2, Analyzing Individual Proposals.* This step involves gathering the information to forecast cash flows for each project and then evaluating the project's profitability.
- *Step 3, Planning the Capital Budget.* The company must organize the profitable proposals into a coordinated whole that fits within the company's overall strategies, and it also must consider the projects' timing. Some projects that look good when considered in isolation may be undesirable strategically. Because of financial and real resource issues, scheduling and prioritizing projects is important.
- *Step 4, Monitoring and Post-Auditing.* In a post-audit, actual results are compared to planned or predicted results, and any differences must be explained. For example, how do the revenues, expenses, and cash flows realized from an investment compare to the predictions? Post-auditing capital projects is important for several reasons. First, it helps monitor the forecasts and analysis that underlie the capital budgeting process. Systematic errors, such as overly optimistic forecasts, become apparent. Second, it helps improve business operations. If sales or costs are out of line, it will focus attention on bringing performance closer to expectations if at all possible. Finally, monitoring and post-auditing recent capital investments will produce concrete ideas for future investments. Managers can decide to invest more heavily in profitable areas and scale down or cancel investments in areas that are disappointing.

Planning for capital investments can be very complex, often involving many persons inside and outside of the company. Information about marketing, science, engineering, regulation, taxation, finance, production, and behavioral issues must be systematically gathered and evaluated. The authority to make capital decisions depends on the size and complexity of the project. Lower-level managers may have discretion to make decisions that involve less than a given amount of money, or that do not exceed a given capital budget. Larger and more complex decisions are reserved for top management, and some are so significant that the company's board of directors ultimately has the decision-making authority.

Like everything else, capital budgeting is a cost-benefit exercise. At the margin, the benefits from the improved decision making should exceed the costs of the capital budgeting efforts.

Companies often put capital budgeting projects into some rough categories for analysis. One such classification would be as follows:

1. *Replacement projects.* These are among the easier capital budgeting decisions. If a piece of equipment breaks down or wears out, whether to replace it may not require careful analysis. If the expenditure is modest and if not investing has significant implications for production, operations, or sales, it would be a waste of resources to overanalyze the decision. Just make the replacement. Other replacement decisions involve replacing

existing equipment with newer, more efficient equipment, or perhaps choosing one type of equipment over another. These replacement decisions are often amenable to very detailed analysis, and you might have a lot of confidence in the final decision.

2. *Expansion projects.* Instead of merely maintaining a company's existing business activities, expansion projects increase the size of the business. These expansion decisions may involve more uncertainties than replacement decisions, and these decisions will be more carefully considered.
3. *New products and services.* These investments expose the company to even more uncertainties than expansion projects. These decisions are more complex and will involve more people in the decision-making process.
4. *Regulatory, safety, and environmental projects.* These projects are frequently required by a governmental agency, an insurance company, or some other external party. They may generate no revenue and might not be undertaken by a company maximizing its own private interests. Often, the company will accept the required investment and continue to operate. Occasionally, however, the cost of the regulatory/safety/environmental project is sufficiently high that the company would do better to cease operating altogether or to shut down any part of the business that is related to the project.
5. *Other.* The projects above are all susceptible to capital budgeting analysis, and they can be accepted or rejected using the net present value (NPV) or some other criterion. Some projects escape such analysis. These are either pet projects of someone in the company (such as the CEO buying a new aircraft) or so risky that they are difficult to analyze by the usual methods (such as some research and development decisions).

3. BASIC PRINCIPLES OF CAPITAL BUDGETING

Capital budgeting has a rich history and sometimes employs some pretty sophisticated procedures. Fortunately, capital budgeting relies on just a few basic principles. Capital budgeting usually uses the following five assumptions:

1. *Decisions are based on cash flows.* The decisions are not based on accounting concepts, such as net income. Furthermore, intangible costs and benefits are often ignored because, if they are real, they should result in cash flows at some other time.
2. *Timing of cash flows is crucial.* Analysts make an extraordinary effort to detail precisely when cash flows occur.
3. *Cash flows are based on opportunity costs.* What are the incremental cash flows that occur with an investment compared to what they would have been without the investment?
4. *Cash flows are analyzed on an after-tax basis.* Taxes must be fully reflected in all capital budgeting decisions.
5. *Financing costs are ignored.* This may seem unrealistic, but it is not. Most of the time, analysts want to know the after-tax operating cash flows that result from a capital investment. Then, these after-tax cash flows and the investment outlays are discounted at the "required rate of return" to find the net present value (NPV). Financing costs are reflected in the required rate of return. If we included financing costs in the cash flows and in the discount rate, we would be double-counting the financing costs. So even though a project may be financed with some combination of debt and equity, we ignore these costs, focusing on the operating cash flows and capturing the costs of debt (and other capital) in the discount rate.

Capital budgeting cash flows are not accounting net income. Accounting net income is reduced by noncash charges such as accounting depreciation. Furthermore, to reflect the cost of debt financing, interest expenses are also subtracted from accounting net income. (No subtraction is made for the cost of equity financing in arriving at accounting net income.) Accounting net income also differs from economic income, which is the cash inflow plus the change in the market value of the company. Economic income does not subtract the cost of debt financing, and it is based on the changes in the market value of the company, not changes in its book value (accounting depreciation). We will further consider cash flows, accounting income, economic income, and other income measures at the end of this chapter.

In assumption 5 above, we referred to the rate used in discounting the cash flows as the “required rate of return.” The required rate of return is the discount rate that investors should require given the riskiness of the project. This discount rate is frequently called the “opportunity cost of funds” or the “cost of capital.” If the company can invest elsewhere and earn a return of r , or if the company can repay its sources of capital and save a cost of r , then r is the company’s opportunity cost of funds. If the company cannot earn more than its opportunity cost of funds on an investment, it should not undertake that investment. Unless an investment earns more than the cost of funds from its suppliers of capital, the investment should not be undertaken. The cost-of-capital concept is discussed more extensively elsewhere. Regardless of what it is called, an economically sound discount rate is essential for making capital budgeting decisions.

Although the principles of capital budgeting are simple, they are easily confused in practice, leading to unfortunate decisions. Some important capital budgeting concepts that managers find very useful are given below.

- A **sunk cost** is one that has already been incurred. You cannot change a sunk cost. Today’s decisions, on the other hand, should be based on current and future cash flows and should not be affected by prior, or sunk, costs.
- An **opportunity cost** is what a resource is worth in its next-best use. For example, if a company uses some idle property, what should it record as the investment outlay: the purchase price several years ago, the current market value, or nothing? If you replace an old machine with a new one, what is the opportunity cost? If you invest \$10 million, what is the opportunity cost? The answers to these three questions are, respectively: the current market value, the cash flows the old machine would generate, and \$10 million (which you could invest elsewhere).
- An **incremental cash flow** is the cash flow that is realized because of a decision: the cash flow *with* a decision minus the cash flow *without* that decision. If opportunity costs are correctly assessed, the incremental cash flows provide a sound basis for capital budgeting.
- An **externality** is the effect of an investment on other things besides the investment itself. Frequently, an investment affects the cash flows of other parts of the company, and these externalities can be positive or negative. If possible, these should be part of the investment decision. Sometimes externalities occur outside of the company. An investment might benefit (or harm) other companies or society at large, and yet the company is not compensated for these benefits (or charged for the costs). **Cannibalization** is one externality. Cannibalization occurs when an investment takes customers and sales away from another part of the company.
- **Conventional** versus **nonconventional cash flows**. A conventional cash flow pattern is one with an initial outflow followed by a series of inflows. In a nonconventional cash flow pattern, the initial outflow is not followed by inflows only, but the cash flows can flip from positive to negative again (or even change signs several times). An investment that involved outlays (negative cash flows) for the first couple of years that were then followed by positive

cash flows would be considered to have a conventional pattern. If cash flows change signs once, the pattern is conventional. If cash flows change signs two or more times, the pattern is nonconventional.

Several types of project interactions make the incremental cash flow analysis challenging. The following are some of these interactions:

- **Independent versus mutually exclusive projects.** Independent projects are projects whose cash flows are independent of each other. Mutually exclusive projects compete directly with each other. For example, if Projects A and B are mutually exclusive, you can choose A or B, but you cannot choose both. Sometimes there are several mutually exclusive projects, and you can choose only one from the group.
- **Project sequencing.** Many projects are sequenced through time, so that investing in a project creates the option to invest in future projects. For example, you might invest in a project today and then in one year invest in a second project if the financial results of the first project or new economic conditions are favorable. If the results of the first project or new economic conditions are not favorable, you do not invest in the second project.
- **Unlimited funds versus capital rationing.** An unlimited funds environment assumes that the company can raise the funds it wants for all profitable projects simply by paying the required rate of return. Capital rationing exists when the company has a fixed amount of funds to invest. If the company has more profitable projects than it has funds for, it must allocate the funds to achieve the maximum shareholder value subject to the funding constraints.

4. INVESTMENT DECISION CRITERIA

Analysts use several important criteria to evaluate capital investments. The two most comprehensive measures of whether a project is profitable or unprofitable are the net present value (NPV) and internal rate of return (IRR). In addition to these, we present four other criteria that are frequently used: the payback period, discounted payback period, average accounting rate of return (AAR), and profitability index (PI). An analyst must fully understand the economic logic behind each of these investment decision criteria as well as its strengths and limitations in practice.

4.1. Net Present Value

For a project with one investment outlay, made initially, the **net present value (NPV)** is the present value of the future after-tax cash flows minus the investment outlay, or

$$\text{NPV} = \sum_{t=1}^n \frac{\text{CF}_t}{(1+r)^t} - \text{Outlay} \quad (2-1)$$

where

CF_t = after-tax cash flow at time t

r = required rate of return for the investment

Outlay = investment cash flow at time zero

To illustrate the net present value criterion, we will take a look at a simple example. Assume that Gerhardt Corporation is considering an investment of €50 million in a capital project that will return after-tax cash flows of €16 million per year for the next four years plus another €20 million in year five. The required rate of return is 10 percent.

For the Gerhardt example, the NPV would be

$$\text{NPV} = \frac{16}{1.10^1} + \frac{16}{1.10^2} + \frac{16}{1.10^3} + \frac{16}{1.10^4} + \frac{20}{1.10^5} - 50$$

$$\text{NPV} = 14.545 + 13.223 + 12.021 + 10.928 + 12.418 - 50$$

$$\text{NPV} = 63.136 - 50 = \text{€}13.136 \text{ million}^1$$

The investment has a total value, or present value of future cash flows, of €63.136 million. Since this investment can be acquired at a cost of €50 million, the investing company is giving up €50 million of its wealth in exchange for an investment worth €63.136 million. The investor's wealth increases by a net of €13.136 million.

Because the NPV is the amount by which the investor's wealth increases as a result of the investment, the decision rule for the NPV is as follows:

Invest if $\text{NPV} > 0$

Do not invest if $\text{NPV} < 0$

Positive NPV investments are wealth-increasing, while negative NPV investments are wealth-decreasing.

Many investments have cash flow patterns in which outflows may occur not only at time zero, but also at future dates. It is useful to consider the NPV to be the present value of all cash flows:

$$\begin{aligned} \text{NPV} &= \text{CF}_0 + \frac{\text{CF}_1}{(1+r)^1} + \frac{\text{CF}}{(1+r)^2} + \cdots + \frac{\text{CF}_n}{(1+r)^n}, \text{ or} \\ \text{NPV} &= \sum_{t=0}^n \frac{\text{CF}_t}{(1+r)^t} \end{aligned} \quad (2-2)$$

In Equation 2-2, the investment outlay, CF_0 , is simply a negative cash flow. Future cash flows can also be negative.

4.2. Internal Rate of Return

The internal rate of return (IRR) is one of the most frequently used concepts in capital budgeting and in security analysis. The IRR definition is one that all analysts know by heart. For a project with one investment outlay, made initially, the IRR is the discount rate that

¹Occasionally, you will notice some rounding errors in our examples. In this case, the present values of the cash flows, as rounded, add up to 63.135. Without rounding, they add up to 63.13627, or 63.136. We will usually report the more accurate result, the one that you would get from your calculator or computer without rounding intermediate results.

makes the present value of the future after-tax cash flows equal that investment outlay. Written out in equation form, the IRR solves this equation:

$$\sum_{t=1}^n \frac{CF_t}{(1 + IRR)^t} = \text{Outlay}$$

where IRR is the internal rate of return. The left-hand side of this equation is the present value of the project's future cash flows, which, discounted at the IRR, equals the investment outlay. This equation will also be seen rearranged as

$$\sum_{t=1}^n \frac{CF_t}{(1 + IRR)^t} - \text{Outlay} = 0 \quad (2-3)$$

In this form, Equation 2-3 looks like the NPV equation, Equation 2-1, except that the discount rate is the IRR instead of r (the required rate of return). Discounted at the IRR, the NPV is equal to zero.

In the Gerhardt Corporation example, we want to find a discount rate that makes the total present value of all cash flows, the NPV, equal zero. In equation form, the IRR is the discount rate that solves this equation:

$$-50 + \frac{16}{(1 + IRR)^1} + \frac{16}{(1 + IRR)^2} + \frac{16}{(1 + IRR)^3} + \frac{16}{(1 + IRR)^4} + \frac{20}{(1 + IRR)^5} = 0$$

Algebraically, this equation would be very difficult to solve. We normally resort to trial and error, systematically choosing various discount rates until we find one, the IRR, that satisfies the equation. We previously discounted these cash flows at 10 percent and found the NPV to be €13.136 million. Since the NPV is positive, the IRR is probably greater than 10 percent. If we use 20 percent as the discount rate, the NPV is –€0.543 million, so 20 percent is a little high. One might try several other discount rates until the NPV is equal to zero; this approach is illustrated in Exhibit 2-1.

EXHIBIT 2-1 Trial and Error Process for Finding IRR

Discount Rate	NPV
10%	13.136
20%	–0.543
19%	0.598
19.5%	0.022
19.51%	0.011
19.52%	0.000

The IRR is 19.52 percent. Financial calculators and spreadsheet software have routines that calculate the IRR for us, so we do not have to go through this trial and error procedure ourselves. The IRR, computed more precisely, is 19.5197 percent.

The decision rule for the IRR is to invest if the IRR exceeds the required rate of return for a project:

Invest if $IRR > r$

Do not invest if $IRR < r$

In the Gerhardt example, since the IRR of 19.52 percent exceeds the project's required rate of return of 10 percent, Gerhardt should invest.

Many investments have cash flow patterns in which the outlays occur at time zero and at future dates. Thus, it is common to define the IRR as the discount rate that makes the present values of all cash flows sum to zero:

$$\sum_{t=0}^n \frac{CF_t}{(1 + IRR)^t} = 0 \quad (2-4)$$

Equation 2-4 is a more general version of Equation 2-3.

4.3. Payback Period

The payback period is the number of years required to recover the original investment in a project. The payback is based on cash flows. For example, if you invest \$10 million in a project, how long will it be until you recover the full original investment? Exhibit 2-2 illustrates the calculation of the payback period by following an investment's cash flows and cumulative cash flows.

EXHIBIT 2-2 Payback Period Example

Year	0	1	2	3	4	5
Cash flow	-10,000	2,500	2,500	3,000	3,000	3,000
Cumulative cash flow	-10,000	-7,500	-5,000	-2,000	1,000	4,000

In the first year, the company recovers 2,500 of the original investment, with 7,500 still unrecovered. You can see that the company recoups its original investment between Year 3 and Year 4. After three years, 2,000 is still unrecovered. Since the Year 4 cash flow is 3,000, it would take two-thirds of the Year 4 cash flow to bring the cumulative cash flow to zero. So, the payback period is three years plus two-thirds of the Year 4 cash flow, or 3.67 years.

The drawbacks of the payback period are transparent. Since the cash flows are not discounted at the project's required rate of return, the payback period ignores the time value of money and the risk of the project. Additionally, the payback period ignores cash flows after the payback period is reached. In Exhibit 2-2, for example, the Year 5 cash flow is completely ignored in the payback computation!

Example 2-1 is designed to illustrate some of the implications of these drawbacks of the payback period.

EXAMPLE 2-1 Drawbacks of the Payback Period

The cash flows, payback periods, and NPVs for Projects A through F are given in Exhibit 2-3. For all of the projects, the required rate of return is 10 percent.

EXHIBIT 2-3 Examples of Drawbacks of the Payback Period

Year	Cash Flows					
	Project A	Project B	Project C	Project D	Project E	Project F
0	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000
1	1,000	100	400	500	400	500
2		200	300	500	400	500
3		300	200	500	400	10,000
4		400	100		400	
5		500	500		400	
Payback period	1.0	4.0	4.0	2.0	2.5	2.0
NPV	-90.91	65.26	140.60	243.43	516.31	7,380.92

Comment on why the payback period provides misleading information about the following:

1. Project A
2. Project B versus Project C
3. Project D versus Project E
4. Project D versus Project F

Solutions:

1. Project A does indeed pay itself back in one year. However, this result is misleading because the investment is unprofitable, with a negative NPV.
2. Although Projects B and C have the same payback period and the same cash flow after the payback period, the payback period does not detect the fact that Project C's cash flows within the payback period occur earlier and result in a higher NPV.
3. Projects D and E illustrate a common situation. The project with the shorter payback period is the less profitable project. Project E has a longer payback and higher NPV.
4. Projects D and F illustrate an important flaw of the payback period—that the payback period ignores cash flows after the payback period is reached. In this case, Project F has a much larger cash flow in Year 3, but the payback period does not recognize its value.

The payback period has many drawbacks—it is a measure of payback and not a measure of profitability. By itself, the payback period would be a dangerous criterion for evaluating capital projects. Its simplicity, however, is an advantage. The payback period is very easy to calculate and to explain. The payback period may also be used as an indicator of project liquidity. A project with a two-year payback may be more liquid than another project with a longer payback.

Because it is not economically sound, the payback period has no decision rule like that of the NPV or IRR. If the payback period is being used (perhaps as a measure of liquidity), analysts should also use an NPV or IRR to ensure that their decisions also reflect the profitability of the projects being considered.

4.4. Discounted Payback Period

The discounted payback period is the number of years it takes for the cumulative discounted cash flows from a project to equal the original investment. The discounted payback period partially addresses the weaknesses of the payback period. Exhibit 2-4 gives an example of calculating the payback period and discounted payback period. The example assumes a discount rate of 10 percent.

EXHIBIT 2-4 Payback Period and Discounted Payback Period

Year	0	1	2	3	4	5
Cash flow (CF)	-5,000	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
Cumulative CF	-5,000	-3,500.00	-2,000.00	-500.00	1,000.00	2,500.00
Discounted CF	-5,000	1,363.64	1,239.67	1,126.97	1,024.52	931.38
Cumulative discounted CF	-5,000	-3,636.36	-2,396.69	-1,269.72	-245.20	686.18

The payback period is 3 years plus $500/1500 = \text{one-third}$ of the fourth year's cash flow, or 3.33 years. The discounted payback period is between four and five years. The discounted payback period is four years plus $245.20/931.38 = 0.26$ of the fifth year's discounted cash flow, or 4.26 years.

The discounted payback period relies on discounted cash flows, much as the NPV criterion does. If a project has a negative NPV, it will usually not have a discounted payback period since it never recovers the initial investment.

The discounted payback does account for the time value of money and risk within the discounted payback period, but it ignores cash flows after the discounted payback period is reached. This drawback has two consequences. First, the discounted payback period is not a good measure of profitability (like the NPV or IRR) because it ignores these cash flows. Second, another idiosyncrasy of the discounted payback period comes from the possibility of negative cash flows after the discounted payback period is reached. It is possible for a project to have a negative NPV but to have a positive cumulative discounted cash flow in the middle of its life and, thus, a reasonable discounted payback period. The NPV and IRR, which consider all of a project's cash flows, do not suffer from this problem.

4.5. Average Accounting Rate of Return

The average accounting rate of return (AAR) can be defined as

$$\text{AAR} = \frac{\text{Average net income}}{\text{Average book value}}$$

To understand this measure of return, we will use a numerical example.

Assume a company invests \$200,000 in a project that is depreciated straight-line over a five-year life to a zero salvage value. Sales revenues and cash operating expenses for each year are as shown in Exhibit 2-5. The table also shows the annual income taxes (at a 40 percent tax rate) and the net income.

EXHIBIT 2-5 Net Income for Calculating an Average Accounting Rate of Return

	Year 1	Year 2	Year 3	Year 4	Year 5
Sales	\$100,000	\$150,000	\$240,000	\$130,000	\$80,000
Cash expenses	50,000	70,000	120,000	60,000	50,000
Depreciation	40,000	40,000	40,000	40,000	40,000
Earnings before taxes	10,000	40,000	80,000	30,000	−10,000
Taxes (at 40 percent)	4,000	16,000	32,000	12,000	−4,000*
Net income	6,000	24,000	48,000	18,000	−6,000

*Negative taxes occur in Year 5 because the earnings before taxes of −\$10,000 can be deducted against earnings on other projects, thus reducing the tax bill by \$4,000.

For the five-year period, the average net income is \$18,000. The initial book value is \$200,000, declining by \$40,000 per year until the final book value is \$0. The average book value for this asset is $(\$200,000 - \$0)/2 = \$100,000$. The average accounting rate of return is

$$\text{AAR} = \frac{\text{Average net income}}{\text{Average book value}} = \frac{18,000}{100,000} = 18\%$$

The advantages of the AAR are that it is easy to understand and easy to calculate. The AAR has some important disadvantages, however. Unlike the other capital budgeting criteria discussed here, the AAR is based on accounting numbers and not based on cash flows. This is an important conceptual and practical limitation. The AAR also does not account for the time value of money, and there is no conceptually sound cutoff for the AAR that distinguishes between profitable and unprofitable investments. The AAR is frequently calculated in different ways, so the analyst should verify the formula behind any AAR numbers that are supplied by someone else. Analysts should know the AAR and its potential limitations in practice, but they should rely on more economically sound methods like the NPV and IRR.

4.6. Profitability Index

The profitability index (PI) is the present value of a project's future cash flows divided by the initial investment. It can be expressed as

$$PI = \frac{\text{PV of future cash flows}}{\text{Initial investment}} = 1 + \frac{\text{NPV}}{\text{Initial investment}} \quad (2-5)$$

You can see that the PI is closely related to the NPV. The PI is the *ratio* of the PV of future cash flows to the initial investment, while an NPV is the *difference* between the PV of future cash flows and the initial investment. Whenever the NPV is positive, the PI will be greater than 1.0, and conversely, whenever the NPV is negative, the PI will be less than 1.0. The investment decision rule for the PI is as follows:

Invest if $PI > 1.0$

Do not invest if $PI < 1.0$

Because the PV of future cash flows equals the initial investment plus the NPV, the PI can also be expressed as 1.0 plus the ratio of the NPV to the initial investment, as shown in Equation 2-5 earlier. Example 2-2 illustrates the PI calculation.

EXAMPLE 2-2 Example of a PI Calculation

The Gerhardt Corporation investment (discussed earlier) had an outlay of €50 million, a present value of future cash flows of €63.136 million, and an NPV of €13.136 million. The profitability index is

$$PI = \frac{\text{PV of future cash flows}}{\text{Initial investment}} = \frac{63.136}{50.000} = 1.26$$

The PI can also be calculated as

$$PI = 1 + \frac{\text{NPV}}{\text{Initial investment}} = 1 + \frac{13.136}{50.000} = 1.26$$

Because the $PI > 1.0$, this is a profitable investment.

The PI indicates the value you are receiving in exchange for one unit of currency invested. Although the PI is used less frequently than the NPV and IRR, it is sometimes used as a guide in capital rationing. The PI is usually called the profitability index in corporations, but it is commonly referred to as a “benefit–cost ratio” in governmental and not-for-profit organizations.

4.7. NPV Profile

The NPV profile shows a project’s NPV graphed as a function of various discount rates. Typically, the NPV is graphed vertically (on the y -axis) and the discount rates are graphed horizontally (on the x -axis). The NPV profile for the Gerhardt capital budgeting project is shown in Example 2-3.

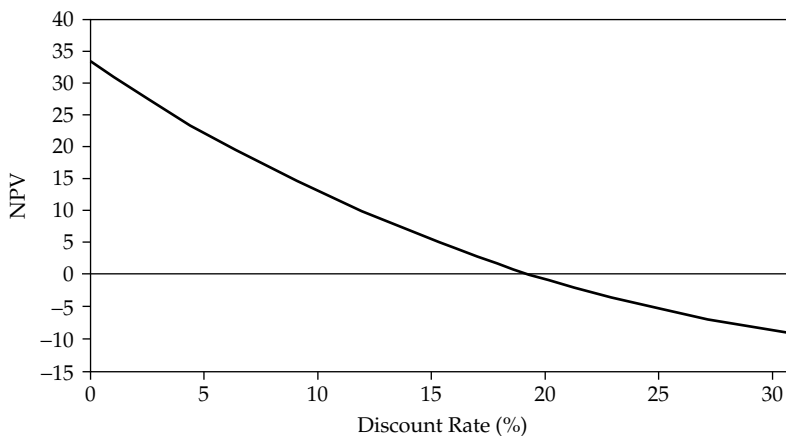
EXAMPLE 2-3 NPV Profile

For the Gerhardt example, we have already calculated several NPVs for different discount rates. At 10 percent the NPV is €13.136 million; at 20 percent the NPV is –€0.543 million; and at 19.52 percent (the IRR), the NPV is zero. What is the NPV if the discount rate is 0 percent? The NPV discounted at 0 percent is €34 million, which is simply the sum of all of the undiscounted cash flows. Exhibits 2-6 and 2-7 show the NPV profile for the Gerhardt example for discount rates between 0 percent and 30 percent.

EXHIBIT 2-6 Gerhardt NPV Profile

Discount Rate	NPV € millions
0%	34.000
5.00%	22.406
10.00%	13.136
15.00%	5.623
19.52%	0.000
20.00%	–0.543
25.00%	–5.661
30.00%	–9.954

EXHIBIT 2-7 Gerhardt NPV Profile



Three interesting points on this NPV profile are where the profile goes through the vertical axis (the NPV when the discount rate is zero), where the profile goes through the horizontal axis (where the discount rate is the IRR), and the NPV for the required rate of return (NPV is €13.136 million when the discount rate is the 10 percent required rate of return).

The NPV profile in Exhibit 2-7 is very well-behaved. The NPV declines at a decreasing rate as the discount rate increases. The profile is convex from the origin (convex from below). You will shortly see some examples in which the NPV profile is more complicated.

4.8. Ranking Conflicts between NPV and IRR

For a single conventional project, the NPV and IRR will agree on whether to invest or to not invest. For independent, conventional projects, no conflict exists between the decision rules for the NPV and IRR. However, in the case of two mutually exclusive projects, the two criteria will sometimes disagree. For example, Project A might have a larger NPV than Project B, but Project B has a higher IRR than Project A. In this case, should you invest in Project A or in Project B?

Differing cash flow patterns can cause two projects to rank differently with the NPV and IRR. For example, suppose Project A has shorter-term payoffs than Project B. This situation is presented in Example 2-4.

Whenever the NPV and IRR rank two mutually exclusive projects differently, as they do in the example above, you should choose the project based on the NPV. Project B, with the higher NPV, is the better project because of the reinvestment assumption. Mathematically, whenever you discount a cash flow at a particular discount rate, you are implicitly assuming

EXAMPLE 2-4 Ranking Conflict Due to Differing Cash Flow Patterns

Projects A and B have similar outlays but different patterns of future cash flows. Project A realizes most of its cash payoffs earlier than Project B. The cash flows as well as the NPV and IRR for the two projects are shown in Exhibit 2-8. For both projects, the required rate of return is 10 percent.

EXHIBIT 2-8 Cash Flows, NPV, and IRR for Two Projects with Different Cash Flow Patterns

Year	Cash Flows					NPV	IRR
	0	1	2	3	4		
Project A	-200	80	80	80	80	53.59	21.86%
Project B	-200	0	0	0	400	73.21	18.92%

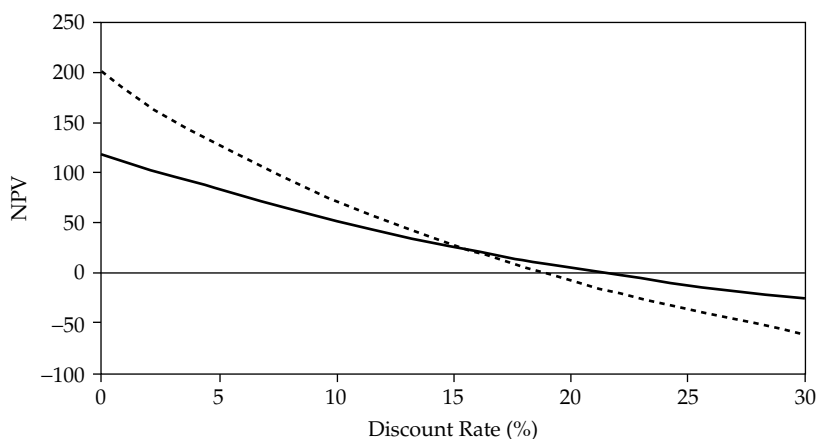
If the two projects were not mutually exclusive, you would invest in both because they are both profitable. However, you can choose either A (which has the higher IRR) or B (which has the higher NPV).

Exhibits 2-9 and 2-10 show the NPVs for Project A and Project B for various discount rates between 0 percent and 30 percent.

EXHIBIT 2-9 NPV Profiles for Two Projects with Different Cash Flow Patterns

Discount Rate	NPV for Project A	NPV for Project B
0%	120.00	200.00
5.00%	83.68	129.08
10.00%	53.59	73.21
15.00%	28.40	28.70
15.09%	27.98	27.98
18.92%	11.41	0.00
20.00%	7.10	-7.10
21.86%	0.00	-18.62
25.00%	-11.07	-36.16
30.00%	-26.70	-59.95

EXHIBIT 2-10 NPV Profiles for Two Projects with Different Cash Flow Patterns



Note that Project B (broken line) has the higher NPV for discount rates between 0 percent and 15.09 percent. Project A (solid line) has the higher NPV for discount rates exceeding 15.09 percent. The crossover point of 15.09 percent in Exhibit 2-10 corresponds to the discount rate at which both projects have the same NPV (of 27.98). Project B has the higher NPV below the crossover point, and Project A has the higher NPV above it.

that you can reinvest a cash flow at that same discount rate.² In the NPV calculation, you use a discount rate of 10 percent for both projects. In the IRR calculation, you use a discount rate equal to the IRR of 21.86 percent for Project A and 18.92 percent for Project B.

Can you reinvest the cash inflows from the projects at 10 percent, or 21.86 percent, or 18.92 percent? When you assume the required rate of return is 10 percent, you are assuming an opportunity cost of 10 percent—you are assuming that you can either find other projects that pay a 10 percent return or pay back your sources of capital that cost you 10 percent. The fact that you earned 21.86 percent in Project A or 18.92 percent in Project B does not mean that you can reinvest future cash flows at those rates. (In fact, if you can reinvest future cash flows at 21.86 percent or 18.92 percent, these should have been used as your required rate of return instead of 10 percent.) Because the NPV criterion uses the most realistic discount rate—the opportunity cost of funds—the NPV criterion should be used for evaluating mutually exclusive projects.

Another circumstance that frequently causes mutually exclusive projects to be ranked differently by NPV and IRR criteria is project scale—the sizes of the projects. Would you rather have a small project with a higher rate of return or a large project with a lower rate of return? Sometimes, the larger, low rate of return project has the better NPV. This case is developed in Example 2-5.

EXAMPLE 2-5 Ranking Conflicts Due to Differing Project Scale

Project A has a much smaller outlay than Project B, although they have similar future cash flow patterns. The cash flows as well as the NPVs and IRRs for the two projects are shown in Exhibit 2-11. For both projects, the required rate of return is 10 percent.

EXHIBIT 2-11 Cash Flows, NPV, and IRR for Two Projects of Differing Scale

Year	Cash Flows					NPV	IRR
	0	1	2	3	4		
Project A	−100	50	50	50	50	58.49	34.90%
Project B	−400	170	170	170	170	138.88	25.21%

If they were not mutually exclusive, you would invest in both projects because they are both profitable. However, you can choose either Project A (which has the higher IRR) or Project B (which has the higher NPV).

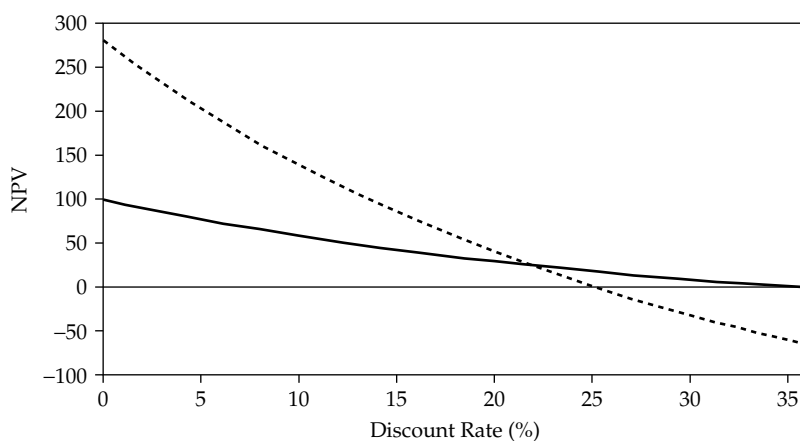
²For example, assume that you are receiving \$100 in one year discounted at 10 percent. The present value is $\$100/1.10 = \90.91 . Instead of receiving the \$100 in one year, invest it for one additional year at 10 percent, and it grows to \$110. What is the present value of \$110 received in two years discounted at 10 percent? It is the same \$90.91. Because both future cash flows are worth the same, you are implicitly assuming that reinvesting the earlier cash flow at the discount rate of 10 percent has no effect on its value.

Exhibits 2-12 and 2-13 show the NPVs for Project A and Project B for various discount rates between 0 percent and 30 percent.

EXHIBIT 2-12 NPV Profiles for Two Projects of Differing Scale

Discount Rate	NPV for Project A	NPV for Project B
0%	100.00	280.00
5.00%	77.30	202.81
10.00%	58.49	138.88
15.00%	42.75	85.35
20.00%	29.44	40.08
21.86%	25.00	25.00
25.00%	18.08	1.47
25.21%	17.65	0.00
30.00%	8.31	-31.74
34.90%	0.00	-60.00
35.00%	-0.15	-60.52

EXHIBIT 2-13 NPV Profiles for Two Projects of Differing Scale



Note that Project B (broken line) has the higher NPV for discount rates between 0 percent and 21.86 percent. Project A has the higher NPV for discount rates exceeding 21.86 percent. The crossover point of 21.86 percent in Exhibit 2-13 corresponds to the discount rate at which both projects have the same NPV (of 25.00). Below the crossover point, Project B has the higher NPV, and above it, Project A has the higher NPV. When cash flows are discounted at the 10 percent required rate of return, the choice is clear—Project B, the larger project, which has the superior NPV.

The good news is that the NPV and IRR criteria will usually indicate the same investment decision for a given project. They will usually both recommend acceptance or rejection of the project. When the choice is between two mutually exclusive projects and the NPV and IRR rank the two projects differently, the NPV criterion is strongly preferred. There are good reasons for this preference. The NPV shows the amount of gain, or wealth increase, as a currency amount. The reinvestment assumption of the NPV is the more economically realistic. The IRR does give you a rate of return, but the IRR could be for a small investment or for only a short period of time. As a practical matter, once a corporation has the data to calculate the NPV, it is fairly trivial to go ahead and calculate the IRR and other capital budgeting criteria. However, the most appropriate and theoretically sound criterion is the NPV.

4.9. The Multiple IRR Problem and the No IRR Problem

A problem that can arise with the IRR criterion is the “multiple IRR problem.” We can illustrate this problem with the following nonconventional cash flow pattern:³

Time	0	1	2
Cash Flow	-1,000	5,000	-6,000

The IRR for these cash flows satisfies this equation:

$$-1,000 + \frac{5,000}{(1 + \text{IRR})^1} + \frac{-6,000}{(1 + \text{IRR})^2} = 0$$

It turns out that there are two values of IRR that satisfy the equation: $\text{IRR} = 1 = 100$ percent and $\text{IRR} = 2 = 200$ percent. To further understand this problem, consider the NPV profile for this investment, which is shown in Exhibits 2-14 and 2-15.

As you can see in the NPV profile, the NPV is equal to zero at $\text{IRR} = 100$ percent and $\text{IRR} = 200$ percent. The NPV is negative for discount rates below 100 percent, positive between 100 percent and 200 percent, and then negative above 200 percent. The NPV reaches its highest value when the discount rate is 140 percent.

It is also possible to have an investment project with no IRR. The “no-IRR problem” occurs with this cash flow pattern:⁴

Time	0	1	2
Cash Flow	100	-300	250

The IRR for these cash flows satisfies this equation:

$$100 + \frac{-300}{(1 + \text{IRR})^1} + \frac{250}{(1 + \text{IRR})^2} = 0$$

For these cash flows, no discount rate exists that results in a zero NPV. Does that mean this project is a bad investment? In this case, the project is actually a good investment. As

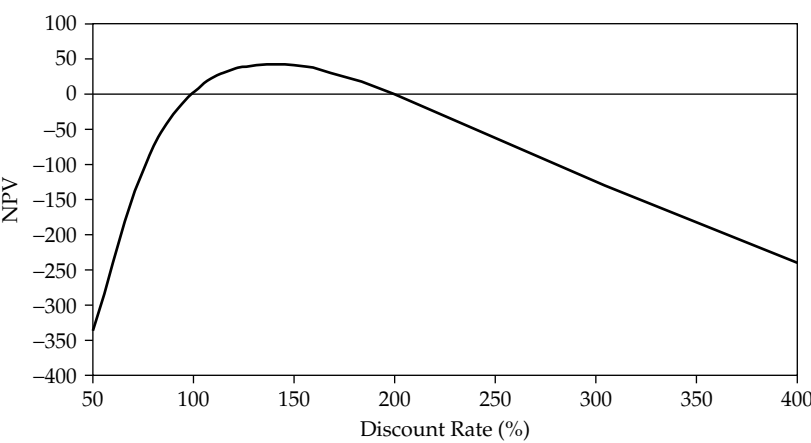
³This example is adapted from Hirschleifer (1958).

⁴This example is also adapted from Hirschleifer.

EXHIBIT 2-14 NPV Profile for a Multiple IRR Example

Discount Rate	NPV
0%	-2,000.00
25%	-840.00
50%	-333.33
75%	-102.04
100%	0.00
125%	37.04
140%	41.67
150%	40.00
175%	24.79
200%	0.00
225%	-29.59
250%	-61.22
300%	-125.00
350%	-185.19
400%	-240.00
500%	-333.33
1,000%	-595.04
2,000%	-775.51
3,000%	-844.95
4,000%	-881.62
10,000%	-951.08
1,000,000%	-999.50

EXHIBIT 2-15 NPV Profile for a Multiple IRR Example

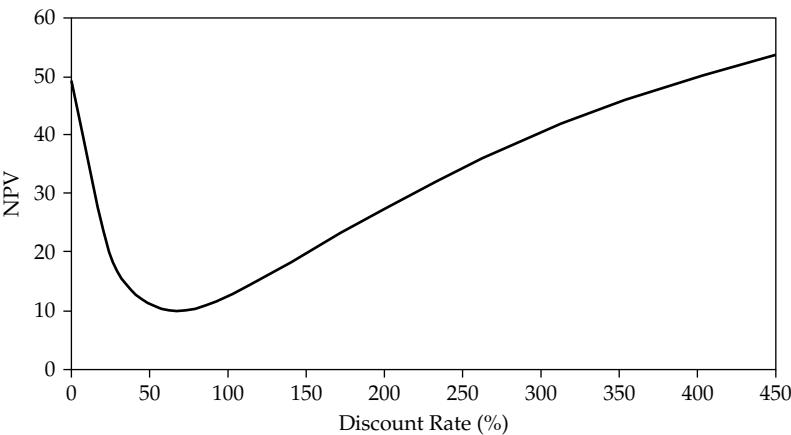


Exhibits 2-16 and 2-17 show, the NPV is positive for all discount rates. The lowest NPV, of 10, occurs for a discount rate of 66.67 percent, and the NPV is always greater than zero. Consequently, no IRR exists.

EXHIBIT 2-16 NPV Profile for a Project with No IRR

Discount Rate	NPV
0%	50.00
25%	20.00
50%	11.11
66.67%	10.00
75%	10.20
100%	12.50
125%	16.05
150%	20.00
175%	23.97
200%	27.78
225%	31.36
250%	34.69
275%	37.78
300%	40.63
325%	43.25
350%	45.68
375%	47.92
400%	50.00

EXHIBIT 2-17 NPV Profile for a Project with No IRR



For conventional projects that have outlays followed by inflows—negative cash flows followed by positive cash flows—the multiple IRR problem cannot occur. However, for nonconventional projects, as in the example above, the multiple IRR problem can occur. The IRR equation is essentially an n th degree polynomial. An n th degree polynomial can have up to n solutions, although it will have no more real solutions than the number of cash flow sign changes. For example, a project with two sign changes could have zero, one, or two IRRs. Having two sign changes does not mean that you *will* have multiple IRRs; it just means that you *might*. Fortunately, most capital budgeting projects have only one IRR. Analysts should always be aware of the unusual cash flow patterns that can generate the multiple IRR problem.

4.10. Popularity and Usage of the Capital Budgeting Methods

Analysts need to know the basic logic of the various capital budgeting criteria as well as the practicalities involved in using them in real corporations. Before delving into the many issues involved in applying these models, we would like to present some feedback on their popularity.

The usefulness of any analytical tool always depends on the specific application. Corporations generally find these capital budgeting criteria useful. Two recent surveys by Graham and Harvey (2001) and Brounen, De Jong, and Koedijk (2004) report on the frequency of their use by U.S. and European corporations. Exhibit 2-18 gives the mean responses of executives in five countries to the question, “How frequently does your company use the following techniques when deciding which projects or acquisitions to pursue?”

EXHIBIT 2-18 Mean Responses about Frequency of Use of Capital Budgeting Techniques

	United States	United Kingdom	Netherlands	Germany	France
Internal rate of return*	3.09	2.31	2.36	2.15	2.27
Net present value*	3.08	2.32	2.76	2.26	1.86
Payback period*	2.53	2.77	2.53	2.29	2.46
Hurdle rate	2.13	1.35	1.98	1.61	0.73
Sensitivity analysis	2.31	2.21	1.84	1.65	0.79
Earnings multiple approach	1.89	1.81	1.61	1.25	1.70
Discounted payback period*	1.56	1.49	1.25	1.59	0.87
Real options approach	1.47	1.65	1.49	2.24	2.20
Accounting rate of return*	1.34	1.79	1.40	1.63	1.11
Value at risk	0.95	0.85	0.51	1.45	1.68
Adjusted present value	0.85	0.78	0.78	0.71	1.11
Profitability index*	0.85	1.00	0.78	1.04	1.64

Respondents used a scale ranging from 0 (never) to 4 (always).

*These techniques were described in this section of the chapter. You will encounter the others elsewhere.

Although financial textbooks preach the superiority of the NPV and IRR techniques, it is clear that several other methods are heavily used.⁵ In the four European countries, the payback period is used as often as, or even slightly more often than, the NPV and IRR. In these two studies, larger companies tended to prefer the NPV and IRR over the payback period. The fact that the U.S. companies were larger, on average, partially explains the greater U.S. preference for the NPV and IRR. Other factors influence the choice of capital budgeting techniques. Private corporations used the payback period more frequently than did public corporations. Companies managed by an MBA had a stronger preference for the discounted cash flow techniques. Of course, any survey research also has some limitations. In this case, the persons in these large corporations responding to the surveys may not have been aware of all of the applications of these techniques.

These capital budgeting techniques are essential tools for corporate managers. Capital budgeting is also relevant to external analysts. Because a corporation's investing decisions ultimately determine the value of its financial obligations, the corporation's investing processes are vital. The NPV criterion is the criterion most directly related to stock prices. If a corporation invests in positive NPV projects, these should add to the wealth of its shareholders. Example 2-6 illustrates this scenario.

EXAMPLE 2-6 NPVs and Stock Prices

Freitag Corporation is investing €600 million in distribution facilities. The present value of the future after-tax cash flows is estimated to be €850 million. Freitag has 200 million outstanding shares with a current market price of €32.00 per share. This investment is new information, and it is independent of other expectations about the company. What should be the effect of the project on the value of the company and the stock price?

Solution. The NPV of the project is €850 million – €600 million = €250 million. The total market value of the company prior to the investment is €32.00 × 200 million shares = €6,400 million. The value of the company should increase by €250 million to €6,650 million. The price per share should increase by the NPV per share, or €250 million/200 million shares = €1.25 per share. The share price should increase from €32.00 to €33.25.

The effect of a capital budgeting project's positive or negative NPV on share price is more complicated than Example 6 above, in which the value of the stock increased by the project's NPV. The value of a company is the value of its existing investments plus the net present values of all of its future investments. If an analyst learns of an investment, the impact of that investment on the stock price will depend on whether the investment's profitability is

⁵Analysts often refer to the NPV and IRR as “discounted cash flow techniques” because they accurately account for the timing of all cash flows when they are discounted.

more or less than expected. For example, an analyst could learn of a positive NPV project, but if the project's profitability is less than expectations, this stock might drop in price on the news. Alternatively, news of a particular capital project might be considered as a signal about other capital projects underway or in the future. A project that by itself might add, say, €0.25 to the value of the stock might signal the existence of other profitable projects. News of this project might increase the stock price by far more than €0.25.

The integrity of a corporation's capital budgeting processes is important to analysts. Management's capital budgeting processes can demonstrate two things about the quality of management: the degree to which management embraces the goal of shareholder wealth maximization, and its effectiveness in pursuing that goal. Both of these factors are important to shareholders.

5. CASH FLOW PROJECTIONS

In Section 4, we presented the basic capital budgeting models that managers use to accept or reject capital budgeting proposals. In that section, we assumed the cash flows were given, and we used them as inputs to the analysis. In Section 5, we detail how these cash flows are found for an "expansion" project. An expansion project is an independent investment that does not affect the cash flows for the rest of the company. In Section 6, we will deal with a "replacement" project, in which the cash flow analysis is more complicated. A replacement project must deal with the differences between the cash flows that occur with the new investment and the cash flows that would have occurred for the investment being replaced.

5.1. Table Format with Cash Flows Collected by Year

The cash flows for a conventional expansion project can be grouped into (1) the investment outlays, (2) after-tax operating cash flows over the project's life, and (3) terminal year after-tax nonoperating cash flows. Exhibit 2-19 gives an example of the cash flows for a capital project where all of the cash flows are collected by year.

The investment outlays include a \$200,000 outlay for fixed capital items. This outlay includes \$25,000 for nondepreciable land, plus \$175,000 for equipment that will be depreciated straight-line to zero over five years. The investment in net working capital is the net investment in short-term assets required for the investment. This is the investment in receivables and inventory needed, less the short-term payables generated by the project. In this case, the project required \$50,000 of current assets but generated \$20,000 in current liabilities, resulting in a total investment in net working capital of \$30,000. The total investment outlay at time zero is \$230,000.

Each year, sales will be \$220,000 and cash operating expenses will be \$90,000. Annual depreciation for the \$175,000 depreciable equipment is \$35,000 (one-fifth of the cost). The result is an operating income before taxes of \$95,000. Income taxes at a 40 percent rate are $0.40 \times \$95,000 = \$38,000$. This leaves operating income after taxes of \$57,000. Adding back the depreciation charge of \$35,000 gives the annual after-tax operating cash flow of \$92,000.⁶

⁶Examining the operating cash flows in Exhibit 19, we have a \$220,000 inflow from sales, a \$90,000 outflow for cash operating expenses, and a \$38,000 outflow for taxes. This is an after-tax cash flow of \$92,000.

EXHIBIT 2-19 Capital Budgeting Cash Flows Example (Cash Flows Collected by Year)

Year	0	1	2	3	4	5
Investment outlays:						
Fixed capital	-200,000					
Net working capital	-30,000					
Total	-230,000					
Annual after-tax operating cash flows:						
Sales		220,000	220,000	220,000	220,000	220,000
Cash operating expenses		90,000	90,000	90,000	90,000	90,000
Depreciation		35,000	35,000	35,000	35,000	35,000
Operating income before taxes		95,000	95,000	95,000	95,000	95,000
Taxes on operating income		38,000	38,000	38,000	38,000	38,000
Operating income after taxes		57,000	57,000	57,000	57,000	57,000
Add back: Depreciation		35,000	35,000	35,000	35,000	35,000
After-tax operating cash flow		92,000	92,000	92,000	92,000	92,000
Terminal year after-tax nonoperating cash flows:						
After-tax salvage value						40,000
Return of net working capital						30,000
Total						70,000
Total after-tax cash flow	-230,000	92,000	92,000	92,000	92,000	162,000
Net present value at 10 percent required rate of return	162,217					
Internal rate of return	32.70%					

At the end of Year 5, the company will sell off the fixed capital assets. In this case, the fixed capital assets (including the land) are sold for \$50,000, which represents a gain of \$25,000 over the remaining book value of \$25,000. The gain of \$25,000 is taxed at 40 percent, resulting in a tax of \$10,000. This leaves \$40,000 for the fixed capital assets after taxes. Additionally, the net working capital investment of \$30,000 is recovered, as the short-term assets (such as inventory and receivables) and short-term liabilities (such as payables) are no longer needed for the project. Total terminal year nonoperating cash flows are then \$70,000.

The investment project has a required rate of return of 10 percent. Discounting the future cash flows at 10 percent and subtracting the investment outlay gives an NPV of \$162,217. The internal rate of return is 32.70 percent. Because the investment has a positive NPV, this project should be accepted. The IRR investment decision criterion would also recommend accepting the project because the IRR is greater than the required rate of return.

5.2. Table Format with Cash Flows Collected by Type

In the layout in Exhibit 2-19, we essentially collected the cash flows in the columns, by *year*, and then found the NPV by summing the present values of the annual cash flows (at the bottom of each column). There is another way of organizing the same information. We could also find the NPV by finding the present values of the cash flows in Exhibit 2-19 by rows, which are the *types* of cash flows. This approach is shown in Exhibit 2-20.

EXHIBIT 2-20 Capital Budgeting Cash Flows Example (Cash Flows Collected by Type)

Time	Type of Cash Flow	Before-Tax Cash Flow	After-Tax Cash Flow	PV at 10%
0	Fixed capital	−200,000	−200,000	−200,000
0	Net working capital	−30,000	−30,000	−30,000
1–5	Sales minus cash expenses	220,000 − 90,000 = 130,000	130,000(1 − 0.40) = 78,000	295,681
1–5	Depreciation tax savings	None	0.40(35,000) = 14,000	53,071
5	After-tax salvage value	50,000	50,000 − 0.40(50,000 − 25,000) = 40,000	24,837
5	Return of net working capital	30,000	30,000	18,628
			NPV =	162,217

As Exhibit 2-20 shows, the outlays in fixed capital and in net working capital at time zero total \$230,000. For Years 1 through 5, the company realizes an after-tax cash flow for sales minus cash expenses of \$78,000, which has a present value of \$295,681. The depreciation charge results in a tax savings of \$14,000 per year, which has a present value of \$53,071. The present values of the after-tax salvage and of the return of net working capital are also shown in the table. The present value of all cash flows is an NPV of \$162,217. Obviously, collecting the after-tax cash flows by year, as in Exhibit 2-19, or by type, as in Exhibit 2-20, results in the same NPV.

5.3. Equation Format for Organizing Cash Flows

The capital budgeting cash flows in the example project above were laid out in one of two alternative tabular formats. Analysts may wish to take even another approach. Instead of producing a table, you can also look at the cash flows using equations such as the following:

1. Initial outlay:

For a new investment

$$\text{Outlay} = \text{FCInv} + \text{NWCInv}$$

where

FCInv = Investment in new fixed capital

NWCInv = Investment in net working capital

The above equation can be generalized for a replacement project (covered in Section 6.2), in which existing fixed capital is sold and provides some of the funding for the new fixed capital purchased. The outlay is then

$$\text{Outlay} = \text{FCInv} + \text{NWCInv} - \text{Sal}_0 + T(\text{Sal}_0 - B_0) \quad (2-6)$$

where

Sal_0 = Cash proceeds (salvage value) from sale of old fixed capital

T = Tax rate

B_0 = Book value of old fixed capital

2. Annual after-tax operating cash flow:

$$\text{CF} = (S - C - D)(1 - T) + D, \text{ or} \quad (2-7)$$

$$\text{CF} = (S - C)(1 - T) + TD \quad (2-8)$$

where

S = sales

C = cash operating expenses

D = depreciation charge

3. Terminal year after-tax nonoperating cash flow:

$$\text{TNOCF} = \text{Sal}_T + \text{NWCInv} - T(\text{Sal}_T - B_T) \quad (2-9)$$

where

Sal_T = Cash proceeds (salvage value) from sale of fixed capital on termination date

B_T = Book value of fixed capital on termination date

The outlay in the example is found with Equation 2-6:

$$\text{Outlay} = 200,000 + 30,000 - 0 + 0 = \$230,000$$

For a replacement project, the old fixed capital would be sold for cash (Sal_0) and then there would be taxes paid on the gain (if $\text{Sal}_0 - B_0$ were positive) or a tax saving (if $\text{Sal}_0 - B_0$ were negative). In this example, Sal_0 and $T(\text{Sal}_0 - B_0)$ are zero because no existing fixed capital is sold at time zero.

Using Equation 2-7, we find that the annual after-tax operating cash flow is

$$\begin{aligned} \text{CF} &= (S - C - D)(1 - T) + D \\ &= (220,000 - 90,000 - 35,000)(1 - 0.40) + 35,000 = 95,000(0.60) + 35,000 \\ &= 57,000 + 35,000 = \$92,000 \end{aligned}$$

Equation 2-7 is the project's net income plus depreciation. An identical cash flow results if we use Equation 2-8:

$$\begin{aligned}
 CF &= (S - C)(1 - T) + TD \\
 &= (220,000 - 90,000)(1 - 0.40) + 0.40(35,000) \\
 &= 130,000(0.60) + 0.40(35,000) = 78,000 + 14,000 = \$92,000
 \end{aligned}$$

Equation 2-8 is the after-tax sales and cash expenses plus the depreciation tax savings. The analyst can use either equation.

Equation 2-9 provides the terminal year nonoperating cash flow:

$$\begin{aligned}
 \text{TNOCF} &= \text{Sal}_T + \text{NWCInv} - T(\text{Sal}_T - B_T) \\
 &= 50,000 + 30,000 - 0.40(50,000 - 25,000) \\
 &= 50,000 + 30,000 - 10,000 = \$70,000
 \end{aligned}$$

The old fixed capital (including land) is sold for \$50,000, but \$10,000 of taxes must be paid on the gain. Including the \$30,000 return of net working capital gives a terminal year nonoperating cash flow of \$70,000.

The NPV of the project is the present value of the cash flows—an outlay of \$230,000 at time zero, an annuity of \$92,000 for five years, plus a single payment of \$70,000 in five years:

$$\text{NPV} = -230,000 + \sum_{t=1}^5 \frac{92,000}{(1.10)^t} + \frac{70,000}{(1.10)^5} = -230,000 + 348,752 + 43,465 = \$162,217$$

We obtain an identical NPV of \$162,217 whether we use a tabular format collecting cash flows by year, a tabular format collecting cash flows by type, or an equation format using Equations 2-6 through 2-9. The analyst usually has some flexibility in choosing how to solve a problem. Furthermore, the analysis that an analyst receives from someone else could be in varying formats. The analyst must interpret this information correctly regardless of format. An analyst may need to present information in alternative formats, depending on what the client or user of the information wishes to see. All that is important is that the cash flows are complete (with no cash flows omitted and none double-counted), that their timing is recognized, and that the discounting is done correctly.

6. MORE ON CASH FLOW PROJECTIONS

Cash flow analysis can become fairly complicated. Section 6 extends the analysis of the previous section to include more details on depreciation methods, replacement projects (as opposed to simple expansion projects), the use of spreadsheets, and the effects of inflation.

6.1. Straight-Line and Accelerated Depreciation Methods

Before going on to more complicated investment decisions, we should mention the variety of depreciation methods that are in use. The example in Section 5.1 assumed straight-line depreciation down to a zero salvage value. Most accounting texts give a good description of the straight-line method, the sum-of-years digits method, the double-declining balance

method (and the 150 percent declining balance method), and the units-of-production and service hours method.⁷

Many countries specify the depreciation methods that are acceptable for tax purposes in their jurisdictions. For example, in the U.S., corporations use the MACRS (modified accelerated cost recovery system) for tax purposes. Under MACRS, real property (real estate) is usually depreciated straight-line over a 27.5- or 39-year life, and other capital assets are usually grouped into MACRS asset classes and subject to a special depreciation schedule in each class. These MACRS classes and the depreciation rates for each class are shown in Exhibit 2-21.

EXHIBIT 2-21 Depreciation Rates under U.S. MACRS

Year	Recovery Period Class					
	3-Year	5-Year	7-Year	10-Year	15-Year	20-Year
1	33.33%	20.00%	14.29%	10.00%	5.00%	3.75%
2	44.45	32.00	24.49	18.00	9.50	7.22
3	14.81	19.20	17.49	14.40	8.55	6.68
4	7.41	11.52	12.49	11.52	7.70	6.18
5		11.52	8.93	9.22	6.93	5.71
6		5.76	8.93	7.37	6.23	5.28
7			8.93	6.55	5.90	4.89
8			4.45	6.55	5.90	4.52
9				6.55	5.90	4.46
10				6.55	5.90	4.46
11				3.29	5.90	4.46
12					5.90	4.46
13					5.90	4.46
14					5.90	4.46
15					5.90	4.46
16					2.99	4.46
17						4.46
18						4.46
19						4.46
20						4.46
21						2.25

For the first four MACRS classes (3-year, 5-year, 7-year, and 10-year), the depreciation is double-declining-balance with a switch to straight-line when optimal and with a half-year convention. For the last two classes (15-year and 20-year), the depreciation is 150 percent-declining-balance with a switch to straight-line when optimal and with a half-year convention.

⁷White, Sondhi, and Fried (2003) is a good example. Consult their chapter 8, “Analysis of Long-Lived Assets: Part II—Analysis of Depreciation and Impairment” for review and examples.

Take 5-year property in Exhibit 2-21 as an example. With double-declining-balance, the depreciation each year is $2/5 = 40$ percent of the beginning-of-year book value. However, with a half-year convention, the asset is assumed to be in service for only six months during the first year, and only one half of the depreciation is allowed the first year. After the first year, the depreciation rate is 40 percent of the beginning balance until Year 4, when straight-line depreciation would be at least as large, so we switch to straight-line. In Year 6, we have one-half of a year of the straight-line depreciation remaining because we assumed the asset was placed in service halfway through the first year.

Accelerated depreciation generally improves the NPV of a capital project compared to straight-line depreciation. For an example of this effect, we will assume the same capital project as in Exhibit 2-19, except that the depreciation is MACRS 3-year property. When using straight-line, the depreciation was 20 percent per year (\$35,000). The depreciation percentages for MACRS 3-year property are given in Exhibit 2-21. The first-year depreciation is $0.3333 \times 175,000 = \$58,327.50$, second-year depreciation is $0.4445 \times 175,000 = \$77,787.50$, third-year depreciation is $0.1481 \times 175,000 = \$25,917.50$, fourth-year depreciation is $0.0741 \times 175,000 = \$12,967.50$, and fifth-year depreciation is zero. The impact on the NPV and IRR of the project is shown in Exhibit 2-22.

EXHIBIT 2-22 Capital Budgeting Example with MACRS

Year	0	1	2	3	4	5
Investment outlays:						
Fixed capital	-200,000					
Net working capital	-30,000					
Total	-230,000					
Annual after-tax operating cash flows:						
Sales		220,000	220,000	220,000	220,000	220,000
Cash operating expenses		90,000	90,000	90,000	90,000	90,000
Depreciation		58,328	77,788	25,918	12,968	0
Operating income before taxes		71,673	52,213	104,083	117,033	130,000
Taxes on operating income (40%)		28,669	20,885	41,633	46,813	52,000
Operating income after taxes		43,004	31,328	62,450	70,220	78,000
Add back: Depreciation		58,328	77,788	25,918	12,968	0
After-tax operating cash flow		101,331	109,115	88,367	83,187	78,000
Terminal year after-tax nonoperating cash flows:						
After-tax salvage value						40,000
Return of net working capital						30,000
Total						70,000
Total after-tax cash flows	-230,000	101,331	109,115	88,367	83,187	148,000
Net present value at 10% required rate of return	\$167,403					
Internal rate of return	34.74%					

As the table shows, the depreciation charges still sum to \$175,000 (except for \$2 of rounding), but they are larger in Years 1 and 2 and smaller in Years 3, 4, and 5. Although this method reduces operating income after taxes in Years 1 and 2 (and increases it in Years 3, 4, and 5), it reduces tax outflows in Years 1 and 2 and increases them later. Consequently, the after-tax operating cash flows (which were \$92,000 per year) increase in early years and decrease in later years. This increases the NPV from \$162,217 to \$167,403, a difference of \$5,186. The IRR also increases from 32.70 percent to 34.74 percent.⁸

The impact of accelerated depreciation can be seen without going through the complete analysis in Exhibit 2-22. We previously showed in Exhibit 2-20 that the present value of the depreciation tax savings (which was an annuity of $0.40 \times \$35,000 = \$14,000$ a year for five years) was \$53,071. The present value of the tax savings from accelerated depreciation is shown in Exhibit 2-23.

EXHIBIT 2-23 Present Value of Tax Savings from Accelerated Depreciation

Year	Depreciation	Tax Savings	PV at 10%
1	\$58,327.50	$0.40 \times \$58,327.5 = \$23,331$	\$21,210
2	\$77,787.50	$0.40 \times \$77,787.5 = \$31,115$	\$25,715
3	\$25,917.50	$0.40 \times \$25,917.5 = \$10,367$	\$7,789
4	\$12,967.50	$0.40 \times \$12,967.5 = \$5,187$	\$3,543
5	\$0	$0.40 \times \$0 = \0	\$0
Total present value			\$58,257

By using the accelerated depreciation schedule, we increase the present value of the tax savings from \$53,071 (from Exhibit 2-20) to \$58,257, an increase of \$5,186. The tax deferral associated with the accelerated depreciation (compared to straight-line) adds \$5,186 to the NPV of the project.

There are a myriad of tax and depreciation schedules that apply to investment projects around the world. These tax and depreciation schedules are also subject to change from year to year. To accurately assess the profitability of a particular capital project, it is vital to identify and apply the schedules that are relevant to the capital budgeting decision at hand.

6.2. Cash Flows for a Replacement Project

In Section 5.1, we evaluated the cash flows for an expansion project, basing our after-tax cash flows on the outlays, annual operating cash flows after tax, and salvage value for the project by itself. In many cases, however, investing in a project will be more complicated. Investing could affect many of the company's cash flows. In principle, the cash flows relevant to an investing decision are the incremental cash flows: the cash flows the company realizes *with* the investment compared to the cash flows the company would realize *without* the investment. For

⁸This example assumes that the investment occurs on the first day of the tax year. If the outlay occurs later in the tax year, the depreciation tax savings for the tax years are unchanged, which means that the cash savings occur sooner, increasing their present values. The result is a higher NPV and IRR.

example, suppose we are investing in a new project with an outlay of \$100,000 and we sell off existing assets that the project replaces for \$30,000. The incremental outlay is \$70,000.

A very common investment decision is a replacement decision, in which you replace old equipment with new equipment. This decision requires very careful analysis of the cash flows. The skills required to detail the replacement decision cash flows are also useful for other decisions in which an investment affects other cash flows in the company. We use the term “replacement” loosely, primarily to indicate that the cash flow analysis is more complicated than it was for the simpler expansion decision.

Assume we are considering the replacement of old equipment with new equipment that has more capacity and is less costly to operate. The characteristics of the old and new equipment are given below:

Old Equipment		New Equipment	
Current book value	\$400,000		
Current market value	\$600,000	Acquisition cost	\$1,000,000
Remaining life	10 years	Life	10 years
Annual sales	\$300,000	Annual sales	\$450,000
Cash operating expenses	\$120,000	Cash operating expenses	\$150,000
Annual depreciation	\$40,000	Annual depreciation	\$100,000
Accounting salvage value	\$0	Accounting salvage value	\$0
Expected salvage value	\$100,000	Expected salvage value	\$200,000

If the new equipment replaces the old equipment, an additional investment of \$80,000 in net working capital will be required. The tax rate is 30 percent, and the required rate of return is 8 percent.

The cash flows can be found by carefully constructing tables like Exhibit 2-19 or by using Equations 2-6 through 2-9. The initial outlay is the investment in the new equipment plus the additional investment in net working capital less the after-tax proceeds from selling the old equipment:

$$\text{Outlay} = \text{FCInv} + \text{NWCInv} - \text{Sal}_0 + T(\text{Sal}_0 - B_0)$$

$$\text{Outlay} = 1,000,000 + 80,000 - 600,000 + 0.3(600,000 - 400,000) = \$540,000$$

In this case, the outlay of \$540,000 is \$1,080,000 for new equipment and net working capital minus the after-tax proceeds of \$540,000 the company receives from selling the old equipment. The incremental operating cash flows are

$$\begin{aligned}
 \text{CF} &= [S - C - D](1 - T) + D \\
 &= [(450,000 - 300,000) - (150,000 - 120,000) - (100,000 - 40,000)] \\
 &\quad (1 - 0.30) + (100,000 - 40,000) \\
 &= (150,000 - 30,000 - 60,000)(1 - 0.30) + 60,000 = \$102,000
 \end{aligned}$$

The incremental sales are \$150,000, incremental cash operating expenses are \$30,000, and incremental depreciation is \$60,000. The incremental after-tax operating cash flow is \$102,000 per year.

At the project termination, the new equipment is expected to be sold for \$200,000, which constitutes an incremental cash flow of \$100,000 over the \$100,000 expected salvage price of the old equipment. Since the accounting salvage values for both the new and old equipment were zero, this gain is taxable at 30 percent. The company also recaptures its investment in net working capital. The terminal year after-tax nonoperating cash flow is

$$\begin{aligned}\text{TNOCF} &= \text{Sal}_T + \text{NWCInv} - T(\text{Sal}_T - B_T) \\ &= (200,000 - 100,000) + 80,000 - 0.30[(200,000 - 100,000) - (0 - 0)] \\ &= \$150,000\end{aligned}$$

Once the cash flows are identified, the NPV and IRR are readily found. The NPV, found by discounting the cash flows at the 8 percent required rate of return, is

$$\text{NPV} = -540,000 + \sum_{t=1}^{10} \frac{102,000}{1.08^t} + \frac{150,000}{1.08^{10}} = \$213,907$$

The IRR, found with a financial calculator, is 15.40 percent. Because the NPV is positive, this equipment replacement decision is attractive. The fact that the IRR exceeds the 8 percent required rate of return leads to the same conclusion.

The key to estimating the incremental cash flows for the replacement is to compare the cash flows that occur with the new investment to the cash flows that would have occurred without the new investment. The analyst is comparing the cash flows with a particular course of action to the cash flows with an alternative course of action.

6.3. Spreadsheet Modeling

Although the examples in this book can be readily solved with a financial calculator, capital budgeting is usually done with the assistance of personal computers and spreadsheets such as Microsoft Excel[®]. Spreadsheets are heavily used for several reasons. Spreadsheets provide a very effective way of building even complex models. Built-in spreadsheet functions (such as those for finding rates of return) are easy to use. The model's assumptions can be changed and solved easily. Models can be shared with other analysts, and they also help in presenting the results of the analysis. Example 2-7 shows how a spreadsheet can be used to solve a capital budgeting problem.

EXAMPLE 2-7 Capital Budgeting with a Spreadsheet

Lawton Enterprises is evaluating a project with the following characteristics:

- Fixed capital investment is \$2,000,000.
- The project has an expected six-year life.

- The initial investment in net working capital is \$200,000. At the end of each year, net working capital must be increased so that the cumulative investment in net working capital is one-sixth of the next year's projected sales.
- The fixed capital is depreciated 30 percent in Year 1, 35 percent in Year 2, 20 percent in Year 3, 10 percent in Year 4, 5 percent in Year 5, and 0 percent in Year 6.
- Sales are \$1,200,000 in Year 1. They grow at a 25 percent annual rate for the next two years, and then grow at a 10 percent annual rate for the last three years.
- Fixed cash operating expenses are \$150,000 for Years 1–3 and \$130,000 for Years 4–6.
- Variable cash operating expenses are 40 percent of sales in Year 1, 39 percent of sales in Year 2, and 38 percent in Years 3–6.
- Lawton's marginal tax rate is 30 percent.
- Lawton will sell its fixed capital investments for \$150,000 when the project terminates and recapture its cumulative investment in net working capital. Income taxes will be paid on any gains.
- The project's required rate of return is 12 percent.
- If taxable income on the project is negative in any year, the loss will offset gains elsewhere in the corporation, resulting in a tax savings.

1. Determine whether this is a profitable investment using the NPV and IRR.
2. If the tax rate increases to 40 percent and the required rate of return increases to 14 percent, is the project still profitable?

Solution to 1.

EXHIBIT 2-24 Cash Flows for Lawton Investment (rounded to nearest \$1,000)

Year	0	1	2	3	4	5	6
Fixed capital investment	-2,000						
NWC investments	-200	-50	-63	-31	-34	-38	
Sales		1,200	1,500	1,875	2,063	2,269	2,496
Fixed cash expenses		150	150	150	130	130	130
Variable cash expenses		480	585	713	784	862	948
Depreciation		600	700	400	200	100	0
Operating income before taxes		-30	65	613	949	1177	1417
Taxes on operating income		-9	20	184	285	353	425
Operating income after taxes		-21	45	429	664	824	992
Add back: Depreciation		600	700	400	200	100	0
After-tax operating cash flow		579	745	829	864	924	992
Salvage value							150
Taxes on salvage value							-45
Return of NWC							416
Total after-tax cash flows	-2,200	529	682	798	830	886	1,513
NPV (at $r = 12$ percent)	1,181						
IRR	26.60%						

Because the NPV of \$1,181,000 is positive, the project is profitable for Lawton to undertake. The IRR investment decision rule also indicates that the project is profitable because the IRR of 26.60 percent exceeds the 12 percent required rate of return.

Solution to 2. The tax rate and required return can be changed in the spreadsheet model. When these changes are made, the NPV becomes \$736,000 and the IRR becomes 24.02 percent. (The revised spreadsheet is not printed here.) Although profitability is lower, the higher tax rate and required rate of return do not change the investment decision.

6.4. Effects of Inflation on Capital Budgeting Analysis

Inflation affects capital budgeting analysis in several ways. The first decision the analyst must make is whether to do the analysis in “nominal” terms or in “real” terms. Nominal cash flows include the effects of inflation, while real cash flows are adjusted downward to remove the effects of inflation. It is perfectly acceptable to do the analysis in either nominal or real terms, and sound decisions can be made either way. However, inflation creates some issues regardless of the approach.

The cash flows and discount rate used should both be nominal or both be real. In other words, nominal cash flows should be discounted at a nominal discount rate, and real cash flows should be discounted at a real rate. The real rate, just like real cash flows, has had the effect of inflation taken out. In general, the relationship between real and nominal rates is

$$(1 + \text{Nominal rate}) = (1 + \text{Real rate})(1 + \text{Inflation rate})$$

Inflation reduces the value of depreciation tax savings (unless the tax system adjusts depreciation for inflation). The effect of expected inflation is captured in the discounted cash flow analysis. If inflation is higher than expected, the profitability of the investment is correspondingly lower than expected. Inflation essentially shifts wealth from the taxpayer to the government. Higher-than-expected inflation increases the corporation’s real taxes because it reduces the value of the depreciation tax shelter. Conversely, lower-than-expected inflation reduces real taxes (the depreciation tax shelters are more valuable than expected).

Inflation also reduces the value of fixed payments to bondholders. When bonds are originally issued, bondholders pay a price for the bonds reflecting their inflationary expectations. If inflation is higher than expected, the real payments to bondholders are lower than expected. Higher-than-expected inflation shifts wealth from bondholders to the issuing corporations. Conversely, if inflation is lower than expected, the real interest expenses of the corporation increase, shifting wealth from the issuing corporation to its bondholders.

Finally, inflation does not affect all revenues and costs uniformly. The company’s after-tax cash flows will be better or worse than expected depending on how particular sales outputs or cost inputs are affected. Furthermore, contracting with customers, suppliers, employees, and sources of capital can be complicated as inflation rises.

The capital budgeting model accommodates the effects of inflation, although inflation complicates the capital budgeting process (and the operations of a business, in general).

7. PROJECT ANALYSIS AND EVALUATION

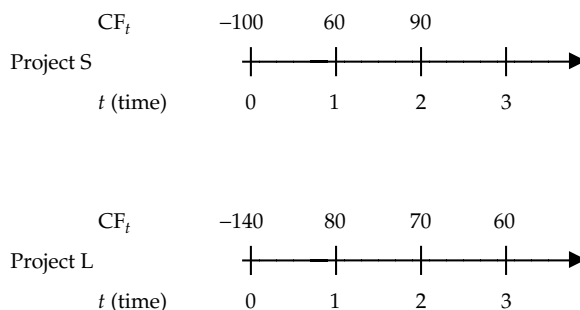
Assessing the opportunity costs and analyzing the risks of capital investments becomes more complex and sophisticated as you examine real cases. The first project interaction we examine in this section is that of comparing mutually exclusive projects with unequal lives. We will briefly describe other project interactions, but will not examine them in detail. We also examine the process of capital budgeting under capital rationing.

Up to this point, we have largely ignored the issue of accounting for risk. We will introduce risk analysis in two ways. The first is accounting for risk on a standalone basis. The second is accounting for risk on a systematic basis.

7.1. Mutually Exclusive Projects with Unequal Lives

We have previously looked at mutually exclusive projects and decided that the best project is the one with the greatest NPV. However, if the mutually exclusive projects have differing lives and the projects will be replaced (or replicated) repeatedly when they wear out, the analysis is more complicated. The analysis of a one-shot (one time only) investment differs from that of an investment chain (in which the asset is replaced regularly in the future).

For example, assume we have two projects with unequal lives of two and three years, with the following after-tax cash flows:



Both projects have a 10 percent required rate of return. The NPV of Project S is \$28.93 and the NPV of Project L is \$35.66. Given that the two projects are mutually exclusive, Project L, with the greater NPV, should be chosen.

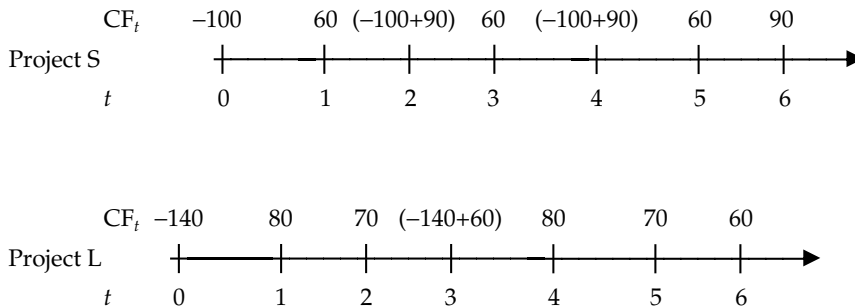
However, let us now assume that these are not one-shot investments, but investments in assets that the company will need to replace when they wear out. Project S would be replaced every two years and Project L every three years. This situation is often referred to as a replacement chain. In this type of problem, you should examine the entire chain and not just the first link in the chain. If the projects are part of a replacement chain, examining the cash flows for only the initial investment for Projects S and L is improper because Project L provides cash flows during Year 3, when Project S provides none.

There are two logically equivalent ways of comparing mutually exclusive projects in a replacement chain. They are the “least common multiple of lives” approach and the “equivalent annual annuity” approach.

7.1.1. Least Common Multiple of Lives Approach

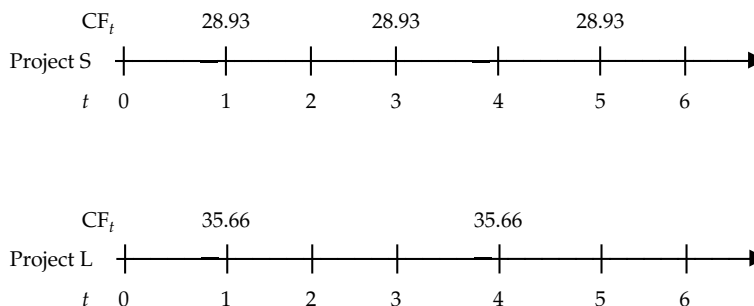
For the least common multiple of lives approach, the analyst extends the time horizon of analysis so that the lives of both projects will divide exactly into the horizon. For Projects S

and L, the least common multiple of 2 and 3 is 6: The two-year project would be replicated three times over the six-year horizon and the three-year project would be replicated two times over the six-year horizon.⁹ The cash flows for replicating Projects S and L over a six-year horizon are shown below.



Discounting the cash flows for the six-year horizon results in an NPV for Project S of \$72.59 and an NPV for Project L of \$62.45. Apparently, investing in Project S and replicating the investment over time has a greater NPV than choosing Project L and replicating it. This decision is the reverse of the one we made when looking solely at the NPVs of the initial investments!

Because the NPV of a single investment represents the present values of its cash flows, you can also visualize the NPV of a replacement chain as the present value of the NPVs of each investment (or link) in the chain. For Projects S and L, the NPVs of each investment are shown on the timelines below:



Investing in Project S is equivalent to receiving values of \$28.93 at times 0, 2, and 4, while investing in Project L is equivalent to receiving values of \$35.66 at times 0 and 3. The present values of these cash flow patterns are \$72.59 for Project S and \$62.45 for Project L. Discounting the NPVs of each investment in the chain is equivalent to discounting all of the individual cash flows in the chain.

7.1.2. Equivalent Annual Annuity Approach

The other method for properly evaluating a replacement chain is called the equivalent annual annuity (EAA) approach. The name for this approach is very descriptive. For an investment

⁹The least common multiple of lives is not necessarily the product of the two lives, as in the case of Projects S and L. For example, if two projects have lives of 8 and 10 years, the least common multiple of lives is 40 years, not 80. Both 8 and 10 are exactly divisible into 40.

project with an outlay and variable cash flows in the future, the project NPV summarizes the equivalent value at time zero. For this same project, the EAA is the annuity payment (series of equal annual payments over the project's life) that is equivalent in value to the NPV.

Analysts can use a simple two-step procedure to find the EAA. The first step is to find the present value of all of the cash flows for an investment—the investment's NPV. The second step is to calculate an annuity payment that has a value equivalent to the NPV. For Project S above, we already calculated the NPV of the project over its two-year life to be \$28.93. The second step is to find an annuity payment for the two-year life that is equivalent. For a two-year life and a 10 percent discount rate, a payment of \$16.66 is the equivalent annuity.

The EAA for Project L is found by annuitizing its \$35.66 NPV over three years, so the EAA for Project L is \$14.34.

The decision rule for the EAA approach is to choose the investment chain that has the highest EAA, which in this case is Project S.

Given these two approaches to comparing replacement chains, which one should the analyst use? As a practical matter, the two approaches are logically equivalent and will result in the same decision.¹⁰ Consequently, the analyst can choose one approach over the other based on personal preference. Or, if the audience for the analyst's work prefers to see the analysis using one approach, the analyst can simply produce the analysis in that format.

7.2. Capital Rationing

Capital rationing is the case in which the company's capital budget has a size constraint. For example, the capital budget is a fixed money amount. A fixed capital budget can place the company in several interesting situations. To illustrate these, we will assume that the company has a fixed \$1,000 capital budget and has the opportunity to invest in four projects. The projects are of variable profitability.

In the first situation, the budget is adequate to invest in all profitable projects. Consider the four projects in Exhibit 2-25.

EXHIBIT 2-25 First Capital Rationing Example

	Investment Outlay	NPV	PI	IRR
Project 1	600	220	1.37	15%
Project 2	200	70	1.35	16%
Project 3	200	−60	0.70	10%
Project 4	400	−100	0.75	8%

In this case, the company has two positive-NPV projects, Projects 1 and 2, which involve a total outlay of \$800. Their total NPV is \$290. The company should choose these projects, and it will have \$200 in its capital budget left over. These excess funds can be used elsewhere

¹⁰For Projects S and L, the NPVs of a replacement chain over the least common multiple of lives (six years) were \$72.59 for Project S and \$62.45 for Project L. If we discount the EAA for Project S (\$16.66) and the EAA for Project L (\$14.34) for six years (treating each as a six-year annuity), we have the same NPVs. Hence, the least common multiple of lives and EAA approaches are consistent with each other.

in the company (moved to someone else's budget, used to pay dividends or repurchase shares, or used to pay down debt). If a manager is afraid to return the excess funds and chooses to invest in Project 3, the manager will consume the whole capital budget but reduce the total NPV to \$230, essentially destroying \$60 of wealth for the company.

A second case exists in which the company has more profitable projects than it can choose, but it is able to invest in the most profitable ones available. Continuing with the \$1,000 capital budget, this second case is illustrated in Exhibit 2-26.

EXHIBIT 2-26 Second Capital Rationing Example

	Investment Outlay	NPV	PI	IRR
Project 5	600	300	1.50	16%
Project 6	200	80	1.40	18%
Project 7	200	60	1.30	12%
Project 8	200	40	1.20	14%

When the analyst has a fixed budget, the PI is especially useful because it shows the profitability of each investment per currency unit invested. If we rank these projects by their PIs, Projects 5, 6, and 7 are the best projects and we are able to select them. This selection results in a total NPV of \$440. The IRRs, shown in the last column, are not a reliable guide to choosing projects under capital rationing because a high-IRR project may have a low NPV. Wealth maximization is best guided by the NPV criterion.

A third case exists in which the company has more profitable projects than it can choose, but it is not able to invest in the most profitable ones available. Assume the company cannot invest in fractional projects: It must take all or none of each project it chooses. Continuing with the \$1,000 capital budget, this case is illustrated in Exhibit 2-27.

EXHIBIT 2-27 Third Capital Rationing Example

	Investment Outlay	NPV	PI	IRR
Project 9	600	300	1.50	15%
Project 10	600	270	1.45	16%
Project 11	200	80	1.40	12%
Project 12	400	100	1.25	11%

In this example, an unlimited budget of \$1,800 would generate a total NPV of \$750. However, when the budget constraint is imposed, the highest NPV results from choosing Projects 9 and 12. The company is forced to choose its best project and its fourth-best project, as indicated by their relative PIs. Any other combination of projects either violates the budget or has a lower total NPV.

Capital rationing has the potential to misallocate resources. Capital markets are supposed to allocate funds to their highest and best uses, with the opportunity cost of funds

(used as the discount rate for NPVs or the hurdle rate for IRRs) guiding this allocation process. Capital rationing violates market efficiency if society's resources are not allocated where they will generate the best returns. Companies that use capital rationing may be doing either "hard" or "soft" capital rationing. Under hard capital rationing, the budget is fixed and the managers cannot go beyond it. Under soft capital rationing, managers may be allowed to over-spend their budgets if they argue effectively that the additional funds will be deployed profitably.

In the case of hard rationing, choosing the optimal projects that fit within the budget and maximize the NPV of the company can be computationally intensive. Sometimes, managers use estimates and trial and error to find the optimal set of projects. The PI can be used as a guide in this trial and error process. Other times, the number of possibilities is so daunting that mathematical programming algorithms are used.

7.3. Risk Analysis of Capital Investments—Standalone Methods

So far, we have evaluated projects by calculating a single NPV to decide whether a project is profitable. We took a single value, or point estimate, of each input into the model and combined the values to calculate the NPV.

Risk is usually measured as a dispersion of outcomes. In the case of standalone risk, we typically measure the riskiness of a project by the dispersion of its NPVs or the dispersion of its IRRs. Sensitivity analysis, scenario analysis, and simulation analysis are very popular standalone risk analysis methods. These risk measures depend on the variation of the project's cash flows.

To illustrate the standalone risk tools, we will use the following "base case" capital project:

Unit price	\$5.00
Annual unit sales	40,000
Variable cost per unit	\$1.50
Investment in fixed capital	\$300,000
Investment in working capital	\$50,000
Project life	6 years
Depreciation (straight-line)	\$50,000
Expected salvage value	\$60,000
Tax rate	40 percent
Required rate of return	12 percent

The outlay, from Equation 2-6, is \$300,000 plus \$50,000, or \$350,000. The annual after-tax operating cash flow, from Equation 2-7, is

$$\begin{aligned}
 CF &= (S - C - D)(1 - T) + D \\
 &= [(5 \times 40,000) - (1.50 \times 40,000) - (50,000)](1 - 0.40) + 50,000 \\
 &= \$104,000
 \end{aligned}$$

The terminal year after-tax nonoperating cash flow, from Equation 2-9, is

$$\begin{aligned} \text{TNOCF} &= \text{Sal}_6 + \text{NWCInv} - T(\text{Sal}_6 - B_6) \\ &= 60,000 + 50,000 - 0.40(60,000 - 0) = \$86,000 \end{aligned}$$

The project NPV is

$$\text{NPV} = -350,000 + \sum_{t=1}^6 \frac{104,000}{1.12^t} + \frac{86,000}{1.12^6} = -350,000 + 471,157 = \$121,157$$

7.3.1. Sensitivity Analysis

Sensitivity analysis calculates the effect on the NPV of changes in one input variable at a time. The base case above has several input variables. If we wish to do a sensitivity analysis of several of them, we must specify the changes in each that we wish to evaluate. Suppose we want to consider the following:

	Base Value	Low Value	High Value
Unit price	\$5.00	\$4.50	\$5.50
Annual unit sales	40,000	35,000	45,000
Variable cost per unit	\$1.50	\$1.40	\$1.60
Expected salvage value	\$60,000	\$30,000	\$80,000
Tax rate	40%	38%	42%
Required rate of return	12%	10%	14%

We have changed each of six input variables. Exhibit 2-28 shows the NPV calculated for the base case. Then the NPV is recalculated by changing one variable from its base case value to its high or low value.

EXHIBIT 2-28 Sensitivity of Project NPV to Changes in a Variable

Variable	Project NPV			Range of Estimates
	Base Case	With Low Estimate	With High Estimate	
Unit price	\$121,157	\$71,820	\$170,494	\$98,674
Annual unit sales	\$121,157	\$77,987	\$164,326	\$86,339
Cost per unit	\$121,157	\$131,024	\$111,289	\$19,735
Salvage value	\$121,157	\$112,037	\$127,236	\$15,199
Tax rate	\$121,157	\$129,165	\$113,148	\$16,017
Required return	\$121,157	\$151,492	\$93,602	\$57,890

As Exhibit 2-28 shows, the project's NPV is most sensitive to changes in the unit price variable. The project's NPV is least sensitive to changes in the salvage value. Roughly

speaking, the project's NPV is most sensitive to changes in unit price and in unit sales. It is least affected by changes in cost per unit, salvage value, and the tax rate. Changes in the required rate of return also have a substantial effect, but not as much as changes in price or unit sales.

In a sensitivity analysis, the manager can choose which variables to change and by how much. Many companies have access to software that can be instructed to change a particular variable by a certain amount—for example, to increase or decrease unit price, unit sales, and cost per unit by 10 percent. The software then produces the changes in NPV for each of these changes. Sensitivity analysis can be used to establish which variables are most influential on the success or failure of a project.

7.3.2. Scenario Analysis

Sensitivity analysis calculates the effect on the NPV of changes in one variable at a time. In contrast, scenario analysis creates scenarios that consist of changes in several of the input variables and calculates the NPV for each scenario. Although corporations could do a large number of scenarios, in practice they usually do only three. They can be labeled variously, but we will present an example with “pessimistic,” “most likely,” and “optimistic” scenarios. Continuing with the basic example from the section above, the values of the input variables for the three scenarios are given in the table in Exhibit 2-29.

EXHIBIT 2-29 Input Variables and NPV for Scenario Analysis

Variable	Scenario		
	Pessimistic	Most Likely	Optimistic
Unit price	\$4.50	\$5.00	\$5.50
Annual unit sales	35,000	40,000	45,000
Variable cost per unit	\$1.60	\$1.50	\$1.40
Investment in fixed capital	\$320,000	\$300,000	\$280,000
Investment in working capital	\$50,000	\$50,000	\$50,000
Project life	6 years	6 years	6 years
Depreciation (straight-line)	\$53,333	\$50,000	\$46,667
Salvage value	\$40,000	\$60,000	\$80,000
Tax rate	40%	40%	40%
Required rate of return	13%	12%	11%
NPV	−\$5,725	\$121,157	\$269,685
IRR	12.49%	22.60%	34.24%

The most likely scenario is the same as the base case we used above for sensitivity analysis, and the NPV for the most likely scenario is \$121,157. To form the pessimistic and optimistic scenarios, managers change several of the assumptions for each scenario. For the pessimistic scenario, several of the input variables are changed to reflect higher costs, lower revenues, and a higher required rate of return. As the table shows, the result is a negative NPV for the

pessimistic scenario and an IRR that is less than the pessimistic scenario's 13 percent required rate of return. For the optimistic scenario, the more favorable revenues, costs, and required rate of return result in very good NPV and IRR.

For this example, the scenario analysis reveals the possibility of an unprofitable investment, with a negative NPV and with an IRR less than the cost of capital. The range for the NPV is fairly large compared to the size of the initial investment, which indicates that the investment is fairly risky. This example included three scenarios for which management wants to know the profitability of the investment for each set of assumptions. Other scenarios can be investigated if management chooses to do so.

7.3.3. Simulation (Monte Carlo) Analysis

Simulation analysis is a procedure for estimating a probability distribution of outcomes, such as for the NPV or IRR for a capital investment project. Instead of assuming a single value (a point estimate) for the input variables in a capital budgeting spreadsheet, the analyst can assume several variables to be stochastic, following their own probability distributions. By simulating the results hundreds or thousands of times, the analyst can build a good estimate of the distributions for the NPV or IRR. Because of the volume of computations, analysts and corporate managers rely heavily on their personal computers and specialized simulation software such as @RISK.¹¹ Example 2-8 presents a simple simulation analysis.

EXAMPLE 2-8 Capital Budgeting Simulation

Gouhua Zhang has made the following assumptions for a capital budgeting project:

- Fixed capital investment is 20,000; no investment in net working capital is required.
- The project has an expected five-year life.
- The fixed capital is depreciated straight-line to zero over a five-year life. The salvage value is normally distributed with an expected value of 2,000 and a standard deviation of 500.
- Unit sales in Year 1 are normally distributed with a mean of 2,000 and a standard deviation of 200.
- Unit sales growth after Year 1 is normally distributed with a mean of 6 percent and standard deviation of 4 percent. Assume the same sales growth rate for Years 2–5.
- The sales price is 5.00 per unit, normally distributed with a standard deviation of 0.25 per unit. The same price holds for all five years.
- Cash operating expenses as a percentage of total revenue are normally distributed with a mean and standard deviation of 30 percent and 3 percent, respectively.
- The discount rate is 12 percent and the tax rate is 40 percent.

¹¹@RISK is a popular and powerful risk analysis tool sold by Palisade Corporation. @RISK is an add-in for Microsoft Excel that allows simulation techniques to be incorporated into spreadsheet models.

1. What are the NPV and IRR using the expected values of all input variables?
2. Perform a simulation analysis and provide probability distributions for the NPV and IRR.

Solution to 1.

EXHIBIT 2-30 Expected Cash Flows for Simulation Example

Time	0	1	2	3	4	5
Fixed capital	-20,000					
After-tax salvage value						1,200
Price		5.00	5.00	5.00	5.00	5.00
Output		2,000	2,120	2,247	2,382	2,525
Revenue		10,000	10,600	11,236	11,910	12,625
Cash operating expenses		3,000	3,180	3,371	3,573	3,787
Depreciation		4,000	4,000	4,000	4,000	4,000
Operating income before taxes		3,000	3,420	3,865	4,337	4,837
Taxes on operating income		1,200	1,368	1,546	1,735	1,935
Operating income after taxes		1,800	2,052	2,319	2,602	2,902
Depreciation		4,000	4,000	4,000	4,000	4,000
Total after-tax cash flow	-20,000	5,800	6,052	6,319	6,602	8,102
NPV (at $r = 12$ percent)	3,294					
IRR	18.11%					

Based on the point estimates for each variable (the mean values for each), which are shown in Exhibit 2-30 above, Zhang should find the NPV to be 3,294 and the IRR to be 18.11 percent.

Solution to 2. Zhang performs a simulation using @RISK with 10,000 iterations. For each iteration, values for the five stochastic variables (price, output, output growth rate, cash expense percentage, and salvage value) are selected from their assumed distributions and the NPV and IRR are calculated. After the 10,000 iterations, the resulting information about the probability distributions for the NPV and IRR is shown in Exhibits 2-31 and 2-32.

As shown, the distributions for the NPV and IRR are somewhat normal looking. The means and standard deviations for each are given in Exhibit 2-32. Both distributions have a slight positive skewness, which means the distributions are skewed to the right. The two kurtosis values are fairly close to 3.0, which means that the distributions are not peaked or fat-tailed compared to the standard normal distribution. The median is the value at which 50 percent of the 10,000 outcomes fall on either side. The 90 percent confidence intervals show that 90 percent of the observations fall between -379 and 7,413 for the NPV and between 11.38 percent and 25.13 percent

for the IRR. Although not shown in the table, 7.04 percent of the observations had a negative NPV and an IRR less than the 12 percent discount rate.

The means of the NPV and IRR from the simulation (in Exhibit 2-32) are fairly close to their values calculated using point estimates for all of the input variables (in Exhibit 2-30). This is not always the case, but it is here. The additional information from a simulation is the dispersions of the NPV and IRR. Given his assumptions and model, the simulation results show Zhang the distributions of NPV and IRR outcomes that should be expected. Managers and analysts often prefer to know these total distributions rather than just their mean values.

EXHIBIT 2-31 Probability Distributions for NPV and IRR

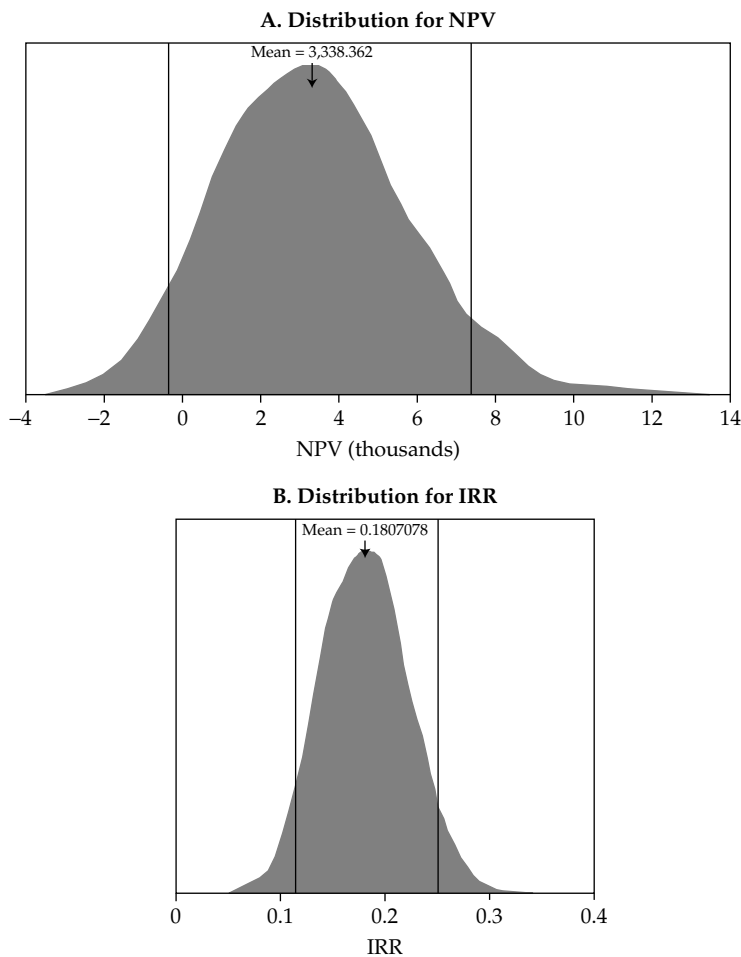


EXHIBIT 2-32 Summary Statistics for NPV and IRR

Statistic	NPV	IRR
Mean	3,338	18.07%
Standard deviation	2,364	4.18%
Skewness	0.2909	0.1130
Kurtosis	3.146	2.996
Median	3,236	18.01%
90% confidence interval	−379 to 7,413	11.38% to 25.13%

Correlations between Input Variables and NPV and IRR

Input Variable	NPV	IRR
Output	0.71	0.72
Output growth rate	0.49	0.47
Price	0.34	0.34
Cash expense proportion	−0.28	−0.29
Salvage value	0.06	0.05

The correlations in Exhibit 2-32 can be interpreted as sensitivity measures. Changes in the “output” variable have the highest correlation with NPV and IRR outcomes. The salvage value has the lowest (absolute value) correlation.

This capital budgeting simulation example was not very complex, with only five stochastic variables. The example’s five input variables were assumed to be normally distributed—in reality, many other distributions can be employed. Finally, the randomly chosen values for each variable were assumed to be independent. They can be selected jointly instead of independently. Simulation techniques have proved to be a boon for addressing capital budgeting problems.

Sensitivity analysis, scenario analysis, and simulation analysis are well-developed standalone risk analysis methods. These risk measures depend on the variation of the project’s cash flows. Market risk measures, presented in the next section, depend not only on the variation of a project’s cash flows, but also on how those cash flows covary with (or correlate with) market returns.

7.4. Risk Analysis of Capital Investments—Market Risk Methods

When using market risk methods, the discount rate to be used in evaluating a capital project is the rate of return required on the project by a diversified investor. The discount rate should thus be a risk-adjusted discount rate, which includes a premium to compensate investors for risk.¹² This risk premium should reflect factors that are priced or valued in the marketplace. The two

¹²Our approach to capital budgeting is to discount expected cash flows at a risk-adjusted cost of capital. An alternative approach, which is also conceptually sound, is the “certainty-equivalent method.” In this method, certainty-equivalent cash flows (expected cash flows that are reduced to certainty equivalents) are valued by discounting them at a risk-free discount rate. The use of risk-adjusted discount rates is more intuitive and much more popular.

equilibrium models for estimating this risk premium are the capital asset pricing model (CAPM) and arbitrage pricing theory (APT). We will discuss the CAPM as a way of finding risk-adjusted discount rates, although you should be aware that other methods can be used.

In the CAPM, total risk can be broken into two components: systematic risk and unsystematic risk. Systematic risk is the portion of risk that is related to the market and that cannot be diversified away. Unsystematic risk is nonmarket risk, risk that is idiosyncratic and that can be diversified away. Diversified investors can demand a risk premium for taking systematic risk, but not unsystematic risk.¹³ Hence, the standalone risk measures—total risk measured by the dispersion of the NPV or the IRR—are inappropriate when the corporation is diversified, or, as is more likely, when the corporation's investors are themselves diversified.

In the capital asset pricing model, a project's or asset's "beta," or β , is generally used as a measure of systematic risk. The security market line (SML) expresses the asset's required rate of return as a function of β :

$$r_j = R_F + \beta_i[E(R_M) - R_F] \quad (2-10)$$

where

r_i = required return for project or asset i

R_F = risk-free rate of return

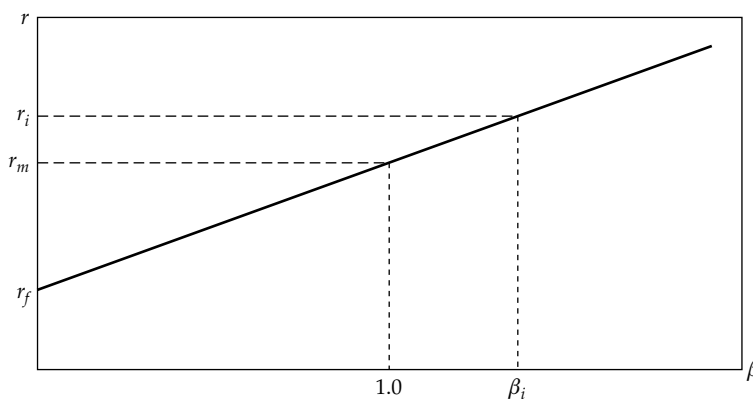
β_i = beta of project or asset i

$[E(R_M) - R_F]$ = market risk premium, the difference between the expected market return and the risk-free rate of return

The project's required rate of return is equal to the risk-free rate plus a risk premium, where the risk premium is the product of the project beta and the market risk premium.

Here, the required rate of return (sometimes called a hurdle rate) is specific to the risk of the project. There is no one hurdle rate appropriate for all projects.

EXHIBIT 2-33 SML for Capital Budgeting Projects



¹³The capital asset pricing model uses this intuition to show how risky assets should be priced relative to the market. While the CAPM assigns a single market risk premium for each security, the APT develops a set of risk premia. The CAPM and APT are developed in detail elsewhere in the CFA curriculum.

The security market line (SML) is graphed in Exhibit 2-33. This line indicates the required rate of return for a project, given its beta. The required rate of return can be used in two ways:

1. The SML is used to find the required rate of return. The required rate of return is then used to find the NPV. Positive NPV projects are accepted and negative NPV projects are rejected.
2. The SML is used to find the required rate of return. The project's IRR is compared to the required rate of return. If the IRR is greater than the required return, the project is accepted (this point would plot above the SML in Exhibit 2-33). If the IRR is less than the required rate of return (below the SML), the project is rejected.

Example 2-9 illustrates how the capital asset pricing model and the security market line are used as part of the capital budgeting process.

EXAMPLE 2-9 Using the SML to Find the Project Required Rate of Return

Premont Systems is evaluating a capital project with the following characteristics:

- The initial outlay is €150,000.
- Annual after-tax operating cash flows are €28,000.
- After-tax salvage value at project termination is €20,000.
- Project life is 10 years.
- The project beta is 1.20.
- The risk-free rate is 4.2 percent and the expected market return is 9.4 percent.

1. Compute the project NPV. Should the project be accepted?
2. Compute the project IRR. Should the project be accepted?

Solution to 1. The project required rate of return is

$$r_i = R_F + \beta_i[E(R_M) - R_F] = 4.2\% + 1.20(9.4\% - 4.2\%) = 4.2\% + 6.24\% = 10.44\%$$

The cash flows discounted at 10.44 percent give an NPV of

$$\text{NPV} = -150,000 + \sum_{t=1}^{10} \frac{28,000}{1.1044^t} + \frac{20,000}{1.1044^{10}} = €26,252$$

The project should be accepted because it has a positive NPV.

Solution to 2. The IRR, found with a financial calculator, is 14.24 percent. The required rate of return, established with the SML as in the solution to Question 1 above, is 10.44 percent. Since the IRR exceeds the required rate of return, the project should be accepted. For a beta of 1.20, the IRR of 14.24 percent would plot above the SML.

Using project betas to establish required rates of return for capital projects is especially important when a project's risk differs from that of the company. The cost of capital for a company is estimated for the company as a whole—it is based on the average riskiness of the company's assets as well as its financial structure. The required rates of return of debt and equity are used to estimate the weighted (overall) average cost of capital (WACC) for the company. When a project under consideration is more risky or less risky than the company, the WACC should not be used as the project required rate of return.

For example, assume that the risk-free rate of return is 3 percent, the market return is 8 percent, and the company beta is 0.9. Assume also that the company is considering three projects: Project A with a 0.5 beta, Project B with a 0.9 beta, and Project C with a 1.1 beta. The required rates of return for the company and for each project are as follows:

Company:	$3\% + 0.9(8\% - 3\%) = 7.5\%$
Project A:	$3\% + 0.5(8\% - 3\%) = 5.5\%$
Project B:	$3\% + 0.9(8\% - 3\%) = 7.5\%$
Project C:	$3\% + 1.1(8\% - 3\%) = 8.5\%$

If management uses the company WACC as the required return for all projects, this rate is too high for Project A, making it less likely that Project A would be accepted. Project B has the same risk as the company, so it would be evaluated fairly. Using the WACC for Project C makes the error of using a discount rate that is too low, which would make it more likely that this high-risk project would be accepted. Whenever possible, it is desirable to use project-specific required rates of return instead of the company's overall required rate of return.

Market returns are readily available for publicly traded companies. The stock betas of these companies can then be calculated, and this calculation assists in estimating the companies' betas and WACC. Unfortunately, however, the returns for specific capital projects are not directly observable, and we have to use proxies for their betas. Frequently, we can employ the pure-play method, in which the analyst identifies other publicly traded stocks in the same business as the project being considered. The betas for the stocks of these companies are used to estimate a project beta. In the pure-play method, these proxy companies need to be relatively focused in the same line of business as the project. When the pure-play method is not possible, other methods, such as estimating accounting betas or cross-sectional regression analysis, are used.

7.5. Real Options

Real options are capital budgeting options that allow managers to make decisions in the future that alter the value of capital budgeting investment decisions made today. Instead of making all capital budgeting decisions now, at time zero, managers can wait and make additional decisions at future dates when these future decisions are contingent upon future economic events or information. These sequential decisions, in which future decisions depend on the decisions made today as well as on future economic events, are very realistic capital budgeting applications.

Real options are like financial options—they just deal with real assets instead of financial assets. A simple financial option could be a call option on a share of stock. Suppose the stock is selling for \$50, the exercise (strike) price is \$50, and the option expires in one year. If the stock goes up to \$60, you exercise the option and have a gain of \$10 in one year. If the stock

goes down to \$40, you do not exercise, and you have no gain. However, no gain is better than the \$10 loss you would have had if you had purchased the stock at the beginning of the year. Real options, like financial options, entail the right to make a decision, but not the obligation. The corporation should exercise a real option only if it is value-enhancing.

Just as financial options are contingent on an underlying asset, real options are contingent on future events. The flexibility that real options give to managers can greatly enhance the NPV of the company's capital investments. The following are several types of these real options:

Timing options. Instead of investing now, the company can delay investing. Delaying an investment and basing the decision on hopefully improved information that you might have in, say, a year could help improve the NPV of the projects selected.

Sizing options. If after investing, the company can abandon the project when the financial results are disappointing, it has an **abandonment option**. At some future date, if the cash flow from abandoning a project exceeds the present value of the cash flows from continuing the project, managers should exercise the abandonment option. Conversely, if the company can make additional investments when future financial results are strong, the company has a **growth option** or an **expansion option**.

Flexibility options. Once an investment is made, other operational flexibilities may be available besides abandonment or expansion. For example, suppose demand exceeds capacity. Management may be able to exercise a **price-setting option**. By increasing prices, the company could benefit from the excess demand, which it cannot do by increasing production. There are also **production-flexibility** options. Even though it is expensive, the company can profit from working overtime or from adding additional shifts. The company can also work with customers and suppliers for their mutual benefit whenever a demand–supply mismatch occurs. This type of option also includes the possibility of using different inputs or producing different outputs.

Fundamental options. In cases like those above, there are options embedded in a project that can raise its value. In other cases, the whole investment is essentially an option. The payoffs from the investment are contingent on an underlying asset, just like most financial options. For example, the value of an oil well or refinery investment is contingent upon the price of oil. The value of a gold mine is contingent upon the price of gold. If oil prices are low, you may not drill a well. If oil prices are high, you go ahead and drill. Many R&D (research and development) projects also look like options.

There are several approaches to evaluating capital budgeting projects with real options. One of the difficulties with real options is that the analysis can be very complicated. Although some of the problems are simple and can be readily solved, many of them are so complex that they are expensive to evaluate or you may not have much confidence in the analysis. Four commonsense approaches to real options analysis are presented below.

1. Use discounted cash flow (DCF) analysis without considering options. If the NPV is positive without considering real options, and the project has real options that would simply add more value, it is unnecessary to evaluate the options. Just go ahead and make the investment.
2. Consider the Project NPV = NPV (based on DCF alone) – Cost of options + Value of options. Go ahead and calculate the NPV based on expected cash flows. Then simply add the value associated with real options. For example, if a project has a negative NPV based on DCF alone of \$50 million, will the options add at least that much to its value?

3. Use decision trees. Although they are not as conceptually sound as option pricing models, decision trees can capture the essence of many sequential decision making problems.
4. Use option pricing models. Except for simple options, the technical requirements for solving these models may require you to hire special consultants or “quants.” Some large companies have their own specialists.

The analyst is confronted with (1) a variety of real options that investment projects may possess and (2) a decision about how to reasonably value these options. Example 2-10 deals with production flexibility; in this case, an additional investment outlay gives the company an option to use alternative fuel sources.

EXAMPLE 2-10 Production-Flexibility Option

Sackley AquaFarms estimated the NPV of the expected cash flows from a new processing plant to be $-\$0.40$ million. Sackley is evaluating an incremental investment of $\$0.30$ million that would give management the flexibility to switch between coal, natural gas, and oil as an energy source. The original plant relied only on coal. The option to switch to cheaper sources of energy when they are available has an estimated value of $\$1.20$ million. What is the value of the new processing plant including this real option to use alternative energy sources?

Solution. The NPV, including the real option, should be:

$$\text{Project NPV} = \text{NPV (based on DCF alone)} - \text{Cost of options} + \text{Value of options}$$

$$\text{Project NPV} = -0.40 \text{ million} - 0.30 \text{ million} + 1.20 \text{ million} = \$0.50 \text{ million}$$

Without the flexibility offered by the real option, the plant is unprofitable. The real option to adapt to cheaper energy sources adds enough to the value of this investment to give it a positive NPV.

Two of the most valuable options are to abandon or expand a project at some point after the original investment. Example 2-11 illustrates the abandonment option.

EXAMPLE 2-11 Abandonment Option

Nyberg Systems is considering a capital project with the following characteristics:

- The initial outlay is €200,000.
- Project life is four years.
- Annual after-tax operating cash flows have a 50 percent probability of being €40,000 for the four years and a 50 percent probability of being €80,000.

- Salvage value at project termination is zero.
- The required rate of return is 10 percent.
- In one year, after realizing the first-year cash flow, the company has the option to abandon the project and receive the salvage value of €150,000.

1. Compute the project NPV assuming no abandonment.
2. What is the optimal abandonment strategy? Compute the project NPV using that strategy.

Solution to 1. The expected annual after-tax operating cash flow is $0.50(40,000) + 0.50(80,000) = €60,000$. The cash flows discounted at 10 percent give an NPV of

$$NPV = -200,000 + \sum_{t=1}^4 \frac{60,000}{1.10^t} = -€9,808$$

The project should be rejected because it has a negative NPV.

Solution to 2. The optimal abandonment strategy would be to abandon the project in one year if the subsequent cash flows are worth less than the abandonment value. If at the end of the first year the low cash flow occurs, you can abandon for €150,000 and give up €40,000 for the following three years. The €40,000 annual cash flow, discounted for three years at 10 percent, has a present value of only €99,474, so you should abandon. Three years of the higher €80,000 cash flow has a present value of €198,948, so you should not abandon. After the first year, abandon if the low cash flow occurs, and do not abandon if the high cash flow occurs.

If the high cash flow occurs and you do not abandon, the NPV is

$$NPV = -200,000 + \sum_{t=1}^4 \frac{80,000}{1.10^t} = €53,589$$

If you abandon when the low cash flow occurs, you receive the first year cash flow and the abandonment value and then no further cash flows. In that case, the NPV is

$$NPV = -200,000 + \frac{40,000 + 150,000}{1.10} = €27,273$$

The expected NPV is then

$$NPV = 0.50(53,589) + 0.50(-27,273) = €13,158$$

Optimal abandonment raises the NPV by $13,158 - (-€9,808) = €22,966$.

A fundamental real option could be a gold mine or an oil well. Example 2-12 looks at the possibility of purchasing the rights to a gold mining property.

EXAMPLE 2-12 Erichmann Gold Mine

The Erichmann family has offered a five-year option on one of its small gold mining properties for \$10 million. The current price of gold is \$400 per ounce. The mine holds an estimated 500,000 ounces that could be mined at an average cost of \$450 per ounce. The maximum production rate is 200,000 ounces per year. How would you assess the Erichmann family's offer?

Solution. A binomial option model can be built for the underlying price of gold. These binomial models are very common in assessing the value of financial options such as puts and calls on stocks, callable bonds, or mortgages with prepayment options. Whenever the price path for gold is above \$450 per ounce, it might be attractive to commence mining. Of course, you would cease mining whenever the price is lower. With additional information about the volatility of gold prices and the risk-free interest rate, an expert could build this binomial model and value the real option. Comparing the value of this real option to its \$10 million cost would enable you to make an investment decision.

A critical assumption of many applications of traditional capital budgeting tools is that the investment decision is made now, with no flexibility considered in future decisions. A more reasonable approach is to assume that the corporation is making sequential decisions, some now and some in the future. A combination of optimal current and future decisions is what will maximize company value. Real options analysis tries to incorporate rational future decisions into the assessment of current investment decision making. This future flexibility, exercised intelligently, enhances the value of capital investments. Some real options can be valued with readily available option pricing models, such as the binomial model or the Black–Scholes–Merton option pricing model.¹⁴ Unfortunately, many real options are very complex and hard to value, which poses a challenge as the analyst tries to lay out the economic contingencies of an investment and assess their values. A real option, with the future flexibility it provides, can be an important piece of the value of many projects.

7.6. Common Capital Budgeting Pitfalls

Although the principles of capital budgeting may be easy to learn, applying the principles to real world investment opportunities can be challenging. Some of the common mistakes that managers make are listed in Exhibit 2-34.

Economic responses. Economic responses to an investment often affect its profitability, and these responses have to be correctly anticipated. For example, in response to a successful investment, competitors can enter and reduce the investment's profitability. Similarly, vendors, suppliers, and employees may want to gain from a profitable enterprise. Companies that

¹⁴Chapter 4 of Chance (2003) gives an excellent overview of option pricing models.

EXHIBIT 2-34 Common Capital Budgeting Pitfalls

Not incorporating economic responses into the investment analysis

Misusing capital budgeting templates

Pet projects

Basing investment decisions on EPS, net income, or return on equity

Using IRR to make investment decisions

Bad accounting for cash flows

Overhead costs

Not using the appropriate risk-adjusted discount rate

Spending all of the investment budget just because it is available

Failure to consider investment alternatives

Handling sunk costs and opportunity costs incorrectly

make highly profitable investments often find that a competitive marketplace eventually causes profitability to revert to normal levels.

Template errors. Because hundreds or even thousands of projects need to be analyzed over time, corporations have standardized capital budgeting templates for managers to use in evaluating projects. This situation creates risks in that the template model may not match the project, or employees may input inappropriate information.

Pet projects. Pet projects are projects that influential managers want the corporation to invest in. Ideally, pet projects will receive the normal scrutiny that other investments receive and will be selected on the strength of their own merits. Often, unfortunately, pet projects are selected without undergoing normal capital budgeting analysis. Or the pet project receives the analysis, but overly optimistic projections are used to inflate the project's profitability.

EPS, net income, or ROE. Managers sometimes have incentives to boost EPS, net income, or ROE. Many investments, even those with strong NPVs, do not boost these accounting numbers in the short run and may even reduce them. Paying attention to short-run accounting numbers can result in choosing projects that are not in the long-run economic interests of the business.

Basing decisions on the IRR. The NPV criterion is economically sound. The IRR criterion is also sound for independent projects (with conventional cash flow patterns). If projects are mutually exclusive or competitive with each other, investing in projects based on the IRR will tend to result in choosing smaller, short-term projects with high IRRs at the expense of larger, longer-term, high NPV projects. Basing decisions on paybacks or accounting rates of return is even more dangerous. These measures can be economically unsound.

Bad accounting for cash flows. In analyzing a complicated project, it is easy to omit relevant cash flows, double count cash flows, and mishandle taxes.

Overhead costs. In large companies, the cost of a project must include the overhead it generates for such things as management time, information technology support, financial systems, and other support. Although these items are hard to estimate, over- or under-estimating these overhead costs can lead to poor investment decisions.

Discount rate errors. The required rate of return for a project should be based on its risk. If a project is being financed with debt (or with equity), you should still use the project's

required rate of return and not the cost of debt (or the cost of equity). Similarly, a high-risk project should not be discounted at the company's overall cost of capital, but at the project's required rate of return. Discount rate errors have a huge impact on the computed NPVs of long-lived projects.

Overspending and underspending the capital budget. Politically, many managers will spend all of their budget and argue that their budget is too small. In a well-run company, managers will return excess funds whenever their profitable projects cost less than their budget, and managers will make a sound case for extra funds if their budget is too small.

Failure to consider investment alternatives. Generating good investment ideas is the most basic step in the capital budgeting process, and many good alternatives are never even considered.

Sunk costs and opportunity costs. Ignoring sunk costs is difficult for managers to do. Furthermore, not identifying the economic alternatives (real and financial) that are the opportunity costs is probably the biggest failure in much analysis. Only costs that change with the decision are relevant.

8. OTHER INCOME MEASURES AND VALUATION MODELS

Capital budgeting was one of the first widespread applications of discounted cash flow analysis. In the basic capital budgeting model, the analyst values an investment by discounting future after-tax cash flows at the rate of return required by investors. Subtracting the initial investment results in the project's NPV. The future cash flows consist of after-tax operating cash flows plus returns of investment (such as salvage value and sale of working capital).

Analysts will employ and encounter other concepts of income and other valuation approaches besides this basic capital budgeting model. Because some of these other approaches are economically sound and widely employed, we will briefly describe some of them here. By considering these approaches, you can see the distinguishing features of each approach and that they should result in consistent valuations (if they are used correctly).

To facilitate the comparison of income measures and valuation models, we will employ as an example a simple company (the Granite Corporation) that invests in one project. The company goes out of business when that project expires. After evaluating that project with the NPV and IRR capital budgeting models, we will examine that same project using the following alternative methods:

- Economic income and accounting income
- Economic profit valuation
- Residual income valuation
- Claims valuation

Our purpose is to show how the various income measures and valuation methods are related to each other.

8.1. The Basic Capital Budgeting Model

The basic capital budgeting model (presented earlier) identifies the after-tax operating cash flows from an investment as well as nonoperating cash flows (such as the initial investment or future recovery of invested capital or net working capital). Then, these cash flows are discounted at the required rate of return for the asset to establish the NPV.

The base-case capital budgeting project is the following. The company is going to invest \$150,000 and generate sales for the next five years as shown in Exhibit 2-35. Variable cash operating expenses will be 50 percent of sales each year, and fixed cash operating expenses are \$20,000. Depreciation is straight-line to zero, \$30,000 per year with a zero book value at the end of five years. The income tax rate is 40 percent. Salvage value is \$10,000, which is taxable at 40 percent, leaving an after-tax salvage value of \$6,000 at the end of five years. The required rate of return is 10 percent.

EXHIBIT 2-35 Basic Capital Budgeting Example for Granite Corporation

Year	0	1	2	3	4	5
Fixed capital investment	−150,000					
Sales		150,000	200,000	250,000	200,000	150,000
Variable cash expenses		75,000	100,000	125,000	100,000	75,000
Fixed cash expenses		20,000	20,000	20,000	20,000	20,000
Depreciation		30,000	30,000	30,000	30,000	30,000
Operating income before taxes		25,000	50,000	75,000	50,000	25,000
Taxes at 40 percent		10,000	20,000	30,000	20,000	10,000
Operating income after taxes		15,000	30,000	45,000	30,000	15,000
After-tax operating cash flow		45,000	60,000	75,000	60,000	45,000
Salvage value						10,000
Taxes on salvage value						4,000
After-tax salvage value						6,000
Total after-tax cash flow	−150,000	45,000	60,000	75,000	60,000	51,000
NPV (at $r = 10$ percent)	69,492					
IRR	26.27%					

The present value of the after-tax cash flows for Years 1–5 is \$219,492. Subtracting the investment of \$150,000 results in the NPV of \$69,492. The IRR for the investment is 26.27 percent.

8.2. Economic and Accounting Income

Economic income and accounting income differ from the after-tax operating cash flows used in the basic capital budgeting model.

Economic income is the profit realized from an investment. For a given year, economic income is the investment's after-tax cash flow plus the change in the market value:

$$\text{Economic income} = \text{Cash flow} + \text{Change in market value}$$

$$\text{Economic income} = \text{Cash flow} + (\text{Ending market value} - \text{Beginning market value})$$

(2-11)

or

$$\text{Economic income} = \text{Cash flow} - (\text{Beginning market value} - \text{Ending market value})$$

$$\text{Economic income} = \text{Cash flow} - \text{Economic depreciation}^{15}$$

For the Granite Corporation, the cash flows are already calculated in Exhibit 2-35. The beginning market value at time zero is the present value of the future after-tax cash flows at the 10 percent required rate of return, or \$219,492. The market value at any future date is the present value of subsequent cash flows discounted back to that date. For the Granite Corporation, the cash flows, changes in market value, and economic incomes are shown in Exhibit 2-36.

EXHIBIT 2-36 Economic Income for Granite Corporation

Year	1	2	3	4	5
Beginning market value	219,492	196,441	156,086	96,694	46,364
Ending market value	196,441	156,086	96,694	46,364	0
Change in market value	-23,051	-40,356	-59,391	-50,331	-46,364
After-tax cash flow	45,000	60,000	75,000	60,000	51,000
Economic income	21,949	19,644	15,609	9,669	4,636
Economic rate of return	10%	10%	10%	10%	10%

In Year 1, the beginning value is \$219,492 and the ending value is \$196,441, so the change in value is $-\$23,051$. The economic income is the cash flow plus the change in value, or $\$45,000 + (-\$23,051) = \$21,949$. The economic income for Years 2–5 is found similarly. The economic rate of return is the year's economic income divided by its beginning market value. Notice that the economic rate of return is precisely 10 percent each year, which was the required rate of return on the project.

Accounting income for this company will differ from the economic income for two reasons. First, the accounting depreciation is based on the original cost of the investment (not the market value of the investment). Consequently, the accounting depreciation schedule does not follow the declines in the market value of an asset. Besides being based on accounting depreciation instead of economic depreciation, accounting net income is the after-tax income remaining after paying interest expenses on the company's debt obligations. In contrast, interest expenses are ignored when computing the economic income for an asset or the after-tax operating cash flows in the basic capital budgeting model. As explained in Section 3, the effects of financing costs are captured in the discount rate, not in the cash flows. In the capital

¹⁵These equations are conceptually identical because economic depreciation is the negative of the change in market value. For example, assume the cash flow is 10, the beginning market value is 30, and the ending market value is 25. Cash flow + Change in market value = Cash flow + (Ending market value – Beginning market value) = $10 + (25 - 30) = 5$. Or, Cash flow – Economic depreciation = Cash flow – (Beginning market value – Ending market value) = $10 - (30 - 25) = 5$.

budgeting model, if we included interest expenses in the cash flows, we would be double counting them.

To illustrate these differences, we will assume that the company borrows an amount equal to one-half of the value of the company, which is 50 percent of \$219,492, or \$109,746, and that it pays $8\frac{1}{3}$ percent interest each year on the beginning balance. With a 40 percent tax rate, the after-tax interest cost is $8\frac{1}{3}$ percent $(1 - 0.40) = 5.0$ percent. Because the Granite Corporation has a five-year life, it does not need to borrow or retain earnings for the future,

EXHIBIT 2-37 Condensed Financial Statements for Granite Corporation

Year	0	1	2	3	4	5
Balance Sheets:						
Assets	150,000	120,000	90,000	60,000	30,000	0
Liabilities	109,746	98,221	78,043	48,347	23,182	0
Net worth	40,254	21,779	11,957	11,653	6,818	0
Income Statements:						
Sales		150,000	200,000	250,000	200,000	150,000
Variable cash expenses		75,000	100,000	125,000	100,000	75,000
Fixed cash expenses		20,000	20,000	20,000	20,000	20,000
Depreciation		30,000	30,000	30,000	30,000	30,000
EBIT		25,000	50,000	75,000	50,000	25,000
Interest expense		9,146	8,185	6,504	4,029	1,932
EBT		15,854	41,815	68,496	45,971	23,068
Taxes at 40 percent		6,342	16,726	27,399	18,388	9,227
Net income before salvage		9,513	25,089	41,098	27,583	13,841
After-tax salvage value						6,000
Net income		9,513	25,089	41,098	27,583	19,841
Statements of Cash Flows:						
Operating cash flows:						
Net income		9,513	25,089	41,098	27,583	19,841
Depreciation		30,000	30,000	30,000	30,000	30,000
Total		39,513	55,089	71,098	57,583	49,841
Financing cash flows:						
Debt repayment		-11,525	-20,178	-29,696	-25,165	-23,182
Dividends/repurchases		-27,987	-34,911	-41,402	-32,417	-26,659
Total		-39,513	-55,089	-71,098	-57,583	-49,841
Investing cash flows		0	0	0	0	0
Total cash flows		0	0	0	0	0

and all cash flows will be distributed to bondholders and stockholders. Granite will maintain a 50 percent debt/value ratio on the company's debt, so bondholders will receive $8\frac{1}{3}$ percent interest on their beginning bond balance and the debt will also be amortized (paid down) whenever the value of the company goes down. Furthermore, after all operating costs, interest expenses, and taxes are paid, stockholders will receive all remaining cash flows each year as a cash dividend or share repurchase.¹⁶

The financial statements for the Granite Corporation are shown in Exhibit 2-37.

The income statement for financial reporting purposes differs from that used in the capital budgeting model because the interest on debt obligations is now taken out as an expense before arriving at net income. The book value of the company's assets is based on the original accounting cost minus accumulated accounting depreciation. Note that the liabilities and net worth are also declining in the balance sheet. The liabilities decline each year, reflecting the amounts that were paid annually to reduce the principal of the loan. Notice, also, that the net worth is declining. Normally, the net worth of a company increases because beginning equity is increased by net retentions—the excess of net income over dividends paid. In this case, the company is shrinking and going out of business in five years, so the distributions to shareholders (which can be either cash dividends or share repurchases) exceed net income and net worth declines. The amounts that are paid each year to reduce debt and for dividends/share repurchases are shown in the financing section of the statement of cash flows.

Accounting measures of performance also can differ from economic measures of performance. Exhibit 2-38 repeats the economic income and accounting income from Exhibits 2-36 and 2-37. The exhibit also shows the economic rate of return each year and two popular accounting measures of performance: the return on equity (ROE = net income divided by beginning equity) and return on assets (ROA = EBIT divided by beginning assets).

EXHIBIT 2-38 Economic Income, Accounting Income, and Rates of Return for Granite Corporation

Year	1	2	3	4	5
Economic income	21,949	19,644	15,609	9,669	4,636
Accounting income	9,513	25,089	41,098	27,583	19,841
Economic rate of return	10.00%	10.00%	10.00%	10.00%	10.00%
Return on equity (ROE)	23.63%	115.20%	343.71%	236.70%	291.00%
Return on assets (ROA)	16.67%	41.67%	83.33%	83.33%	83.33%

As Exhibit 2-38 illustrates, economic and accounting incomes differ substantially. Over the five years, economic income is much less than accounting income, and the patterns certainly differ. In addition, the accounting rates of return, the ROE and ROA, for this admittedly unusual company are quite different from the economic rate of return.

¹⁶The assumptions may be unrealistic, but this is a very simple corporation.

8.3. Economic Profit, Residual Income, and Claims Valuation

Although the capital budgeting model is widely employed, analysts have used other procedures to divide up the cash flows from a company or project and then value them using discounted cash flow methods. We present three of these alternative models here: the economic profit model, the residual income model, and the claims valuation model. Used correctly, they are all consistent with the basic capital budgeting model and with each other.

8.3.1. Economic Profit

The first alternative method for measuring income and valuing assets is based on economic profit (EP).¹⁷ Economic profit has been used in asset valuation as well as in performance measurement and management compensation. Its calculation is loosely as follows:

$$EP = NOPAT - \$WACC \quad (2-12)$$

where

EP = Economic profit

NOPAT = Net operating profit after tax = $EBIT(1 - \text{Tax rate})$

EBIT = Operating income before taxes, or Earnings before interest and taxes

$\$WAC$ = Dollar cost of capital = $WACC \times \text{Capital}$

WACC = Weighted average (or overall) cost of capital

Capital = Investment

EP is a periodic measure of profit above and beyond the dollar cost of the capital invested in the project. The dollar cost of capital is the dollar return that the company must make on the project in order to pay the debt holders and the equity holders their respective required rates of return.¹⁸

For the Granite Corporation, for the first year, we have the following:

$$NOPAT = EBIT(1 - \text{Tax rate}) = 25,000(1 - 0.40) = \$15,000$$

$$\$WACC = WACC \times \text{Capital} = 10\% \times 150,000 = \$15,000$$

$$EP = NOPAT - \$WACC = 15,000 - 15,000 = \$0$$

Exhibit 2-39 shows the EP for all five years for the Granite Corporation.

¹⁷Economic Value Added® or EVA, trademarked by the consulting firm Stern Stewart & Company, is a well-known commercial application of the economic profit approach. See Stewart (1991) and Peterson and Peterson (1996) for complete discussion.

¹⁸In the chapter on cost of capital, we will explain the relationship between the required rate of return on the project or WACC (here 10 percent), the rate of return required by debtholders (here 8½ percent), and the rate of return required by equityholders (here 15 percent).

EXHIBIT 2-39 EP for Granite Corporation

Year	1	2	3	4	5**
Capital*	150,000	120,000	90,000	60,000	30,000
NOPAT	15,000	30,000	45,000	30,000	21,000
\$WACC	15,000	12,000	9,000	6,000	3,000
EP	0	18,000	36,000	24,000	18,000

*Depreciation is \$30,000 per year.

**The \$6,000 after-tax gain from salvage is included in NOPAT in Year 5.

EP is readily applied to valuation of an asset or a security. The NPV found by discounted cash flow analysis in the basic capital budgeting model will be equal to the present value of future EP discounted at the weighted average cost of capital.

$$NPV = \sum_{t=1}^{\infty} \frac{EP_t}{(1 + WACC)^t} \quad (2-13)$$

This NPV is also called the market value added (MVA).¹⁹ So we have

$$NPV = MVA = \sum_{t=1}^{\infty} \frac{EP_t}{(1 + WACC)^t} \quad (2-14)$$

Discounting the five years of EP for the Granite Corporation at the 10 percent WACC gives an NPV (and MVA) of \$69,492. The total value of the company (of the asset) is the original investment of \$150,000 plus the NPV of \$69,492, or \$219,492. The valuation using EP is the same as that found with the basic capital budgeting model.

8.3.2. Residual Income

Another method for estimating income and valuing an asset is the residual income method.²⁰ This method focuses on the returns to equity, where

$$\text{Residual income} = \text{Net income} - \text{Equity charge}$$

or

$$RI_t = NI_t - r_e B_{t-1} \quad (2-15)$$

¹⁹Peterson and Peterson define MVA as the market value of the company minus the capital invested, which is an NPV.

²⁰See Chapter 5 in Pinto, Henry, Robinson, and Stowe (2010) and Edwards and Bell (1961) for treatments of residual income analysis.

where

RI_t = Residual income during period t

NI_t = Net income during period t

$r_e B_{t-1}$ = Equity charge for period t , which is the required rate of return on equity, r_e , times the beginning-of-period book value of equity, B_{t-1}

For the first year for the Granite Corporation, the net income is \$9,513. The beginning book value of equity is \$40,254 (from the balance sheet in Exhibit 2-37), and the required rate of return on equity is 15 percent. Consequently, the residual income for Year 1 is:

$$RI_t = NI_t - r_e B_{t-1} = 9,513 - 0.15(40,254) = 9,513 - 6,038 = \$3,475$$

The residual income for all five years for Granite is shown in Exhibit 2-40.

EXHIBIT 2-40 Residual Income for Granite Corporation

Year	1	2	3	4	5*
NI_t	9,513	25,089	41,098	27,583	19,841
$r_e B_{t-1}$	6,038	3,267	1,794	1,748	1,023
RI_t	3,475	21,822	39,304	25,835	18,818

*The \$6,000 after-tax gain from salvage is included in NI in Year 5.

Residual income, like EP, can also be applied to valuation of an asset or security. The NPV of an investment is the present value of future residual income discounted at the required rate of return on equity.

$$NPV = \sum_{t=1}^{\infty} \frac{RI_t}{(1 + r_e)^t} \quad (2-16)$$

Discounting the residual income for the Granite Corporation at the 15 percent required rate of return on equity gives an NPV of \$69,492. The total value of the company (of the asset) is the present value of the residual income, the original equity investment, plus the original debt investment:

PV of residual income	\$69,492
Equity investment	40,254
Debt investment	<u>109,746</u>
Total value	\$219,492

The value of the company is the original book value of its debt and equity plus the present value of the residual income (which is the project's NPV). Again, this is the same value we found with the basic capital budgeting model and with the EP model.

8.3.3. Claims Valuation

To value a company, the EP valuation approach essentially adds the present value of EP to the original investment. The residual income approach adds the present value of residual income to the original debt and equity investments in the company. Since the EP approach is from the perspective of all suppliers of capital, EP is discounted at the overall WACC. The residual income approach takes the perspective of equity investors, so residual income is discounted at the cost of equity.

The third and final alternative valuation approach that we present is to divide the operating cash flows between security-holder classes (in this example, debt and equity), and then value the debt and equity cash flows separately.

Balance Sheet	
Assets	Liabilities
	Equity

The basic capital budgeting approach is to value the asset, which is on the left-hand side of the balance sheet above. The claims valuation approach values the liabilities and equity, the claims against the assets, which are on the right-hand side of the balance sheet. The value of the claims should equal the value of the assets.

For the Granite Corporation, the cash flows to debtholders are the interest payments and principal payments. These are valued by discounting them at the cost of debt, which is $8\frac{1}{3}$ percent. The cash flows to stockholders are the dividends and share repurchases, which are valued by discounting them at the 15 percent cost of equity. Exhibit 2-41 below lists the future cash flows for debt and equity.

EXHIBIT 2-41 Payments to Bondholders and Stockholders of Granite Corporation

Year	1	2	3	4	5
Interest payments	9,146	8,185	6,504	4,029	1,932
Principal payments	11,525	20,178	29,696	25,165	23,182
Total debt payments	20,671	28,363	36,199	29,194	25,114
Equity distributions	27,987	34,911	41,402	32,417	26,659

The present value of the total debt payments, discounted at the cost of debt, is \$109,746. The value of the equity distributions, discounted at the cost of equity, is \$109,746. The total value of the company is the combined value of debt and equity, which is \$219,492.

In our example, the basic capital budgeting model, the economic profit model, the residual income model, and the claims valuation model all result in the same valuation of the company. In the real world, analysts must deal with many accounting complications. Some of these complications may include pension liability adjustments, valuations of marketable securities held, exchange rate gains and losses, and adjustments for leases, inventories, goodwill, deferred taxes, and so forth. In theory, all of the valuation models are equivalent. In practice, even with due diligence and care, analysts may prefer one approach over others and disagree about valuations.

There are other approaches to valuation that analysts use and run across. Two common ones are the free cash flow to the firm (**FCFF**) and free cash flow to equity (**FCFE**) approaches.²¹ The free cash flow to the firm approach is fundamentally the same as the basic capital budgeting approach. The free cash flow to equity approach is related to the claims valuation approach. In corporate finance, corporate managers usually value an asset by valuing its total after-tax cash flows. Security analysts typically value equity by valuing the cash flows to stockholders. Real estate investors often evaluate real estate investments by valuing the cash flows to the equity investor after payments to creditors, which is like the claims valuation approach.

9. SUMMARY

Capital budgeting is the process that companies use for decision making on capital projects—those projects with a life of a year or more. This chapter developed the principles behind the basic capital budgeting model, the cash flows that go into the model, and several extensions of the basic model.

- Capital budgeting undergirds the most critical investments for many corporations—their investments in long-term assets. The principles of capital budgeting have been applied to other corporate investing and financing decisions and to security analysis and portfolio management.
- The typical steps in the capital budgeting process are: (1) generating ideas, (2) analyzing individual proposals, (3) planning the capital budget, and (4) monitoring and post-auditing.
- Projects susceptible to capital budgeting process can be categorized as: (1) replacement, (2) expansion, (3) new products and services, and (4) regulatory, safety, and environmental.
- Capital budgeting decisions are based on incremental after-tax cash flows discounted at the opportunity cost of funds. Financing costs are ignored because both the cost of debt and the cost of other capital are captured in the discount rate.
- The net present value (NPV) is the present value of all after-tax cash flows, or

$$\text{NPV} = \sum_{t=0}^n \frac{\text{CF}_t}{(1+r)^t}$$

where the investment outlays are negative cash flows included in the CF_t s and where r is the required rate of return for the investment.

- The IRR is the discount rate that makes the present value of all future cash flows sum to zero. This equation can be solved for the IRR:

$$\sum_{t=0}^n \frac{\text{CF}_t}{(1+\text{IRR})^t} = 0$$

- The payback period is the number of years required to recover the original investment in a project. The payback is based on cash flows.

²¹The free cash flow to the firm and free cash flow to equity approaches are developed in Chapter 4 of Pinto, Henry, Robinson, and Stowe (2010).

- The discounted payback period is the number of years it takes for the cumulative discounted cash flows from a project to equal the original investment.
- The average accounting rate of return (AAR) can be defined as follows:

$$\text{AAR} = \frac{\text{Average net income}}{\text{Average book value}}$$

- The profitability index (PI) is the present value of a project's future cash flows divided by the initial investment:

$$\text{PI} = \frac{\text{PV of future cash flows}}{\text{Initial investment}} = 1 + \frac{\text{NPV}}{\text{Initial investment}}$$

- The capital budgeting decision rules are to invest if the $\text{NPV} > 0$, if the $\text{IRR} > r$, or if the $\text{PI} > 1.0$. There are no decision rules for the payback period, discounted payback period, and AAR because they are not always sound measures.
- The NPV profile is a graph that shows a project's NPV graphed as a function of various discount rates.
- For mutually exclusive projects that are ranked differently by the NPV and IRR, it is economically sound to choose the project with the higher NPV.
- The “multiple IRR problem” and the “no IRR problem” can arise for a project with nonconventional cash flows—cash flows that change signs more than once during the project's life.
- The fact that projects with positive NPVs theoretically increase the value of the company and the value of its stock could explain the popularity of NPV as an evaluation method.
- Analysts often organize the cash flows for capital budgeting in tables, summing all of the cash flows occurring at each point in time. These totals are then used to find an NPV or IRR. Alternatively, tables collecting cash flows by type can be used. Equations for the capital budgeting cash flows are as follows:

Initial outlay:

$$\text{Outlay} = \text{FCInv} + \text{NWCInv} - \text{Sal}_0 + T(\text{Sal}_0 - B_0)$$

Annual after-tax operating cash flow:

$$\text{CF} = (S - C - D)(1 - T) + D, \text{ or}$$

$$\text{CF} = (S - C)(1 - D) + TD$$

Terminal year after-tax nonoperating cash flow:

$$\text{TNOCF} = \text{Sal}_T + \text{NWCInv} - T(\text{Sal}_T - B_T)$$

- Depreciation schedules affect taxable income, taxes paid, and after-tax cash flows, and therefore capital budgeting valuations.
- Spreadsheets are heavily used for capital budgeting valuation.
- When inflation exists, the analyst should perform capital budgeting analysis in “nominal” terms if cash flows are nominal and in “real” terms if cash flows are real.

- Inflation reduces the value of depreciation tax savings (unless the tax system adjusts depreciation for inflation). Inflation reduces the value of fixed payments to bondholders. Inflation usually does not affect all revenues and costs uniformly. Contracting with customers, suppliers, employees, and sources of capital can be complicated as inflation rises.
- Two ways of comparing mutually exclusive projects in a replacement chain are the “least common multiple of lives” approach and the “equivalent annual annuity” approach.
- For the least common multiple of lives approach, the analyst extends the time horizon of analysis so that the lives of both projects will divide exactly into the horizon. The projects are replicated over this horizon, and the NPV for the total cash flows over the least common multiple of lives is used to evaluate the investments.
- The equivalent annual annuity is the annuity payment (series of equal annual payments over the project’s life) that is equivalent in value to the project’s actual cash flows. Analysts find the present value of all of the cash flows for an investment (the NPV) and then calculate an annuity payment that has a value equivalent to the NPV.
- With capital rationing, the company’s capital budget has a size constraint. Under “hard” capital rationing, the budget is fixed. In the case of hard rationing, managers use trial and error and sometimes mathematical programming to find the optimal set of projects. In that situation, it is best to use the NPV or PI valuation methods.
- Sensitivity analysis calculates the effect on the NPV of changes in one input variable at a time.
- Scenario analysis creates scenarios that consist of changes in several of the input variables and calculates the NPV for each scenario.
- Simulation (Monte Carlo) analysis is used to estimate probability distributions for the NPV or IRR of a capital project. Simulations randomly select values for stochastic input variables and then repeatedly calculate the project NPV and IRR to find their distributions.
- Risk-adjusted discount rates based on market risk measures should be used as the required rate of return for projects when the investors are diversified. The capital asset pricing model (CAPM) and arbitrage pricing theory (APT) are common approaches for finding market-based risk-adjusted rates.
- In the CAPM, a project’s or asset’s beta, or β , is used as a measure of systematic risk. The security market line (SML) estimates the asset’s required rate of return as $r_i = R_F + \beta_i[E(R_M) - R_F]$.
- Project-specific betas should be used instead of company betas whenever the risk of the project differs from that of the company.
- Real options can be classified as (1) timing options; (2) sizing options, which can be abandonment options or growth (expansion) options; (3) flexibility options, which can be price-setting options or production-flexibility options; and (4) fundamental options. Simple options can be evaluated with decision trees; for more complex options, the analyst should use option pricing models.
- Economic income is the investment’s after-tax cash flow plus the change in the market value. Accounting income is revenues minus expenses. Accounting depreciation, based on the original cost of the investment, is the decrease in the book (accounting) value, while economic depreciation is the decrease in the market value of the investment. Accounting net income is net of the after-tax interest expenses on the company’s debt obligations. In computing economic income, financing costs are ignored.
- Economic profit is

$$EP = \text{NOPAT} - \$WACC$$

where $\text{NOPAT} = \text{Net operating profit after tax} = \text{EBIT}(1 - \text{Tax rate})$ and $\text{\$WACC} = \text{Dollar cost of capital} = \text{WACC} \times \text{Capital}$. When applied to the valuation of an asset or security, the NPV of an investment (and its market value added) is the present value of future EP discounted at the weighted average cost of capital.

$$\text{NPV} = \text{MVA} = \sum_{t=1}^{\infty} \frac{\text{EP}_t}{(1 + \text{WACC})^t}$$

The total value of the company (of the asset) is the original investment plus the NPV.

- Residual income = Net income – Equity charge, or $\text{RI}_t = \text{NI}_t - r_e \text{B}_{t-1}$ where RI_t = Residual income during period t , NI_t = Net income during period t , r_e = the cost of equity, and B_{t-1} = the beginning-of-period book value of equity. The NPV of an investment is the present value of future residual income discounted at the required rate of return on equity:

$$\text{NPV} = \sum_{t=1}^{\infty} \frac{\text{RI}_t}{(1 + r_e)^t}$$

- The total value of the company (of the asset) is the NPV plus the original equity investment plus the original debt investment.
- The claims valuation approach values an asset by valuing the claims against the asset. For example, an asset financed with debt and equity has a value equal to the value of the debt plus the value of the equity.

PROBLEMS

1. Given the following cash flows for a capital project, calculate the NPV and IRR. The required rate of return is 8%.

Year	0	1	2	3	4	5
Cash flow	–50,000	15,000	15,000	20,000	10,000	5,000

	NPV	IRR
A.	\$1,905	10.9%
B.	\$1,905	26.0%
C.	\$3,379	10.9%

2. Given the following cash flows for a capital project, calculate its payback period and discounted payback period. The required rate of return is 8%. The discounted payback period is:

Year	0	1	2	3	4	5
Cash flow	–50,000	15,000	15,000	20,000	10,000	5,000

- A. 0.16 years longer than the payback period.
- B. 0.51 years longer than the payback period.
- C. 1.01 years longer than the payback period.

3. An investment of \$100 generates after-tax cash flows of \$40 in Year 1, \$80 in Year 2, and \$120 in Year 3. The required rate of return is 20%. The net present value is *closest* to:
- A. \$42.22.
 - B. \$58.33.
 - C. \$68.52.
4. An investment of \$150,000 is expected to generate an after-tax cash flow of \$100,000 in one year and another \$120,000 in two years. The cost of capital is 10%. What is the internal rate of return?
- A. 28.39%.
 - B. 28.59%.
 - C. 28.79%.
5. Kim Corporation is considering an investment of 750 million won with expected after-tax cash inflows of 175 million won per year for seven years. The required rate of return is 10%. What is the project's

	NPV?	IRR?
A.	102 million won	14.0%
B.	157 million won	23.3%
C.	193 million won	10.0%

6. Kim Corporation is considering an investment of 750 million won with expected after-tax cash inflows of 175 million won per year for seven years. The required rate of return is 10%. Expressed in years, the project's payback period and discounted payback period, respectively, are *closest* to:
- A. 4.3 years and 5.4 years.
 - B. 4.3 years and 5.9 years.
 - C. 4.8 years and 6.3 years.
7. An investment of \$20,000 will create a perpetual after-tax cash flow of \$2,000. The required rate of return is 8%. What is the investment's profitability index?
- A. 1.08.
 - B. 1.16.
 - C. 1.25.
8. Hermann Corporation is considering an investment of €375 million with expected after-tax cash inflows of €115 million per year for seven years and an additional after-tax salvage value of €50 million in year seven. The required rate of return is 10%. What is the investment's PI?
- A. 1.19.
 - B. 1.33.
 - C. 1.56.

9. Erin Chou is reviewing a profitable investment project that has a conventional cash flow pattern. If the cash flows for the project, initial outlay, and future after-tax cash flows all double, Chou would predict that the IRR would:
- increase and the NPV would increase.
 - stay the same and the NPV would increase.
 - stay the same and the NPV would stay the same.
10. Shirley Shea has evaluated an investment proposal and found that its payback period is one year, it has a negative NPV, and it has a positive IRR. Is this combination of results possible?
- Yes.
 - No, because a project with a positive IRR has a positive NPV.
 - No, because a project with such a rapid payback period has a positive NPV.
11. An investment has an outlay of 100 and after-tax cash flows of 40 annually for four years. A project enhancement increases the outlay by 15 and the annual after-tax cash flows by 5. As a result, the vertical intercept of the NPV profile of the enhanced project shifts:
- up and the horizontal intercept shifts left.
 - up and the horizontal intercept shifts right.
 - down and the horizontal intercept shifts left.
12. Projects 1 and 2 have similar outlays, although the patterns of future cash flows are different. The cash flows as well as the NPV and IRR for the two projects are shown below. For both projects, the required rate of return is 10%.

Year	Cash Flows					NPV	IRR
	0	1	2	3	4		
Project 1	-50	20	20	20	20	13.40	21.86%
Project 2	-50	0	0	0	100	18.30	18.92%

The two projects are mutually exclusive. What is the appropriate investment decision?

- Invest in both projects.
 - Invest in Project 1 because it has the higher IRR.
 - Invest in Project 2 because it has the higher NPV.
13. Consider the two projects below. The cash flows as well as the NPV and IRR for the two projects are given. For both projects, the required rate of return is 10%.

Year	Cash Flows					NPV	IRR
	0	1	2	3	4		
Project 1	-100	36	36	36	36	14.12	16.37%
Project 2	-100	0	0	0	175	19.53	15.02%

What discount rate would result in the same NPV for both projects?

- A. A rate between 0.00% and 10.00%.
- B. A rate between 10.00% and 15.02%.
- C. A rate between 15.02% and 16.37%.

14. Wilson Flannery is concerned that this project has multiple IRRs.

Year	0	1	2	3
Cash flows	−50	100	0	−50

How many discount rates produce a zero NPV for this project?

- A. One, a discount rate of 0%.
- B. Two, discount rates of 0% and 32%.
- C. Two, discount rates of 0% and 62%.

15. With regard to the net present value (NPV) profiles of two projects, the crossover rate is *best* described as the discount rate at which:

- A. two projects have the same NPV.
- B. two projects have the same internal rate of return.
- C. a project's NPV changes from positive to negative.

16. With regard to net present value (NPV) profiles, the point at which a profile crosses the vertical axis is *best* described as:

- A. the point at which two projects have the same NPV.
- B. the sum of the undiscounted cash flows from a project.
- C. a project's internal rate of return when the project's NPV is equal to zero.

17. With regard to net present value (NPV) profiles, the point at which a profile crosses the horizontal axis is *best* described as:

- A. the point at which two projects have the same NPV.
- B. the sum of the undiscounted cash flows from a project.
- C. a project's internal rate of return when the project's NPV is equal to zero.

18. With regard to capital budgeting, an appropriate estimate of the incremental cash flows from a project is *least likely* to include:

- A. externalities.
- B. interest costs.
- C. opportunity costs.

19. FITCO is considering the purchase of new equipment. The equipment costs \$350,000, and an additional \$110,000 is needed to install it. The equipment will be depreciated straight-line to zero over a five-year life. The equipment will generate additional annual revenues of \$265,000, and it will have annual cash operating expenses of \$83,000. The equipment will be sold for \$85,000 after five years. An inventory investment of \$73,000

is required during the life of the investment. FITCO is in the 40% tax bracket and its cost of capital is 10%. What is the project NPV?

- A. \$52,122.
 - B. \$64,090.
 - C. \$97,449.
20. After estimating a project's NPV, the analyst is advised that the fixed capital outlay will be revised upward by \$100,000. The fixed capital outlay is depreciated straight-line over an eight-year life. The tax rate is 40% and the required rate of return is 10%. No changes in cash operating revenues, cash operating expenses, or salvage value are expected. What is the effect on the project NPV?
- A. \$100,000 decrease.
 - B. \$73,325 decrease.
 - C. \$59,988 decrease.
21. When assembling the cash flows to calculate an NPV or IRR, the project's after-tax interest expenses should be subtracted from the cash flows for:
- A. the IRR calculation, but not the NPV calculation.
 - B. both the NPV calculation and the IRR calculation.
 - C. neither the NPV calculation nor the IRR calculation.
22. Standard Corporation is investing \$400,000 of fixed capital in a project that will be depreciated straight-line to zero over its 10-year life. Annual sales are expected to be \$240,000, and annual cash operating expenses are expected to be \$110,000. An investment of \$40,000 in net working capital is required over the project's life. The corporate income tax rate is 30 percent. What is the after-tax operating cash flow expected in year one?
- A. \$63,000.
 - B. \$92,000.
 - C. \$103,000.
23. Five years ago, Frater Zahn's Company invested £38 million—£30 million in fixed capital and another £8 million in working capital—in a bakery. Today, Frater Zahn's is selling the fixed assets for £21 million and liquidating the investment in working capital. The book value of the fixed assets is £15 million and the marginal tax rate is 40%. The fifth year's after-tax nonoperating cash flow to Frater Zahn's is *closest* to:
- A. £20.6 million.
 - B. £23.0 million.
 - C. £26.6 million.

The following information relates to Questions 24, 25, and 26.

McConachie Company is considering the purchase of a new 400-ton stamping press. The press costs \$360,000, and an additional \$40,000 is needed to install it. The press will be depreciated straight-line to zero over a five-year life. The press will generate no additional revenues, but it will reduce cash operating expenses by \$140,000 annually. The press will be sold for \$120,000 after five years. An inventory investment of \$60,000 is required during the life of the investment. McConachie is in the 40 percent tax bracket.

24. What is the McConachie net investment outlay?
- A. \$400,000.
 - B. \$420,000.
 - C. \$460,000.
25. McConachie's incremental annual after-tax operating cash flow is *closest* to:
- A. \$116,000.
 - B. \$124,000.
 - C. \$140,000.
26. What is the terminal year after-tax nonoperating cash flow at the end of year five?
- A. \$108,000.
 - B. \$132,000.
 - C. \$180,000.

The following information relates to Questions 27 through 32.

Linda Pyle is head of analyst recruiting for PPA Securities. She has been very frustrated by the number of job applicants who, in spite of their stellar pedigrees, seem to have little understanding of basic financial concepts. Pyle has written a set of conceptual questions and simple problems for the human resources department to use to screen for the better candidates in the applicant pool. A few of her corporate finance questions and problems are given below.

Concept 1. "A company invests in depreciable assets, financed partly by issuing fixed-rate bonds. If inflation is lower than expected, the value of the real tax savings from depreciation and the value of the real after-tax interest expense are both reduced."

Concept 2. "Sensitivity analysis and scenario analysis are useful tools for estimating the impact on a project's NPV of changing the value of one capital budgeting input variable at a time."

Concept 3. "When comparing two mutually exclusive projects with unequal lives, the IRR is a good approach for choosing the better project because it does not require equal lives."

Concept 4. "Project-specific betas should be used instead of company betas whenever the risk of the project differs from that of the company."

Problem. "Fontenot Company is investing €100 in a project that is being depreciated straight-line to zero over a two-year life with no salvage value. The project will generate earnings before interest and taxes of €50 each year for two years. Fontenot's weighted average cost of capital and required rate of return for the project are both 12 percent, and its tax rate is 30 percent."

27. For Concept 1, the statement is correct regarding the effects on:
- A. the real tax savings from depreciation, but incorrect regarding the real after-tax interest expense.
 - B. both the real tax savings from depreciation and the real after-tax interest expense.
 - C. neither the real tax savings from depreciation nor the real after-tax interest expense.
28. For Concept 2, the statement is correct regarding:
- A. sensitivity analysis, but not correct regarding scenario analysis.
 - B. scenario analysis, but not correct regarding sensitivity analysis.
 - C. both sensitivity analysis and scenario analysis.

29. Are the statements identified as Concept 3 and Concept 4 correct?
- No for Concepts 3 and 4.
 - No for Concept 3, but yes for Concept 4.
 - Yes for Concept 3, but no for Concept 4.
30. The after-tax operating cash flows in euros for the Fontenot Company are:
- 50 in both years.
 - 70 in both years.
 - 85 in both years.
31. The economic income in euros for the Fontenot Company is:
- 17.24 in year one and 9.11 in year two.
 - 17.76 in year one and 24.89 in year two.
 - 24.89 in year one and 17.76 in year two.
32. The market value added (MVA) in euros for the Fontenot Company is *closest* to:
- 38.87.
 - 39.92.
 - 43.65.

The following information relates to Questions 33–38.

The capital budgeting committee for Laroche Industries is meeting. Laroche is a North American conglomerate that has several divisions. One of these divisions, Laroche Livery, operates a large fleet of vans. Laroche's management is evaluating whether it is optimal to operate new vans for two, three, or four years before replacing them. The managers have estimated the investment outlay, annual after-tax operating expenses, and after-tax salvage cash flows for each of the service lives. Because revenues and some operating costs are unaffected by the choice of service life, they were ignored in the analysis. Laroche Livery's opportunity cost of funds is 10 percent. The table below gives the cash flows in thousands of Canadian dollars (C\$).

Service Life	Investment	Year 1	Year 2	Year 3	Year 4	Salvage
2 years	−40,000	−12,000	−15,000			20,000
3 years	−40,000	−12,000	−15,000	−20,000		17,000
4 years	−40,000	−12,000	−15,000	−20,000	−25,000	12,000

Schoeman Products, another division of Laroche, has evaluated several investment projects and now must choose the subset of them that fits within its C\$40 million capital budget. The outlays and NPVs for the six projects are given below. Schoeman cannot buy fractional projects, and must buy all or none of a project. The currency amounts are in millions of Canadian dollars.

Project	Outlay	PV of Future Cash Flows	NPV
1	31	44	13
2	15	21	6
3	12	16.5	4.5
4	10	13	3
5	8	11	3
6	6	8	2

Schoeman wants to determine which subset of the six projects is optimal.

A final proposal comes from the division Society Services, which has an investment opportunity with a real option to invest further if conditions warrant. The crucial details are as follows:

- The original project:
 - An outlay of C\$190 million at time zero.
 - Cash flows of C\$40 million per year for Years 1–10 if demand is “high.”
 - Cash flows of C\$20 million per year for Years 1–10 if demand is “low.”
- Additional cash flows with the optional expansion project:
 - An outlay of C\$190 million at time one.
 - Cash flows of C\$40 million per year for Years 2–10 if demand is “high.”
 - Cash flows of C\$20 million per year for Years 2–10 if demand is “low.”
- Whether demand is “high” or “low” in Years 1–10 will be revealed during the first year. The probability of “high” demand is 0.50, and the probability of “low” demand is 0.50.
- The option to make the expansion investment depends on making the initial investment. If the initial investment is not made, the option to expand does not exist.
- The required rate of return is 10 percent.

Society Services wants to evaluate its investment alternatives.

The internal auditor for Laroche Industries has made several suggestions for improving capital budgeting processes at the company. The internal auditor’s suggestions are as follows:

- Suggestion 1.* “In order to put all capital budgeting proposals on an equal footing, the projects should all use the risk-free rate for the required rate of return.”
- Suggestion 2.* “Because you cannot exercise both of them, you should not permit a given project to have both an abandonment option and an expansion/growth option.”
- Suggestion 3.* “When rationing capital, it is better to choose the portfolio of investments that maximizes the company NPV than the portfolio that maximizes the company IRR.”
- Suggestion 4.* “Project betas should be used for establishing the required rate of return whenever the project’s beta is different from the company’s beta.”

33. What is the optimal service life for Laroche Livery's fleet of vans?
- A. Two years.
 - B. Three years.
 - C. Four years.
34. The optimal subset of the six projects that Schoeman is considering consists of Projects:
- A. 1 and 5.
 - B. 2, 3, and 4.
 - C. 2, 4, 5, and 6.
35. What is the NPV (C\$ millions) of the original project for Society Services without considering the expansion option?
- A. -6.11.
 - B. -5.66.
 - C. 2.33.
36. What is the NPV (C\$ millions) of the optimal set of investment decisions for Society Services including the expansion option?
- A. 6.34.
 - B. 12.68.
 - C. 31.03.
37. Should the capital budgeting committee accept the internal auditor's first and second suggestions, respectively?
- A. No for Suggestions 1 and 2.
 - B. No for Suggestion 1 and Yes for Suggestion 2.
 - C. Yes for Suggestion 1 and No for Suggestion 2.
38. Should the capital budgeting committee accept the internal auditor's third and fourth suggestions, respectively?
- A. No for Suggestions 3 and 4.
 - B. Yes for Suggestions 3 and 4.
 - C. No for Suggestion 3 and Yes for Suggestion 4.

The following information relates to Questions 39–44.

Maximilian Böhm is reviewing several capital budgeting proposals from subsidiaries of his company. Although his reviews deal with several details that may seem like minutiae, the company places a premium on the care it exercises in making its investment decisions.

The first proposal is a project for Richie Express, which is investing \$500,000, all in fixed capital, in a project that will have depreciation and operating income after taxes, respectively, of \$40,000 and \$20,000 each year for the next three years. Richie Express will sell the asset in three years, paying 30 percent taxes on any excess of the selling price over book value. The proposal indicates that a \$647,500 terminal selling price will enable the company to earn a 15 percent internal rate of return on the investment. Böhm doubts that this terminal value estimate is correct.

Another proposal concerns Gasup Company, which does natural gas exploration. A new investment has been identified by the Gasup finance department with the following projected cash flows:

- Investment outlays are \$6 million immediately and \$1 million at the end of the first year.
- After-tax operating cash flows are \$0.5 million at the end of the first year and \$4 million at the end of each of the second, third, fourth, and fifth years. In addition, an after-tax outflow occurs at the end of the five-year project that has not been included in the operating cash flows: \$5 million required for environmental cleanup.
- The required rate of return on natural gas exploration is 18 percent.

The Gasup analyst is unsure about the calculation of the NPV and the IRR because the outlay is staged over two years.

Finally, Dominion Company is evaluating two mutually exclusive projects: The Pinto grinder involves an outlay of \$100,000, annual after-tax operating cash flows of \$45,000, an after-tax salvage value of \$25,000, and a three-year life. The Bolten grinder has an outlay of \$125,000, annual after-tax operating cash flows of \$47,000, an after-tax salvage value of \$20,000, and a four-year life. The required rate of return is 10 percent. The net present value (NPV) and equivalent annual annuity (EAA) of the Pinto grinder are \$30,691 and \$12,341, respectively. Whichever grinder is chosen, it will have to be replaced at the end of its service life. The analyst is unsure about which grinder should be chosen.

Böhm and his colleague Beth Goldberg have an extended conversation about capital budgeting issues, including several comments listed below. Goldberg makes two comments about real options:

1. “The abandonment option is valuable, but it should be exercised only when the abandonment value is above the amount of the original investment.”
2. “If the cost of a real option is less than its value, this will increase the NPV of the investment project in which the real option is embedded.”

Böhm also makes several comments about specific projects under consideration:

- A. “The land and building were purchased five years ago for \$10 million. This is the amount that should now be included in the fixed capital investment.”
 - B. “We can improve the project’s NPV by using the after-tax cost of debt as the discount rate. If we finance the project with 100 percent debt, this discount rate would be appropriate.”
 - C. “It is generally safer to use the NPV than the IRR in making capital budgeting decisions. However, when evaluating mutually exclusive projects, if the projects have conventional cash flow patterns and have the same investment outlays, it is acceptable to use either the NPV or IRR.”
 - D. “You should not base a capital budgeting decision on its immediate impact on earnings per share (EPS).”
39. What terminal selling price is required for a 15% internal rate of return on the Richie project?
- A. \$588,028.
 - B. \$593,771.
 - C. \$625,839.
40. The NPV and IRR, respectively, of the Gasup Company investment are *closest* to:
- A. \$509,600 and 21.4%.
 - B. \$509,600 and 31.3%.
 - C. \$946,700 and 31.3%.

41. Of the two grinders that the Dominion Company is evaluating, Böhm should recommend the:
 - A. Bolten grinder because its NPV is higher than the Pinto grinder NPV.
 - B. Bolten grinder because its EAA is higher than the Pinto grinder EAA.
 - C. Pinto grinder because its EAA is higher than the Bolten grinder EAA.
42. Are Goldberg's comments about real options correct?
 - A. No for Comment #1 and Comment #2.
 - B. No for Comment #1 and Yes for Comment #2.
 - C. Yes for Comment #1 and No for Comment #2.
43. Is Böhm most likely correct regarding Comment A about the \$10 million investment and Comment B about using the after-tax cost of debt?
 - A. No for both comments.
 - B. Yes for both comments.
 - C. No for Comment A and Yes for Comment B.
44. Is Böhm most likely correct regarding Comment C that it is acceptable to use either NPV or IRR and Comment D about the immediate impact on EPS?
 - A. No for both comments.
 - B. Yes for both comments.
 - C. No for Comment C and Yes for Comment D.

The following information relates to Questions 45–50.

Barbara Simpson is a sell-side analyst with Smith Riccardi Securities. Simpson covers the pharmaceutical industry. One of the companies she follows, Bayonne Pharma, is evaluating a regional distribution center. The financial predictions for the project are as follows:

- Fixed capital outlay is €1.50 billion.
- Investment in net working capital is €0.40 billion.
- Straight-line depreciation is over a six-year period with zero salvage value.
- Project life is 12 years.
- Additional annual revenues are €0.10 billion.
- Annual cash operating expenses are reduced by €0.25 billion.
- The capital equipment is sold for €0.50 billion in 12 years.
- Tax rate is 40 percent.
- Required rate of return is 12 percent.

Simpson is evaluating this investment to see whether it has the potential to affect Bayonne Pharma's stock price. Simpson estimates the NPV of the project to be €0.41 billion, which should increase the value of the company.

Simpson is evaluating the effects of other changes to her capital budgeting assumptions. She wants to know the effect of a switch from straight-line to accelerated depreciation on the company's operating income and the project's NPV. She also believes that the initial outlay might be much smaller than initially assumed. Specifically, she thinks the outlay for fixed capital might be €0.24 billion lower, with no change in salvage value.

When reviewing her work, Simpson's supervisor provides the following comments: "I note that you are relying heavily on the NPV approach to valuing the investment decision. I don't think you should use an IRR because of the multiple IRR problem that is likely to arise with the

Bayonne Pharma project. However, the equivalent annual annuity would be a more appropriate measure to use for the project than the NPV. I suggest that you compute an EAA.”

45. Simpson should estimate the after-tax operating cash flow for Years 1–6 and 7–12, respectively, to be *closest* to:
 - A. €0.31 billion and €0.21 billion.
 - B. €0.31 billion and €0.25 billion.
 - C. €0.35 billion and €0.25 billion.
46. Simpson should estimate the initial outlay and the terminal year nonoperating cash flow, respectively, to be *closest* to:
 - A. €1.50 billion and €0.70 billion.
 - B. €1.90 billion and €0.70 billion.
 - C. €1.90 billion and €0.90 billion.
47. Is Simpson’s estimate of the NPV of the project correct?
 - A. Yes.
 - B. No. The NPV is –€0.01 billion.
 - C. No. The NPV is €0.34 billion.
48. A switch from straight-line to accelerated depreciation would:
 - A. increase the NPV and decrease the first year operating income after taxes.
 - B. increase the first year operating income after taxes and decrease the NPV.
 - C. increase both the NPV and first year operating income after taxes.
49. If the outlay is lower by the amount that Simpson suggests, the project NPV should increase by an amount *closest* to:
 - A. €0.09 billion.
 - B. €0.14 billion.
 - C. €0.17 billion.
50. How would you evaluate the comments by Simpson’s supervisor about not using the IRR and about using the EAA? The supervisor is:
 - A. incorrect about both.
 - B. correct about IRR and incorrect about EAA.
 - C. incorrect about IRR and correct about EAA.

The following information relates to Questions 51–56.

Mun Hoe Yip is valuing Pure Corporation. Pure is a simple corporation that is going out of business in five years, distributing its income to creditors and bondholders as planned in the financial statements below. Pure has a 19 percent cost of equity, $8\frac{1}{3}$ percent before-tax cost of debt, 12 percent weighted average cost of capital, and 40 percent tax rate, and it maintains a 50 percent debt/value ratio.

Yip is valuing the company using the basic capital budgeting method as well as other methods, such as EP, residual income, and claims valuation. Yip’s research assistant, Linda Robinson, makes three observations about the analysis.

Observation 1: “The present value of the company’s economic income should be equal to the present value of the cash flows in the basic capital budgeting approach.”

Observation 2: “The economic income each year is equal to the cash flow minus the economic depreciation.”

Observation 3: “The market value added is the present value of the company’s economic profit (EP), which equals the net worth of 77,973.”

Year	0	1	2	3	4	5
Balance Sheets:						
Assets	200,000	160,000	120,000	80,000	40,000	0
Liabilities	122,027	107,671	88,591	64,222	33,929	0
Net worth	77,973	52,329	31,409	15,778	6,071	0
Income Statements:						
Sales		180,000	200,000	220,000	240,000	200,000
Variable cash expenses		90,000	100,000	110,000	120,000	100,000
Fixed cash expenses		20,000	20,000	20,000	20,000	20,000
Depreciation		40,000	40,000	40,000	40,000	40,000
EBIT		30,000	40,000	50,000	60,000	40,000
Interest expense		10,169	8,973	7,383	5,352	2,827
EBT		19,831	31,027	42,617	54,648	37,173
Taxes at 40 percent		7,932	12,411	17,047	21,859	14,869
Net income before salvage		11,899	18,616	25,570	32,789	22,304
After-tax salvage value						12,000
Net income		11,899	18,616	25,570	32,789	34,304
Statements of Cash Flows:						
Operating cash flows:						
Net income		11,899	18,616	25,570	32,789	34,304
Depreciation		40,000	40,000	40,000	40,000	40,000
Total		51,899	58,616	65,570	72,789	74,304
Financing cash flows:						
Debt repayment		14,357	19,080	24,369	30,293	33,929
Dividends/repurchases		37,542	39,536	41,201	42,496	40,375
Total		-51,899	-58,616	-65,570	-72,789	-74,304
Investing cash flows:		0	0	0	0	0
Total cash flows:		0	0	0	0	0

-
51. Economic income during Year 1 is *closest* to:
- A. 23,186.
 - B. 29,287.
 - C. 46,101.
52. What is EP during Year 1?
- A. -12,101.
 - B. -6,000.
 - C. 6,000.
53. What is residual income during Year 1?
- A. -2,916.
 - B. 2,542.
 - C. 8,653.
54. What is the value of equity at time zero?
- A. 44,055.
 - B. 77,973.
 - C. 122,027.
55. Are Robinson's first two observations, respectively, correct?
- A. Yes for both observations.
 - B. No for the first and Yes for the second.
 - C. Yes for the first and No for the second.
56. Which of the following would be Yip's *most* appropriate response to Robinson's third observation?
- A. The market value added is not equal to the present value of EP, although the market value of equity is equal to 122,027.
 - B. The market value added is equal to the present value of EP, which in this case is 44,055.
 - C. The market value added is not equal to the present value of EP, and market value added is equal to 44,055.

CHAPTER 3

COST OF CAPITAL

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LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- Calculate and interpret the weighted average cost of capital (WACC) of a company.
- Describe how taxes affect the cost of capital from different capital sources.
- Explain alternative methods of calculating the weights used in the WACC, including the use of the company's target capital structure.
- Explain how the marginal cost of capital and the investment opportunity schedule are used to determine the optimal capital budget.
- Explain the marginal cost of capital's role in determining the net present value of a project.
- Calculate and interpret the cost of fixed rate debt capital using the yield-to-maturity approach and the debt-rating approach.
- Calculate and interpret the cost of noncallable, nonconvertible preferred stock.
- Calculate and interpret the cost of equity capital using the capital asset pricing model approach, the dividend discount approach, and the bond yield plus risk premium approach.
- Calculate and interpret the beta and cost of capital for a project.
- Explain the country equity risk premium in the estimation of the cost of equity for a company located in a developing market.
- Describe the marginal cost of capital schedule, explain why it may be upward sloping with respect to additional capital, and calculate and interpret its break points.
- Explain and demonstrate the correct treatment of flotation costs.

1. INTRODUCTION

A company grows by making investments that are expected to increase revenues and profits. The company acquires the capital or funds necessary to make such investments by borrowing or using funds from owners. By applying this capital to investments with long-term benefits, the company is producing value today. But, how much value? The answer depends not only on the investments' expected future cash flows but also on the cost of the funds. Borrowing is not costless. Neither is using owners' funds.

The cost of this capital is an important ingredient in both investment decision making by the company's management and the valuation of the company by investors. If a company invests in projects that produce a return in excess of the cost of capital, the company has created value; in contrast, if the company invests in projects whose returns are less than the cost of capital, the company has actually destroyed value. Therefore, the estimation of the cost of capital is a central issue in corporate financial management. For the analyst seeking to evaluate a company's investment program and its competitive position, an accurate estimate of a company's cost of capital is important as well.

Cost of capital estimation is a challenging task. As we have already implied, the cost of capital is not observable but, rather, must be estimated. Arriving at a cost of capital estimate requires a host of assumptions and estimates. Another challenge is that the cost of capital that is appropriately applied to a specific investment depends on the characteristics of that investment: The riskier the investment's cash flows, the greater its cost of capital. In reality, a company must estimate project-specific costs of capital. What is often done, however, is to estimate the cost of capital for the company as a whole and then adjust this overall corporate cost of capital upward or downward to reflect the risk of the contemplated project relative to the company's average project.

This chapter is organized as follows: In the next section, we introduce the cost of capital and its basic computation. Section 3 presents a selection of methods for estimating the costs of the various sources of capital, and Section 4 discusses issues an analyst faces in using the cost of capital. Section 5 summarizes the chapter.

2. COST OF CAPITAL

The **cost of capital** is the rate of return that the suppliers of capital—bondholders and owners—require as compensation for their contribution of capital. Another way of looking at the cost of capital is that it is the opportunity cost of funds for the suppliers of capital: A potential supplier of capital will not voluntarily invest in a company unless its return meets or exceeds what the supplier could earn elsewhere in an investment of comparable risk.

A company typically has several alternatives for raising capital, including issuing equity, debt, and instruments that share characteristics of debt and equity. Each source selected becomes a component of the company's funding and has a cost (required rate of return) that may be called a **component cost of capital**. Because we are using the cost of capital in the evaluation of investment opportunities, we are dealing with a *marginal* cost—what it would cost to raise additional funds for the potential investment project. Therefore, the cost of capital that the investment analyst is concerned with is a marginal cost.

Let us focus on the cost of capital for the entire company (later we will address how to adjust that for specific projects). The cost of capital of a company is the required rate of return

that investors demand for the average-risk investment of a company. The most common way to estimate this required rate of return is to calculate the marginal cost of each of the various sources of capital and then calculate a weighted average of these costs. This weighted average is referred to as the **weighted average cost of capital (WACC)**. The WACC is also referred to as the **marginal cost of capital (MCC)** because it is the cost that a company incurs for additional capital. The weights in this weighted average are the proportions of the various sources of capital that the company uses to support its investment program. Therefore, the WACC, in its most general terms, is

$$\text{WACC} = w_d r_d (1 - t) + w_p r_p + w_e r_e \quad (3-1)$$

where

- w_d is the proportion of debt that the company uses when it raises new funds
- r_d is the before-tax marginal cost of debt
- t is the company's marginal tax rate
- w_p is the proportion of preferred stock the company uses when it raises new funds
- r_p is the marginal cost of preferred stock
- w_e is the proportion of equity that the company uses when it raises new funds
- r_e is the marginal cost of equity

EXAMPLE 3-1 Computing the Weighted Average Cost of Capital

Assume that ABC Corporation has the following capital structure: 30 percent debt, 10 percent preferred stock, and 60 percent equity. ABC Corporation wishes to maintain these proportions as it raises new funds. Its before-tax cost of debt is 8 percent, its cost of preferred stock is 10 percent, and its cost of equity is 15 percent. If the company's marginal tax rate is 40 percent, what is ABC's weighted average cost of capital?

Solution. The weighted average cost of capital is

$$\text{WACC} = (0.3)(0.08)(1 - 0.40) + (0.1)(0.1) + (0.6)(0.15) = 11.44 \text{ percent}$$

There are important points concerning the calculation of the WACC as shown in Equation 3-1 that the analyst must be familiar with. The next two sections address two key issues: taxes and the selection of weights.

2.1. Taxes and the Cost of Capital

Notice that in Equation 3-1 we adjust the expected before-tax cost on new debt financing, r_d , by a factor of $(1 - t)$. In the United States and many other tax jurisdictions, the interest on debt financing is a deduction to arrive at taxable income. Taking the tax deductibility of

interest as the base case, we adjust the pretax cost of debt for this tax shield. Multiplying r_d by $(1 - t)$ results in an estimate of the after-tax cost of debt.

For example, suppose a company pays €1 million in interest on its €10 million of debt. The cost of this debt is not €1 million because this interest expense reduces taxable income by €1 million, resulting in a lower tax. If the company is subject to a tax rate of 40 percent, this €1 million of interest costs the company $(€1 \text{ million})(1 - 0.4) = €0.6 \text{ million}$ because the interest reduces the company's tax bill by €0.4 million. In this case, the before-tax cost of debt is 10 percent, whereas the after-tax cost of debt is $(€0.6 \text{ million})/(€10 \text{ million}) = 6 \text{ percent}$.

Estimating the cost of common equity capital is more challenging than estimating the cost of debt capital. Debt capital involves a stated legal obligation on the part of the company to pay interest and repay the principal on the borrowing. Equity entails no such obligation. Estimating the cost of conventional preferred equity is rather straightforward because the dividend is generally stated and fixed, but estimating the cost of common equity is challenging. There are several methods available for estimating the cost of common equity, and we discuss two in this chapter. The first method uses the capital asset pricing model, and the second method uses the dividend discount model, which is based on discounted cash flows. No matter the method, there is no need to make any adjustment in the cost of equity for taxes because the payments to owners, whether in the form of dividends or the return on capital, are not tax deductible for the company.

EXAMPLE 3-2 Incorporating the Effect of Taxes on the Costs of Capital

Jorge Ricard, a financial analyst, is estimating the costs of capital for the Zeale Corporation. In the process of this estimation, Ricard has estimated the before-tax costs of capital for Zeale's debt and equity as 4 percent and 6 percent, respectively. What are the after-tax costs of debt and equity if Zeale's marginal tax rate is

1. 30 percent?
2. 48 percent?

Solutions.

	Marginal Tax Rate	After-Tax Cost of Debt	After-Tax Cost of Equity
1.	30 percent	$0.04(1 - 0.30) = 2.80 \text{ percent}$	6 percent
2.	48 percent	$0.04(1 - 0.48) = 2.08 \text{ percent}$	6 percent

Note: There is no adjustment for taxes in the case of equity; the before-tax cost of equity is equal to the after-tax cost of equity.

2.2. Weights of the Weighted Average

How do we determine what weights to use? Ideally, we want to use the proportion of each source of capital that the company would use in the project or company. If we assume that a company has a target capital structure and raises capital consistent with this target, we should use this target capital structure. The **target capital structure** is the capital structure that a company is striving to obtain.¹ If we know the company's target capital structure, then, of course, we should use this in our analysis. Someone outside the company, however, such as an analyst, typically does not know the target capital structure and must estimate it using one of several approaches:

1. Assume the company's current capital structure, at market value weights for the components, represents the company's target capital structure.
2. Examine trends in the company's capital structure or statements by management regarding capital structure policy to infer the target capital structure.
3. Use averages of comparable companies' capital structures as the target capital structure.

In the absence of knowledge of a company's target capital structure, we may take Method 1 as the baseline. Note that in applying Method 3, we use unweighted, arithmetic average, as is often done for simplicity. An alternative is to calculate a weighted average, which would give more weight to larger companies.

Suppose we are using the company's current capital structure as a proxy for the target capital structure. In this case, we use the market value of the different capital sources in the calculation of these proportions. For example, if a company has the following market values for its capital:

Bonds outstanding	\$5 million
Preferred stock	1 million
Common stock	14 million
Total capital	\$20 million

the weights that we apply would be

$$w_d = 0.25$$

$$w_p = 0.05$$

$$w_e = 0.70$$

Example 3-3 illustrates the estimation of weights. Note that a simple way of transforming a debt-to-equity ratio D/E into a weight—that is, $D/(D + E)$ —is to divide D/E by $1 + D/E$.

¹In Chapter 5, we discuss the capital structure decision in greater detail, including a look at how it relates to the value of the company.

EXAMPLE 3-3 Estimating the Proportions of Capital

Fin Anziell is a financial analyst with Analytiker Firma. Anziell is in the process of estimating the cost of capital of Gewicht GmbH. The following information is provided:

Gewicht GmbH	
Market value of debt	€50 million
Market value of equity	€60 million

Primary competitors and their capital structures (in millions):

Competitor	Market Value of Debt	Market Value of Equity
A	€25	€50
B	€101	€190
C	£40	£60

What are Gewicht's proportions of debt and equity that Anziell would use if estimating these proportions using the company's:

1. current capital structure?
2. competitors' capital structure?

Suppose Gewicht announces that a debt-to-equity ratio of 0.7 reflects its target capital structure.

3. What weights should Anziell use in the cost of capital calculations?

Solution to 1.

Current capital structure

$$w_d = \frac{€50 \text{ million}}{€50 \text{ million} + €60 \text{ million}} = 0.4545 \quad w_e = \frac{€60 \text{ million}}{€50 \text{ million} + €60 \text{ million}} = 0.5454$$

Solution to 2.

Competitors' capital structure²

²These weights represent the arithmetic average of the three companies' debt proportion and equity proportion, respectively.

$$w_d = \frac{\left(\frac{€25}{€25 + €50}\right) + \left(\frac{€101}{€101 + €190}\right) + \left(\frac{£40}{£40 + £60}\right)}{3} = 0.3601$$

$$w_e = \frac{\left(\frac{€50}{€25 + €50}\right) + \left(\frac{€190}{€101 + €190}\right) + \left(\frac{£60}{£40 + £60}\right)}{3} = 0.6399$$

Solution to 3. A debt-to-equity ratio of 0.7 represents a weight on debt of $0.7/1.7 = 0.4118$ so that $w_d = 0.4118$ and $w_e = 1 - 0.4118 = 0.5882$. These would be the preferred weights to use in a cost of capital calculation.

2.3. Applying the Cost of Capital to Capital Budgeting and Security Valuation

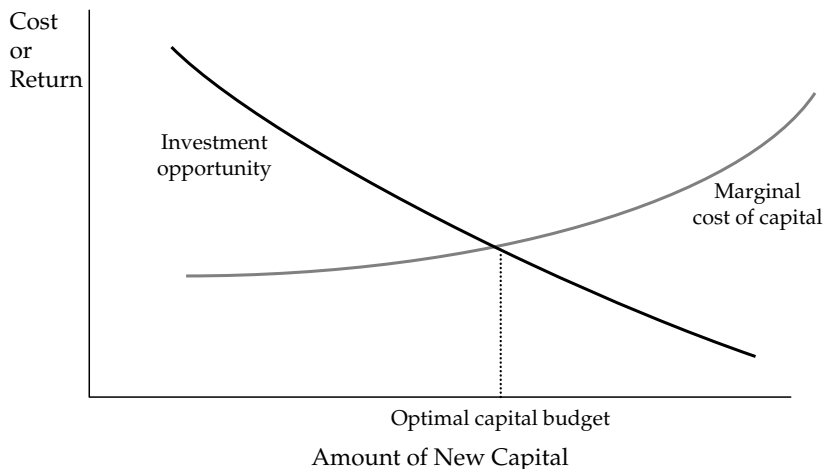
With some insight now into the calculation of the cost of capital, let us continue to improve our understanding of the roles it plays in financial analysis. A chief use of the marginal cost of capital estimate is in capital-budgeting decision making. What role does the marginal cost of capital play in a company's investment program, and how do we adapt it when we need to evaluate a specific investment project?

A company's marginal cost of capital (MCC) may increase as additional capital is raised, whereas returns to a company's investment opportunities are generally believed to decrease as the company makes additional investments, as represented by the **investment opportunity schedule (IOS)**.³ We show this relation in Exhibit 3-1, graphing the upward-sloping marginal cost of capital schedule against the downward-sloping investment opportunity schedule. In the context of a company's investment decision, the optimal capital budget is that amount of capital raised and invested at which the marginal cost of capital is equal to the marginal return from investing. In other words, the optimal capital budget occurs when the marginal cost of capital intersects with the investment opportunity schedule as seen in Exhibit 3-1.

The relation between the MCC and the IOS provides a broad picture of the basic decision-making problem of a company. However, we are often interested in valuing an individual project or even a portion of a company, such as a division or product line. In these applications, we are interested in the cost of capital for the project, product, or division as opposed to the cost of capital for the company overall. The cost of capital in these applications should reflect the riskiness of the future cash flows of the project, product, or division. For an average-risk project, the opportunity cost of capital is the company's WACC. If the systematic risk of the project is above or below average relative to the company's current portfolio of projects, an upward or downward adjustment, respectively, is made to the company's WACC. Companies may take an *ad hoc* or a systematic approach to making such

³The investment opportunity schedule originates with Fisher's production opportunities (1930) and was adapted to capital budgeting by John Hirshleifer (1958), 329–352.

EXHIBIT 3-1 Optimal Investment Decision



adjustments. The discussion of a systematic approach is a somewhat advanced topic that we defer to Section 4.1.

The WACC or MCC corresponding to the average risk of the company, adjusted appropriately for the risk of a given project, plays a role in capital-budgeting decision making based on the net present value (NPV) of that project. Recall from the capital-budgeting chapter that the NPV is the present value of all the project cash flows. It is useful to think of it as the difference between the present value of the cash inflows, discounted at the opportunity cost of capital applicable to the specific project, and the present value of the cash outflows, discounted using that same opportunity cost of capital:

$$\text{NPV} = \text{Present value of inflows} - \text{Present value of outflows}$$

If an investment's NPV is positive, the company should undertake the project. If we choose to use the company's WACC in the calculation of the NPV of a project, we are assuming that the project:

- Has the same risk as the average-risk project of the company.
- Will have a constant target capital structure throughout its useful life.⁴

These may not be realistic or appropriate assumptions and are potential drawbacks to using the company's WACC in valuing projects. However, alternative approaches are subject to drawbacks as well, and the approach outlined has wide acceptance.⁵

⁴WACC is estimated using fixed proportions of equity and debt. The NPV method assumes a constant required rate of return, whereas a fluctuating capital structure would cause WACC to fluctuate. The importance of this issue is demonstrated by Miles and Ezzell (1980), 719–730.

⁵See the chapter on capital budgeting for a discussion.

For the analyst, the second key use of the marginal cost of capital is in security valuation using any one of several discounted cash flow valuation models available.⁶ For a particular valuation model, if these cash flows are cash flows to the company's suppliers of capital (that is, free cash flow to the firm), the analyst uses the weighted average cost of capital of the company in the valuation.⁷ If these cash flows are strictly those belonging to the company's owners, such as the free cash flow to equity, or dividends, the analyst uses the cost of equity capital to find the present value of these flows.⁸

In the next section, we discuss how an analyst may approach the calculation of the component costs of capital, focusing on debt, preferred stock, and common equity.

3. COSTS OF THE DIFFERENT SOURCES OF CAPITAL

Each source of capital has a different cost because of the differences among the sources, such as seniority, contractual commitments, and potential value as a tax shield. We focus on the costs of three primary sources of capital: debt, preferred equity, and common equity.

3.1. Cost of Debt

The **cost of debt** is the cost of debt financing to a company when it issues a bond or takes out a bank loan. We discuss two methods to estimate the before-tax cost of debt, r_d : the yield-to-maturity approach and debt-rating approach.

3.1.1. Yield-to-Maturity Approach

The **yield to maturity (YTM)** is the annual return that an investor earns on a bond if the investor purchases the bond today and holds it until maturity. In other words, it is the yield, r_d , that equates the present value of the bond's promised payments to its market price:

$$\begin{aligned}
 P_0 &= \frac{PMT_1}{\left(1 + \frac{r_d}{2}\right)} + \cdots + \frac{PMT_n}{\left(1 + \frac{r_d}{2}\right)^n} + \frac{FV}{\left(1 + \frac{r_d}{2}\right)^n} \\
 &= \left(\sum_{t=1}^n \frac{PMT_t}{\left(1 + \frac{r_d}{2}\right)^t} \right) + \frac{FV}{\left(1 + \frac{r_d}{2}\right)^n} \quad (3-2)
 \end{aligned}$$

⁶See Pinto, Henry, Robinson, and Stowe (2010) for a presentation of such models.

⁷**Free cash flow to the firm (FCFF)** is the cash flow available to the company's suppliers of capital after all operating expenses (including taxes) have been paid and necessary investments in working capital (e.g., inventory) and fixed capital (e.g., plant and equipment) have been made.

⁸**Free cash flow to equity (FCFE)** is the cash flow available to holders of the company's common equity after all operating expenses, interest, and principal payments have been paid and necessary investments in working capital and fixed capital have been made. See Pinto, Henry, Robinson, and Stowe (2010) for more details on FCFF and FCFE and valuation models based on those concepts.

where

P_0 is the current market price of the bond

PMT_t is the interest payment in period t

r_d is the yield to maturity⁹

n is the number of periods remaining to maturity

FV is the maturity value of the bond

This valuation equation assumes the bond pays semiannual interest and that any intermediate cash flows (in this case the interest prior to maturity) are reinvested at the rate $r_d/2$.

Example 3-4 illustrates the calculation of the after-tax cost of debt.

EXAMPLE 3-4 Calculating the After-Tax Cost of Debt

Valence Industries issues a bond to finance a new project. It offers a 10-year, 5 percent semiannual coupon bond. Upon issue, the bond sells at \$1,025. What is Valence's before-tax cost of debt? If Valence's marginal tax rate is 35 percent, what is Valence's after-tax cost of debt?

Solution.

Given:

$$PV = \$1,025$$

$$FV = \$1,000$$

$$PMT = 5 \text{ percent of } 1,000 \div 2 = \$25$$

$$n = 10 \times 2 = 20$$

$$\$1,025 = \left(\sum_{t=1}^{20} \frac{\$25}{(1+i)^t} \right) + \frac{\$1,000}{(1+i)^{20}}$$

Use a financial calculator to solve for i , the six-month yield. Because $i = 2.342$ percent, the before-tax cost of debt is $r_d = 2.342 \text{ percent} \times 2 = 4.684 \text{ percent}$, and Valence's after-tax cost of debt is $r_d(1 - t) = 0.04684(1 - 0.35) = 0.03045$ or 3.045 percent.

3.1.2. Debt-Rating Approach

When a reliable current market price for a company's debt is not available, the **debt-rating approach** can be used to estimate the before-tax cost of debt. Based on a company's debt

⁹ r_d is expressed as an annual rate and is divided by the number of payment periods per year. Because most corporate bonds pay semiannual interest, we divided r_d by 2 in this calculation. The interest payment for each period thus corresponds with the bond's semiannual coupon payment.

rating, we estimate the before-tax cost of debt by using the yield on comparably rated bonds for maturities that closely match that of the company's existing debt.

Suppose a company's capital structure includes debt with an average maturity (or duration) of 10 years and the company's marginal tax rate is 35 percent. If the company's rating is AAA and the yield on debt with the same debt rating and similar maturity (or duration) is 4 percent, the company's after-tax cost of debt is¹⁰

$$r_d(1 - t) = 4 \text{ percent}(1 - 0.35) = 2.6 \text{ percent}$$

A consideration when using this approach is that debt ratings are ratings of the debt issue itself, with the issuer being only one of the considerations. Other factors, such as debt seniority and security, also affect ratings and yields, so care must be taken to consider the likely type of debt to be issued by the company in determining the comparable debt rating and yield. The debt-rating approach is a simple example of pricing on the basis of valuation-relevant characteristics, which in bond markets has been known as evaluated pricing or **matrix pricing**.

3.1.3. Issues in Estimating the Cost of Debt

3.1.3.1. Fixed-Rate Debt versus Floating-Rate Debt Up to now, we have assumed that the interest on debt is a fixed amount each period. We can observe market yields of the company's existing debt or market yields of debt of similar risk in estimating the before-tax cost of debt. However, the company may also issue floating-rate debt in which the interest rate adjusts periodically according to a prescribed index, such as the prime rate or LIBOR, over the life of the instrument.

Estimating the cost of a floating-rate security is difficult because the cost of this form of capital over the long term depends not only on the current yields but also on the future yields. The analyst may use the current term structure of interest rates and term structure theory to assign an average cost to such instruments.

3.1.3.2. Debt with Option-Like Features How should an analyst determine the cost of debt when the company used debt with option-like features, such as call, conversion, or put provisions? Clearly, options affect the value of debt. For example, a callable bond would have a yield greater than a similar noncallable bond of the same issuer because bondholders want to be compensated for the call risk associated with the bond. In a similar manner, the put feature of a bond, which provides the investor with an option to sell the bond back to the issuer at a predetermined price, has the effect of lowering the yield on a bond below that of a similar nonputtable bond.

If the company already has debt outstanding incorporating option-like features that the analyst believes are representative of the future debt issuance of the company, the analyst may simply use the yield to maturity on such debt in estimating the cost of debt.

If the analyst believes that the company will add or remove option features in future debt issuance, the analyst can make market value adjustments to the current YTM to reflect the value of such additions and/or deletions. The technology for such adjustments is an advanced topic that is outside the scope of this chapter.¹¹

¹⁰Duration is a more precise measure of a bond's interest rate sensitivity than maturity.

¹¹See Fabozzi (2004), for example, for an introduction. Fabozzi discusses the estimation of an option-adjusted spread (OAS) to price the call option feature of a callable bond.

3.1.3.3. Nonrated Debt If a company does not have any debt outstanding or if the yields on the company's existing debt are not available, the analyst may not always be able to use the yield on similarly rated debt securities. It may be the case that the company does not have rated bonds. Though researchers offer approaches for estimating a company's "synthetic" debt rating based on financial ratios, these methods are imprecise because debt ratings incorporate not only financial ratios but also information about the particular bond issue and the issuer that are not captured in financial ratios.

3.1.3.4. Leases A lease is a contractual obligation that can substitute for other forms of borrowing. This is true whether the lease is an operating lease or a capital lease, though only the capital lease is represented as a liability on the company's balance sheet.¹² If the company uses leasing as a source of capital, the cost of these leases should be included in the cost of capital. The cost of this form of borrowing is similar to that of the company's other long-term borrowing.

3.2. Cost of Preferred Stock

The **cost of preferred stock** is the cost that a company has committed to pay preferred stockholders as a preferred dividend when it issues preferred stock. In the case of nonconvertible, noncallable preferred stock that has a fixed dividend rate and no maturity date (**fixed rate perpetual preferred stock**), we can use the formula for the value of a preferred stock:

$$P_p = \frac{D_p}{r_p}$$

where

P_p is the current preferred stock price per share

D_p is the preferred stock dividend per share

r_p is the cost of preferred stock

We can rearrange this equation to solve for the cost of preferred stock:

$$r_p = \frac{D_p}{P_p} \quad (3-3)$$

Therefore, the cost of preferred stock is the preferred stock's dividend per share divided by the current preferred stock's price per share. Unlike interest on debt, the dividend on

¹²In the United States, an operating lease is distinguished from a capital lease in Statement of Financial Accounting Standards No. 13, Accounting for Leases (FASB, November 1976). (IAS No. 17 similarly distinguishes between operating and finance leases, another term for capital-type leases.) These two forms of leases are distinguished on the basis of ownership transference, the existence of a bargain purchase option, the term of the lease relative to the economic life of the asset, and the present value of the lease payments relative to the value of the asset. In either case, however, the lease obligation is a form of borrowing, even though it is only in the case of a capital lease that the obligation appears as a liability on the company's balance sheet. The discount rate applied in the valuation of a capital lease is the rate of borrowing at the time of the lease commencement; therefore, it is reasonable to apply the company's long-term borrowing rate when estimating the cost of capital for leasing.

preferred stock is not tax deductible by the company; therefore, there is no adjustment to the cost for taxes.¹³

A preferred stock may have a number of features that affect the yield and hence the cost of preferred stock. These features include a call option, cumulative dividends, participating dividends, adjustable-rate dividends, or convertibility into common stock. When estimating a yield based on current yields of the company's preferred stock, we must make appropriate adjustments for the effects of these features on the yield of an issue. For example, if the company has callable, convertible preferred stock outstanding, yet it is expected that the company will issue only noncallable, nonconvertible preferred stock in the future, we would have to either use the current yields on comparable companies' noncallable, nonconvertible preferred stock or estimate the yield on preferred equity using methods outside the scope of this chapter.¹⁴

EXAMPLE 3-5 Calculating the Cost of Preferred Equity

Alcoa has one class of preferred stock outstanding, a \$3.75 cumulative preferred stock, for which there are 546,024 shares outstanding.¹⁵ If the price of this stock is \$72, what is the estimate of Alcoa's cost of preferred equity?

Solution. Cost of Alcoa's preferred stock = $\$3.75/\$72.00 = 5.21$ percent.

EXAMPLE 3-6 Choosing the Best Estimate of the Cost of Preferred Equity

Wim Vanistendael is finance director of De Gouden Tulip N.V., a leading Dutch flower producer and distributor. He has been asked by the CEO to calculate the cost of preferred equity and has recently obtained the following information:

- The issue price of preferred stock was €3.5 million and the preferred dividend is 5 percent.
- If the company issued new preferred stock today, the preferred coupon rate would be 6.5 percent.
- The company's marginal tax rate is 30.5 percent.

What is the cost of preferred equity for De Gouden Tulip N.V.?

¹³This is not to be confused, however, with the dividends received deduction, which reduces the effective tax on intercorporate preferred dividends received.

¹⁴A method for estimating this yield involves first estimating the option-adjusted spread (OAS). For further information on the OAS, see Fabozzi (2004).

¹⁵Alcoa Annual Report 2004, footnote R, p. 56.

Solution. If De Gouden Tulip were to issue new preferred stock today, the coupon rate would be close to 6.5 percent. The current terms thus prevail over the past terms when evaluating the actual cost of preferred stock. The cost of preferred stock for De Gouden Tulip is, therefore, 6.5 percent. Because preferred dividends offer no tax shield, there is no adjustment made based on the marginal tax rate.

3.3. Cost of Common Equity

The cost of common equity (r_e), usually referred to simply as the cost of equity, is the rate of return required by a company's common shareholders. A company may increase common equity through the reinvestment of earnings—that is, retained earnings—or through the issuance of new shares of stock.

As we discussed earlier, the estimation of the cost of equity is challenging because of the uncertain nature of the future cash flows in terms of the amount and timing. Commonly used approaches for estimating the cost of equity include the capital asset pricing model, the dividend discount model, and the bond yield plus risk premium method.

3.3.1. Capital Asset Pricing Model Approach

In the capital asset pricing model (CAPM) approach, we use the basic relationship from the capital asset pricing model theory that the expected return on a stock, $E(R_i)$, is the sum of the risk-free rate of interest, R_F , and a premium for bearing the stock's market risk, $\beta_i (R_M - R_F)$:

$$E(R_i) = R_F + \beta_i [E(R_M) - R_F] \quad (3-4)$$

where

β_i = the return sensitivity of stock i to changes in the market return

$E(R_M)$ = the expected return on the market

$E(R_M) - R_F$ = the expected market risk premium

A risk-free asset is defined here as an asset that has no default risk. A common proxy for the risk-free rate is the yield on a default-free government debt instrument. In general, the selection of the appropriate risk-free rate should be guided by the duration of projected cash flows. If we are evaluating a project with an estimated useful life of 10 years, we may want to use the rate on the 10-year Treasury bond.

EXAMPLE 3-7 Using the CAPM to Estimate the Cost of Equity

Valence Industries wants to know its cost of equity. Its CFO believes the risk-free rate is 5 percent, equity risk premium is 7 percent, and Valence's equity beta is 1.5. What is Valence's cost of equity using the CAPM approach?

Solution. Cost of common stock = 5 percent + 1.5(7 percent) = 15.5 percent.

The expected market risk premium, or $E(R_M - R_F)$, is the premium that investors demand for investing in a market portfolio relative to the risk-free rate. When using the CAPM to estimate the cost of equity, in practice we typically estimate beta relative to an equity market index. In that case, the market premium estimate we are using is actually an estimate of the **equity risk premium (ERP)**.

An alternative to the CAPM to accommodate risks that may not be captured by the market portfolio alone is a multifactor model that incorporates factors that may be other sources of **priced risk** (risk for which investors demand compensation for bearing), including macroeconomic factors and company-specific factors. In general

$$E(R_i) = R_F + \beta_{i1}(\text{Factor risk premium})_1 + \beta_{i2}(\text{Factor risk premium})_2 + \cdots + \beta_{ij}(\text{Factor risk premium})_j \quad (3-5)$$

where

β_{ij} is stock i 's sensitivity to changes in the j th factor

$(\text{Factor risk premium})_j$ is expected risk premium for the j th factor

The basic idea behind these multifactor models is that the CAPM beta may not capture all the risks, especially in a global context, which include inflation, business-cycle, interest rate, exchange rate, and default risks.^{16,17}

There are several ways to estimate the equity risk premium, though there is no general agreement as to the best approach. The three we discuss are the historical equity risk premium approach, the dividend discount model approach, and the survey approach.

The **historical equity risk premium approach** is a well-established approach based on the assumption that the realized equity risk premium observed over a long period of time is a good indicator of the expected equity risk premium. This approach requires compiling historical data to find the average rate of return of a country's market portfolio and the average rate of return for the risk-free rate in that country. For example, an analyst might use the historical returns to the TOPIX Index to estimate the risk premium for Japanese equities. The exceptional bull market observed during the second half of the 1990s, and the bursting of the technology bubble that followed during the years 2000–2002, reminds us that the time period for such estimates should cover complete market cycles.

Elroy Dimson, Paul Marsh, and Mike Staunton conduct an analysis of the equity risk premiums observed in markets located in 16 countries, including the United States, over the period 1900–2002.¹⁸ These researchers found that the annualized U.S. equity risk premium relative to U.S. Treasury bills was 5.3 percent (geometric mean) and 7.2 percent (arithmetic mean). They also found that the annualized U.S. equity risk premium relative to bonds was

¹⁶An example of the multifactor model is the three-factor Fama and French model (Fama and French [1992], 427–465), which includes factors for the market, equity capitalization, and the ratio of book value of equity to the market value of equity.

¹⁷These models are discussed in more detail by Bruner, et al. (2003) and by Fama and French (2004), 3–24.

¹⁸Dimson, Marsh, and Staunton (2003), 27–38.

4.4 percent (geometric mean) and 6.4 percent (arithmetic mean).¹⁹ Note that the arithmetic mean is greater than the geometric mean as a result of the significant volatility of the observed market rate of return and of the observed risk-free rate. Under the assumption of an unchanging distribution of returns through time, the arithmetic mean is the unbiased estimate of the expected single-period equity risk premium, but the geometric mean better reflects growth rate over multiple periods.²⁰ In Exhibit 3-2 we provide historical estimates of the equity risk premium for 16 developed markets from Dimson, Marsh, and Staunton's study.

EXHIBIT 3-2 Equity Risk Premiums Relative to Bonds (1900 to 2001)

Country	Mean	
	Geometric	Arithmetic
Australia	6.3%	7.9%
Belgium	2.8	4.7
Canada	4.2	5.7
Denmark	1.8	3.1
France	4.6	6.7
Germany	6.3	9.6
Ireland	3.1	4.5
Italy	4.6	8.0
Japan	5.9	10.0
The Netherlands	4.4	6.4
South Africa	5.4	7.1
Spain	2.2	4.1
Sweden	4.9	7.1
Switzerland	2.4	3.9
United Kingdom	4.2	5.5
United States	4.8	6.7
World	4.3	5.4

Note: Germany excludes 1922–1923. Switzerland commences in 1911.

Source: Dimson, Marsh, and Staunton (2003).

¹⁹Jeremy Siegel presents a longer time series of market returns, covering the period from 1802 through 2004, and observes an equity return of 6.82 percent and an equity risk premium in the range of 3.31 to 5.36 percent. See Siegel (2005), 61–73. The range depends on the method of calculation (compounded or arithmetic) and the benchmark (bonds or bills).

²⁰Aside from the method of averaging (geometric versus arithmetic), estimates of the historical equity risk premium differ depending on the assumed investment horizon (short versus intermediate versus long), whether conditional on some variable or unconditional, whether U.S. or global markets are examined, the source of the data, the period observed, and whether nominal or real returns are estimated.

To illustrate the historical method as applied in the CAPM, suppose that we use the historical geometric mean for U.S. equity of 4.8 percent to value Citibank Inc. (NYSE: C) as of early January 2006. According to Standard & Poor's, Citibank had a beta of 1.32 at that time. Using the 10-year U.S. Treasury bond yield of 4.38 percent to represent the risk-free rate, the estimate of the cost of equity for Citibank is 4.38 percent + 1.32(4.8 percent) = 10.72 percent.

The historical premium approach has several limitations. One limitation is that the level of risk of the stock index may change over time. Another is that the risk aversion of investors may change over time. And still another limitation is that the estimates are sensitive to the method of estimation and the historical period covered.

EXAMPLE 3-8 Estimating the Equity Risk Premium Using Historical Rates of Return

Suppose that the arithmetic average T-bond rate observed over the past 100 years is an unbiased estimator for the risk-free rate and amounts to 5.4 percent. Likewise, suppose the arithmetic average of return on the market observed over the past 100 years is an unbiased estimator for the expected return for the market. The average rate of return of the market was 9.3 percent. Calculate the equity risk premium.

Solution.

$$\text{ERP} = \bar{R}_M - \bar{R}_F = 9.3 \text{ percent} - 5.4 \text{ percent} = 3.9 \text{ percent.}$$

A second approach for estimating the equity risk premium is the **dividend discount model based approach** or **implied risk premium approach**, which is implemented using the Gordon growth model (also known as the constant-growth dividend discount model). For developed markets, corporate earnings often meet, at least approximately, the model's assumption of a long-run trend growth rate. We extract the premium by analyzing how the market prices an index. That is, we use the relationship between the value of an index and expected dividends, assuming a constant growth in dividends:

$$P_0 = \frac{D_1}{r_e - g}$$

where P_0 is the current market value of the equity market index, D_1 are the dividends expected next period on the index, r_e is the required rate of return on the market, and g is the expected growth rate of dividends. We solve for the required rate of return on the market as

$$r_e = \frac{D_1}{P_0} + g \quad (3-6)$$

Therefore, the expected return on the market is the sum of the dividend yield and the growth rate in dividends.²¹ The equity risk premium thus is the difference between the expected return on the equity market and the risk-free rate.

Suppose the expected dividend yield on an equity index is 5 percent and the expected growth rate of dividends on the index is 2 percent. The expected return on the market according to the Gordon growth model is

$$E(R_m) = 5 \text{ percent} + 2 \text{ percent} = 7 \text{ percent}$$

A risk-free rate of interest of 3.8 percent implies an equity risk premium of 7 percent – 3.8 percent = 3.2 percent.

Another approach to estimate the equity risk premium is quite direct: Ask a panel of finance experts for their estimates and take the mean response. This is the **survey approach**. For example, one set of U.S. surveys found that the expected U.S. equity risk premium over the next 30 years was 5.5 percent to 7 percent forecasting from 2001 as the baseline year and 7.1 percent using 1998 as the baseline year.

Once we have an estimate of the equity risk premium, we fine-tune this estimate for the particular company or project by adjusting it for the specific systematic risk of the project. We adjust for the specific systematic risk by multiplying the market risk premium by beta to arrive at the company's or project's risk premium, which we then add to the risk-free rate to determine the cost of equity within the framework of the CAPM.²²

3.3.2. Dividend Discount Model Approach

Earlier we used the Gordon growth model to develop an estimate of the equity risk premium for use in the CAPM. We can also use the Gordon growth model directly to obtain an estimate of the cost of equity. To review, the dividend discount model in general states that the intrinsic value of a share of stock is the present value of the share's expected future dividends:

$$V_0 = \sum_{t=1}^{\infty} \left(\frac{D}{(1+r_e)^t} \right) = \frac{D}{(1+r_e)} + \frac{D}{(1+r_e)^2} + \dots$$

where

V_0 is the intrinsic value of a share

D_t is the share's dividend at the end of period t

r_e is the cost of equity

Based on Gordon's constant growth formulation, we assume dividends are expected to grow at a constant rate, g .²³ Therefore, if we assume that price reflects intrinsic value ($V_0 = P_0$), we can rewrite the valuation of the stock as

²¹We explain Equation 3-6 in more detail in Section 3.3.2.

²²Some researchers argue that the equity risk premium should reflect a country risk premium. For example, a multinational company or project may have a higher cost of capital than a comparable domestic company because of political risk, foreign exchange risk, or higher agency costs. In most cases, this risk is unsystematic and hence does not affect the cost of capital estimate.

²³See Gordon (1962).

$$P_0 = \frac{D_1}{r_e - g}$$

We can then rewrite the above equation and estimate the cost of equity as we did for Equation 3-6 in Section 3.3.1:

$$r_e = \frac{D_1}{P_0} + g$$

Therefore, to estimate r_e , we need to estimate the dividend in the next period and the assumed constant dividend growth rate. The current stock price, P_0 , is known, and the dividend of the next period, D_1 , can be predicted if the company has a stable dividend policy. (The ratio D_1/P_0 may be called the forward annual dividend yield.) The challenge is estimating the growth rate.

There are at least two ways to estimate the growth rate. The first is to use a forecasted growth rate from a published source or vendor. A second is to use a relationship between the growth rate, the retention rate, and the return on equity. In this context, this is often referred to as the **sustainable growth rate** and is interpretable as the rate of dividend (and earnings) growth that can be sustained over time for a given level of return on equity, keeping the capital structure constant and without issuing additional common stock. The relationship is given in Equation 3-7:

$$g = (1 - D/\text{EPS})\text{ROE} \quad (3-7)$$

where D/EPS represents the assumed stable dividend payout ratio and ROE is the historical return on equity. The term $(1 - D/\text{EPS})$ is the company's earnings retention rate.

Consider Citigroup, Inc. Citigroup has an earnings retention rate of 59 percent. As of early January 2006, Citigroup had a forward annual dividend yield of 3.9 percent, a trailing return on equity of approximately 20 percent, but an estimated average return on equity going forward of approximately 16.6 percent. According to Equation 3-7, Citigroup's sustainable growth rate is $0.59(16.6 \text{ percent}) = 9.79 \text{ percent}$. The dividend discount model estimate of the cost of equity is, therefore, $9.79 \text{ percent} + 3.9 \text{ percent} = 13.69 \text{ percent}$.

3.3.3. Bond Yield Plus Risk Premium Approach

The **bond yield plus risk premium approach** is based on the fundamental tenet in financial theory that the cost of capital of riskier cash flows is higher than that of less risky cash flows. In this approach, we sum the before-tax cost of debt, r_d , and a risk premium that captures the additional yield on a company's stock relative to its bonds. The estimate is, therefore,

$$r_e = r_d + \text{Risk premium} \quad (3-8)$$

The risk premium compensates for the additional risk of equity compared with debt.²⁴ Ideally, this risk premium is forward looking, representing the additional risk associated with the stock of the company as compared with the bonds of the same company. However, we

²⁴This risk premium is not to be confused with the equity risk premium. The equity risk premium is the difference between the cost of equity and the *risk-free rate of interest*. The risk premium in the bond yield plus risk premium approach is the difference between the cost of equity and the *company's cost of debt*.

often estimate this premium using historical spreads between bond yields and stock yields. In developed country markets, a typical risk premium added is in the range of 3 to 5 percent.

Looking again at Citigroup, as of early January 2006, the yield to maturity of the Citigroup 5.3s bonds maturing in 2016 was approximately 4.95 percent. Adding an arbitrary risk premium of 3.5 percent produces an estimate of the cost of equity of $4.95 + 3.5 = 8.45$ percent. This estimate contrasts with the higher estimates of 10.72 percent, under the CAPM approach, and 13.69 percent, under the dividend discount model approach. Such disparities are not uncommon and reflect the difficulty of cost of equity estimation.

4. TOPICS IN COST OF CAPITAL ESTIMATION

When calculating a company's weighted average cost of capital (WACC), it is essential to understand the risk factors that have been considered in determining the risk-free rate, the equity risk premium, and beta to ensure a consistent calculation of WACC and avoid the double counting or omission of pertinent risk factors.

4.1. Estimating Beta and Determining a Project Beta

When the analyst uses the CAPM to estimate the cost of equity, he or she must estimate beta. The estimation of beta presents many choices as well as challenges.

One common method of estimating the company's stock beta is to use a market model regression of the company's stock returns (R_{it}) against market returns (R_{mt}) over T periods:²⁵

$$R_{it} = \hat{a} + \hat{b} R_{mt} \quad t = 1, 2, \dots, T$$

where \hat{a} is the estimated intercept and \hat{b} is the estimated slope of the regression that is used as an estimate of beta. However, beta estimates are sensitive to the method of estimation and data used. Consider some of the issues:

- *Estimation period.* The estimated beta is sensitive to the length of the estimation period, with beta commonly estimated using data over two to nine years. Selection of the estimation period is a trade-off between data richness captured by longer estimation periods and company-specific changes that are better reflected with shorter estimation periods. In general, longer estimation periods are applied to companies with a long and stable operating history, and shorter estimation periods are used for companies that have undergone significant structural changes in the recent past (such as restructuring, recent acquisition, or divestiture) or changes in financial and operating leverage.
- *Periodicity of the return interval* (e.g., daily, weekly, or monthly). Researchers have observed smaller standard error in beta estimated using smaller return intervals, such as daily returns.²⁶
- *Selection of an appropriate market index.* The choice of market index affects the estimate of beta.

²⁵This equation is commonly referred to as the *market model* and was first introduced by Michael C. Jensen (1969), 389–416.

²⁶Daves, Ehrhardt, and Kunkel (2000), 7–13.

- *Use of a smoothing technique.* Some analysts adjust historical betas to reflect the tendency of betas to revert to 1.²⁷ As an example, the expression $\beta_{i,adj} = 0.333 + 0.667\beta_i$ adjusts betas above and below 1.0 toward 1.0.
- *Adjustments for small-capitalization stocks.* Small-capitalization stocks have generally exhibited greater risks and greater returns than large-capitalization stocks over the long run. Roger Ibbotson, Paul Kaplan, and James Peterson argue that betas for small-capitalization companies be adjusted upward.²⁸

Arriving at an estimated beta for publicly traded companies is generally not a problem because of the accessibility of stock return data, the ease of use of estimating beta using simple regression, and the availability of estimated betas on publicly traded companies from financial analysis vendors, such as Barra, Bloomberg, Thompson Financial's Datastream, Reuters, and Value Line. The challenge is to estimate a beta for a company that is not publicly traded or to estimate a beta for a project that is not the average or typical project of a publicly traded company. Estimating a beta in these cases requires proxying for the beta by using the information on the project or company combined with a beta of a publicly traded company.

The beta of a company or project is affected by the systematic components of business risk and by financial risk. Both of these factors affect the uncertainty of the cash flows of the company or project. The **business risk** of a company or project is the risk related to the uncertainty of revenues, referred to as **sales risk**, and as **operating risk**, which is the risk attributed to the company's operating cost structure. Sales risk is affected by the elasticity of the demand of the product, the cyclicalities of the revenues, and the structure of competition in the industry. Operating risk is affected by the relative mix of fixed and variable operating costs: the greater the fixed operating costs, relative to variable operating costs, the greater the uncertainty of income and cash flows from operations.

Financial risk is the uncertainty of net income and net cash flows attributed to the use of financing that has a fixed cost, such as debt and leases. The greater the use of fixed-financing sources of capital, relative to variable sources, the greater the financial risk. In other words, a company that relies heavily on debt financing instead of equity financing is assuming a great deal of financial risk.

How does a financial analyst estimate a beta for a company or project that is not publicly traded? One common method is the **pure-play method**, which requires using a comparable publicly traded company's beta and adjusting it for financial leverage differences.

A **comparable company** is a company that has similar business risk. The reason it is referred to as the *pure-play* method is that one of the easiest ways of identifying a comparable for a project is to find a company in the same industry that is in that *single* line of business. For example, if the analyst is examining a project that involves drug stores, appropriate comparables in the United States may be Walgreens, CVS Corporation, and Rite Aid Corporation.

In estimating a beta in this way, the analyst must make adjustments to account for differing degrees of financial leverage. This requires a process of "unlevering" and "levering" the beta. The beta of the comparable is first "unlevered" by removing the effects of its financial leverage.²⁹ The unlevered beta is often referred to as the **asset beta** because it reflects the business risk of the assets. Once we determine the unlevered beta, we adjust it for the

²⁷Blume (1971), 1–10.

²⁸See Ibbotson, Kaplan, and Peterson (1997), 104–110.

²⁹The process of unlevering and levering a beta was developed by Robert S. Hamada (1972, 435–452) and is based on the capital structure theories of Franco Modigliani and Merton Miller.

capital structure of the company or project that is the focus of our analysis. In other words, we “lever” the asset beta to arrive at an estimate of the equity beta for the project or company of interest.

For a given company, we can unlever its equity beta to estimate its asset beta. To do this, we must determine the relationship between a company’s asset beta and its equity beta. Because the company’s risk is shared between creditors and owners, we can represent the company’s risk, β_{asset} , as the weighted average of the company’s creditors’ market risk, β_{debt} , and the market risk of the owners, β_{equity} :

$$\beta_{\text{asset}} = \beta_{\text{debt}} w_d + \beta_{\text{equity}} w_e$$

or

$$\beta_{\text{asset}} = \beta_{\text{debt}} \left(\frac{D}{D+E} \right) + \beta_{\text{equity}} \left(\frac{E}{D+E} \right)$$

where

E = market value of equity

D = market value of debt

w_d = proportion of debt $D/D + E$

w_e = proportion of equity $E/D + E$

But interest on debt is deducted by the company to arrive at taxable income, so the claim that creditors have on the company’s assets does not cost the company the full amount but, rather, the after-tax claim; the burden of debt financing is actually less due to interest deductibility. We can represent the asset beta of a company as the weighted average of the betas of debt and equity after considering the effects of the tax deductibility of interest:

$$\beta_{\text{asset}} = \beta_{\text{debt}} \frac{(1-t)D}{(1-t)D+E} + \beta_{\text{equity}} \frac{E}{(1-t)D+E}$$

where t is the marginal tax rate.

We generally assume that a company’s debt does not have market risk, so $\beta_{\text{debt}} = 0$. This means that the returns on debt do not vary with the returns on the market, which we generally assume to be true for most large companies. If $\beta_{\text{debt}} = 0$, then³⁰

$$\beta_{\text{asset}} = \beta_{\text{equity}} \left[\frac{1}{1 + \left((1-t) \frac{D}{E} \right)} \right] \quad (3-9)$$

Therefore, the market risk of a company’s equity is affected by both the asset’s market risk, β_{asset} , and a factor representing the nondiversifiable portion of company’s financial risk, $[1 + (1-t)D/E]$:

³⁰The first step is $\beta_{\text{asset}} = \beta_{\text{equity}} \left[\frac{E}{(1-t)D+E} \right]$, which we simplify to arrive at Equation 3-9.

$$\beta_{\text{equity}} = \beta_{\text{asset}} \left[1 + \left((1 - t) \frac{D}{E} \right) \right] \quad (3-10)$$

Suppose a company has an equity beta of 1.5, a debt-to-equity ratio of 0.4, and a marginal tax rate of 30 percent. Using Equation 3-9, the company's asset beta is 1.1719:

$$\beta_{\text{asset}} = 1.5 \left[\frac{1}{1 + \left((1 - 0.3)(0.4) \right)} \right] = 1.5[0.7813] = 1.1719$$

In other words, if the company did not have any debt financing, its $\beta_{\text{asset}} = \beta_{\text{equity}} = 1.1719$; however, the use of debt financing increases its β_{equity} from 1.1719 to 1.5. What would the company's equity beta be if the company's debt-to-equity ratio were 0.5 instead of 0.4? In this case, we apply Equation 3-10, using the debt-to-equity ratio of 0.5:

$$\beta_{\text{equity}} = 1.1719 \left[1 + \left((1 - 0.3)(0.5) \right) \right] = 1.5821$$

Therefore, the unlevering calculation produces a measure of market risk for the assets of the company—ignoring the company's capital structure. We use the levering calculation in Equation 3-10 to estimate the market risk of a company given a specific asset risk, marginal tax rate, and capital structure.

We can use the same unlevering and levering calculations to estimate the asset risk and equity risk for a project. We start with the equity beta of the comparable company, which is the levered beta, $\beta_{L,\text{comparable}}$, and then convert it into the equivalent asset beta for the unlevered company, $\beta_{U,\text{comparable}}$. Once we have the estimate of the unlevered beta, which is the company's asset risk, we then can use the project's capital structure and marginal tax rate to convert this asset beta into an equity beta for the project, $\beta_{L,\text{project}}$.

Estimating a Beta Using the Pure-Play Method

Step 1: Select the Comparable

Determine comparable company or companies. These are companies with similar business risk.



Step 2: Estimate Comparable's Beta

Estimate the equity beta of the comparable company or companies.



Step 3: Unlever the Comparable's Beta

Unlever the beta of the comparable company or companies, removing the financial risk component of the equity beta, leaving the business risk component of the beta.



Step 4: Lever the Beta for the Project's Financial Risk

Lever the beta of the project by adjusting the asset beta for the financial risk of the project.

We begin by estimating the levered beta of the comparable company, $\beta_{L, \text{comparable}}$. Using the capital structure and tax rate of the levered company, we estimate the asset beta for the comparable company, $\beta_{U, \text{comparable}}$:

$$\beta_{U, \text{comparable}} = \frac{\beta_{L, \text{comparable}}}{\left[1 + \left((1 - t_{\text{comparable}}) \frac{D_{\text{comparable}}}{E_{\text{comparable}}} \right) \right]} \quad (3-11)$$

We then consider the financial leverage of the project or company and calculate its equity risk, $\beta_{L, \text{project}}$:

$$\beta_{L, \text{project}} = \beta_{U, \text{comparable}} \left[1 + \left((1 - t_{\text{project}}) \frac{D_{\text{project}}}{E_{\text{project}}} \right) \right] \quad (3-12)$$

To illustrate the use of these equations, suppose we want to evaluate a project that will be financed with debt and equity in a ratio of 0.4:1 (a debt-to-equity ratio of 0.4, corresponding to approximately $0.4/(0.4 + 1.0) = 0.286$ for each euro of capital needed). We find a comparable company operating in the same line of business as the project. The marginal tax rate for the company sponsoring the project and the comparable company is 35 percent. The comparable company has a beta of 1.2 and a debt-to-equity ratio of 0.125. The unlevered beta of the comparable is 1.1098:

$$\beta_{U, \text{comparable}} = \frac{1.2}{[1 + (1 - 0.35)0.125]} = 1.1098$$

The levered beta for the project is 1.3983:

$$\beta_{L, \text{project}} = 1.1098[1 + ((1 - 0.35)0.4)] = 1.3983$$

We then use the 1.3983 as the beta in our CAPM estimate of the component cost of equity for the project and, combined with the cost of debt in a weighted average, provide an estimate of the cost of capital for the project.³¹

EXAMPLE 3-9 Inferring an Asset Beta

Suppose that the beta of a publicly traded company's stock is 1.3 and that the market value of equity and debt are, respectively, C\$540 million and C\$720 million. If the marginal tax rate of this company is 40 percent, what is the asset beta of this company?

Solution.

$$\beta_U = \frac{1.3}{\left[1 + \left((1 - 0.4) \frac{720}{540} \right) \right]} = 0.72$$

³¹In this example, the weights are $w_d = 0.4/1.4 = 0.2857$ and $w_e = 1/1.4 = 0.7143$.

EXAMPLE 3-10 Calculating a Beta Using the Pure-Play Method

Raymond Cordier is the business development manager of Aerotechnique S.A., a private Belgian subcontractor of aerospace parts. Although Aerotechnique is not listed on the Belgian stock exchange, Cordier needs to evaluate the levered beta for the company. He has access to the following information:

- The average levered and average unlevered betas for the group of comparable companies operating in different European countries are 1.6 and 1.0, respectively.
- Aerotechnique's debt-to-equity ratio, based on market values, is 1.4.
- Aerotechnique's corporate tax rate is 34 percent.

Solution. The beta for Aerotechnique is estimated on the basis of the average unlevered beta extracted from the group of comparable companies. On that basis, and applying the financing structure of Aerotechnique, the estimated beta for Aerotechnique is

$$\beta_{\text{Aerotechnique}} = 1.0[1 + ((1 - 0.34)(1.4))] = 1.924$$

EXAMPLE 3-11 Estimating the Weighted Average Cost of Capital

Georg Schrempp is the CFO of Bayern Chemicals KgaA, a large German manufacturer of industrial, commercial, and consumer chemical products. Bayern Chemicals is privately owned, and its shares are not listed on an exchange. The CFO has appointed Markus Meier, CFA, of Crystal Clear Valuation Advisors, a third-party valuator, to perform a standalone valuation of Bayern Chemicals. Meier had access to the following information to calculate Bayern Chemicals' weighted average cost of capital:

- The nominal risk-free rate is represented by the yield on the long-term 10-year German bund, which at the valuation date was 4.5 percent.
- The average long-term historical equity risk premium in Germany is assumed at 5.7 percent.³²
- Bayern Chemicals' corporate tax rate is 38 percent.
- Bayern Chemicals' target debt-to-equity ratio is 0.7. Bayern is operating at its target debt-to-equity ratio.

³²Dimson, Marsh, and Staunton (2003), 27–38.

- Bayern Chemicals' cost of debt has an estimated spread of 225 basis points over the 10-year bund.
- Exhibit 3-3 supplies additional information on comparables for Bayern Chemicals.

EXHIBIT 3-3 Information on Comparables

Comparable Companies	Country	Tax Rate	Market Capitalization in Millions	Net Debt in Millions	D/E	Beta
British Chemicals Ltd.	UK	30.0%	4,500	6,000	1.33	1.45
Compagnie Petrochimique S.A.	France	30.3%	9,300	8,700	0.94	0.75
Rotterdam Chemie N.V.	Netherlands	30.5%	7,000	7,900	1.13	1.05
Average					1.13	1.08

Based only on the information given, calculate Bayern Chemicals' WACC.

Solution. To calculate the cost of equity, the first step is to “unlever” the betas of the comparable companies and calculate an average for a company with business risk similar to the average of these companies:

Comparable Companies	Unlevered Beta
British Chemicals Ltd.	0.75
Compagnie Petrochimique S.A.	0.45
Rotterdam Chemie N.V.	0.59
Average ³³	0.60

Levering the average unlevered beta for the peer group average, applying Bayern Chemicals' target debt-to-equity ratio and marginal tax rate, results in a beta of 0.86:

$$\beta_{\text{BayernChemicals}} = 0.60\{1 + [(1 - 0.38)0.7]\} = 0.86$$

The cost of equity of Bayern Chemicals (r_e) can be calculated as follows:

$$r_e = 4.5 \text{ percent} + (0.86)(5.7 \text{ percent}) = 9.4 \text{ percent}$$

³³An analyst must apply judgment and experience to determine a representative average for the comparable companies. This example uses a simple average, but in some situations a weighted average based on some factor such as market capitalization may be more appropriate.

The weights for the cost of equity and cost of debt may be calculated as follows:

$$w_d = \frac{D/E}{\left(\frac{D}{E} + 1\right)} = \frac{0.7}{1.7} = 0.41$$

$$w_e = 1 - w_d = 1 - 0.41 = 0.59$$

The before-tax cost of debt of Bayern Chemicals (r_d) is 6.75 percent:

$$r_d = 4.5 \text{ percent} + 2.25 \text{ percent} = 6.75 \text{ percent.}$$

As a result, Bayern Chemicals' WACC is 7.27 percent:

$$\text{WACC} = [(0.41)(0.0675)(1 - 0.38)] + [(0.59)(0.094)] = 0.0726 \text{ or } 7.26 \text{ percent}$$

4.2. Country Risk

The use of a stock's beta to capture the country risks of a project is well supported in empirical studies that examine developed nations. However, beta does not appear to adequately capture country risk for companies in developing nations.³⁴ A common approach for dealing with this problem is to adjust the cost of equity estimated using the CAPM by adding a **country spread** to the market risk premium.³⁵ The country spread is also referred to as a **country equity premium**.

Perhaps the simplest estimate of the country spread is the **sovereign yield spread**, which is the difference between the government bond yield in that country, denominated in the currency of a developed country, and the Treasury bond yield on a similar maturity bond in the developed country.³⁶ However, this approach may be too coarse for the purposes of equity risk premium estimation.

Another approach is to calculate the country equity premium as the product of the sovereign yield spread and the ratio of the volatility of the developing country equity market to that of the sovereign bond market denominated in terms of the currency of a developed country:³⁷

$$\text{Country equity premium} = \text{Sovereign yield spread} \left(\frac{\text{Annualized standard deviation of equity index}}{\text{Annualized standard deviation of the sovereign bond market in terms of the developed market currency}} \right) \quad (3-13)$$

³⁴See Campbell R. Harvey (2001).

³⁵Adding the country spread to the market risk premium for a developing country and then multiplying this sum by the market risk of the project is making the assumption that the country risk premium varies according to market risk. An alternative method calculates the cost of equity as the sum of three terms: (1) the risk-free rate of interest, (2) the product of the beta and the developed market risk premium, and (3) the country risk premium. This latter method assumes that the country risk premium is the same, regardless of the project's market risk.

³⁶Mariscal and Lee (1993).

³⁷See Damodaran (1999 and 2003).

The logic of this calculation is that the sovereign yield spread captures the general risk of the country, which is then adjusted for the volatility of the stock market relative to the bond market. This country equity premium is then used in addition to the equity premium estimated for a project in a developed country. Therefore, if the equity risk premium for a project in a developed country is 4.5 percent and the country risk premium is 3 percent, the total equity risk premium used in the CAPM estimation is 7.5 percent. If the appropriate beta is 1.2 and the risk-free rate of interest is 4 percent, the cost of equity is

$$\text{Cost of equity} = 0.04 + 1.2(0.045 + 0.03) = 0.13 \text{ or } 13 \text{ percent}$$

EXAMPLE 3-12 Estimating the Country Equity Premium

Miles Avenaugh, an analyst with the Global Company, is estimating a country equity premium to include in his estimate of the cost of equity capital for Global's investment in Argentina. Avenaugh has researched yields in Argentina and observed that the Argentinean government's 10-year bond is 9.5 percent. A similar maturity U.S. Treasury bond has a yield of 4.5 percent. The annualized standard deviation of the Argentina Merval stock index, a market value index of stocks listed on the Buenos Aires Stock Exchange, during the most recent year is 40 percent. The annualized standard deviation of the Argentina dollar-denominated 10-year government bond over the recent period was 28 percent.

What is the estimated country equity premium for Argentina based on Avenaugh's research?

Solution.

$$\text{Country equity premium} = 0.05 \left(\frac{0.40}{0.28} \right) = 0.05(1.4286) = 0.0714, \text{ or } 7.14 \text{ percent}$$

Still another approach is to use country credit ratings to estimate the expected rates of returns for countries that have credit ratings but no equity markets.³⁸ This method requires estimating reward to credit risk measures for a large sample of countries for which there are both credit ratings and equity markets and then applying this ratio to those countries without equity markets based on the country's credit rating.

4.3. Marginal Cost of Capital Schedule

As we noted in Section 2.3, as a company raises more funds, the costs of the different sources of capital may change, resulting in a change in the weighted average cost of capital for different levels of financing. The result is the marginal cost of capital (MCC) schedule, which we

³⁸Erb, Harvey, and Viskanta (1996), 46–58.

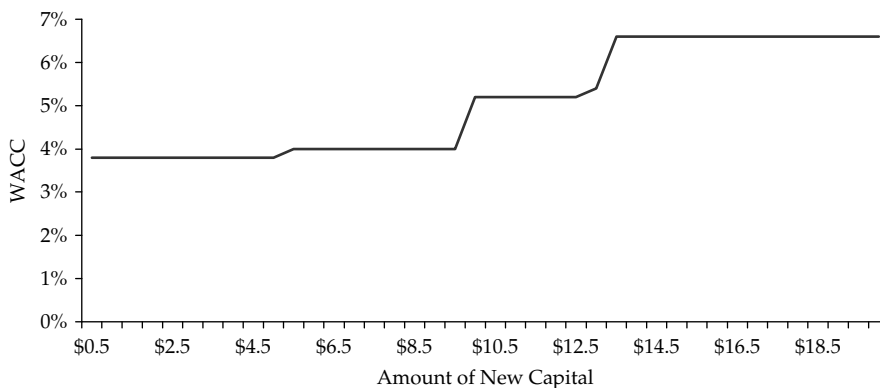
often depict in graphical form as the weighted average cost of capital for different amounts of capital raised, as we showed earlier in Exhibit 3-1.³⁹

Why would the cost of capital change as more capital is raised? One source of a difference in cost depending on the amount of capital raised is that a company may have existing debt with a bond covenant that restricts the company from issuing debt with similar seniority as existing debt. Or, a **debt incurrence test** may restrict a company's ability to incur additional debt at the same seniority based on one or more financial tests or conditions. For example, if a company issues senior debt such that any additional debt at that seniority violates the debt incurrence test of an existing bond covenant, the company may have to issue less senior debt or even equity, which would have a higher cost.

Another source of increasing marginal costs of capital is a deviation from the target capital structure. In the ideal, theoretical world, a company has a target capital structure and goes to the market each period and raises capital in these proportions. However, as a practical matter, companies do not necessarily tap the market in these ideal proportions because of considerations for economies of scale in raising new capital and market conditions. Because of such perceived economies of scale, companies tend to issue new securities such that in any given period, it may deviate from the proportions dictated by any target or optimal capital structure. In other words, these short-run deviations are due to the "lumpiness" of security issuance. As the company experiences deviations from the target capital structure, the marginal cost of capital may increase, reflecting these deviations.

The amount of capital at which the weighted average cost of capital changes—which means that the cost of one of the sources of capital changes—is referred to as a **break point**. The reality of raising capital is that the marginal cost of capital schedule is not as smooth as we depicted in Exhibit 3-1 but, rather, is a step-up cost schedule as shown in Exhibit 3-4.

EXHIBIT 3-4 Marginal Cost of Capital Schedule



³⁹In later chapters we discuss cases where a company's WACC may actually decrease as additional capital is raised. For example, if a company financed solely with common equity raises additional capital via debt, then the tax advantages provided by debt will result in a lower WACC under the new capital structure. For this discussion, we are assuming that the company is already operating at or near its optimum balance of debt versus equity.

Consider the case of a company facing the costs of capital given in Exhibit 3-5.

EXHIBIT 3-5 Schedule of the Costs of Debt and Equity

Amount of New Debt (in millions)	After-Tax Cost of Debt	Amount of New Equity (in millions)	Cost of Equity
new debt \leq €2	2.0 percent	new equity \leq €6	5.0 percent
€2 < new debt \leq €5	2.5 percent	€6 < new equity \leq €8	7.0 percent
€5 < new debt	3.0 percent	€8 < new equity	9.0 percent

If the company raises capital according to its target capital structure proportions of 40 percent debt and 60 percent equity, this company faces a marginal cost of capital schedule that is upward sloping, with break points at €5 million, €10 million, €12.5 million, and €13.3 million, as depicted in Exhibit 3-4. These break points are determined from the amounts of capital at which the cost changes, calculated as

$$\text{Break point} = \frac{\text{Amount of capital at which the source's cost of capital changes}}{\text{Proportion of new capital raised from the source}} \quad (3-14)$$

For example, the first break point for debt financing is reached with €2 million/0.4 = €5 million of new capital raised. The first break point attributed to a change in equity cost occurs at €6 million/0.6 = €10 million. Example 3-13 illustrates a marginal cost of capital schedule with break points and also how the WACC figures in the choice of an optimal capital structure.

EXAMPLE 3-13 Marginal Cost of Capital Schedule

Alan Conlon is the CFO of Allied Canadian Breweries Ltd. He wants to determine the capital structure that will result in the lowest cost of capital for Allied. He has access to the following information:

- The minimum rate at which the company can borrow is the 12-month LIBOR rate plus a premium that varies with the debt-to-capital ratio $[D/(D + E)]$ as given in Exhibit 3-6.
 - The current 12-month LIBOR is 4.5 percent.
 - The market risk premium is 4 percent, and unlevered beta is 0.9.
 - The risk-free rate is 4.25 percent.
 - The company's tax rate is 36 percent.
1. Determine the WACC for levels of the debt-to-capital ratio given in Exhibit 3-6.
 2. Recommend a target capital structure given that the company is concerned with achieving the lowest possible cost of capital.

EXHIBIT 3-6 Spreads over LIBOR for
Alternative Debt-to-Capital Ratios

$D/D + E$	Spread (bps)
Less than 0.40	200
0.40 to 0.49	300
0.50 to 0.69	400
0.60 to 0.69	600
0.70 to 0.79	800
0.80 to 0.89	1,000
0.90 or higher	1,200

Solution to 1. The WACC expressed as a function of the capital structure is shown in Exhibit 3-7.

EXHIBIT 3-7 WACC for Alternative Capital Structures

$D/D + E$	β	r_d (percent)	r_e (percent)	WACC (percent)
0.1	0.96	6.5	8.1	7.7
0.2	1.04	6.5	8.4	7.6
0.3	1.15	6.5	8.8	7.4
0.4	1.28	7.5	9.4	7.6
0.5	1.48	8.5	10.2	7.8
0.6	1.76	10.5	11.3	8.6
0.7	2.24	12.5	13.2	9.6
0.8	3.20	14.5	17.1	10.8
0.9	6.08	16.5	28.6	12.4

Solution to 2. The optimal capital structure is 30 percent debt.

4.4. Flotation Costs

When a company raises new capital, it generally seeks the assistance of investment bankers. Investment bankers charge the company a fee based on the size and type of offering. This fee is referred to as the **flotation cost**. In the case of debt and preferred stock, we do not usually incorporate flotation costs in the estimated cost of capital because the amount of these costs is quite small, often less than 1 percent.⁴⁰

⁴⁰We can incorporate them for these sources by simply treating the flotation costs as an outlay, hence reducing proceeds from the source.

However, with equity issuance, the flotation costs may be substantial, so we should consider these when estimating the cost of external equity capital. For example, Inmoo Lee, Scott Lochhead, Jay Ritter, and Quanshui Zhao observe average flotation costs for new equity in the United States of 7.11 percent.⁴¹ The flotation costs in other countries differ from the U.S. experience: Thomas Bühner and Christoph Kaserer observe flotation costs around 1.65 percent in Germany, Seth Armitage estimates an average issuance cost of 5.78 percent in the United Kingdom, and Christoph Kaserer and Fabian Steiner observe an average cost of 4.53 for Swiss capital offerings.⁴² A large part of the differences in costs among these studies is likely attributed to the type of offering; cash underwritten offers, typical in the United States, are generally more expensive than rights offerings, which are common in Europe.

Should we incorporate flotation costs into the cost of capital? There are two views on this topic. One view, which you can find often in textbooks, is to incorporate the flotation costs into the cost of capital. The other view is that flotation costs should not be included in the cost of capital but, rather, incorporated into any valuation analysis as an additional cost of the project.

Consistent with the first view, we can specify flotation costs in monetary terms, as an amount per share or as a percentage of the share price. With flotation costs in monetary terms on a per share basis, F , the cost of external equity is

$$r_e = \left(\frac{D_1}{P_0 - F} \right) + g \quad (3-15)$$

As a percentage applied against the price per share, the cost of external equity is

$$r_e = \left(\frac{D_1}{P_0(1 - f)} \right) + g \quad (3-16)$$

where f is the flotation cost as a percentage of the issue price.

Suppose a company has a current dividend of \$2 per share, a current price of \$40 per share, and an expected growth rate of 5 percent. The cost of internally generated equity would be 10.25 percent:

$$r_e = \left(\frac{\$2(1 + 0.05)}{\$40} \right) + 0.05 = 0.0525 + 0.05 = 0.1025 \text{ or } 10.25 \text{ percent}$$

If the flotation costs are 4 percent of the issuance, the cost of externally generated equity would be slightly higher at 10.469 percent:

$$r_e = \left(\frac{\$2(1 + 0.05)}{\$40(1 - 0.04)} \right) + 0.05 = 0.05469 + 0.05 = 0.1047, \text{ or } 10.47 \text{ percent}$$

The problem with this approach is that the flotation costs are a cash flow at the initiation of the project and affect the value of any project by reducing the initial cash flow. Adjusting the cost of capital for flotation costs is incorrect because by doing so, we are adjusting the present

⁴¹Lee, Lochhead, Ritter, and Zhao (1996), 59–74.

⁴²See, for example, Bühner and Kaserer (2002), 249; Armitage (2000), 57–68; and Kaserer and Steiner (2004).

value of the future cash flows by a fixed percentage—in the above example, a difference of 22 basis points, which does not necessarily equate to the present value of the flotation costs.⁴³

The alternative and recommended approach is to make the adjustment to the cash flows in the valuation computation. For example, consider a project that requires a €60,000 initial cash outlay and is expected to produce cash flows of €10,000 each year for 10 years. Suppose the company's marginal tax rate is 40 percent and that the before-tax cost of debt is 5 percent. Furthermore, suppose that the company's dividend next period is €1, the current price of the stock is €20, and the expected growth rate is 5 percent so that the cost of equity using the dividend discount model is $(€1/€20) + 0.05 = 0.10$ or 10 percent. Assume the company will finance the project with 40 percent debt and 60 percent equity. Exhibit 3-8 summarizes the information on the component costs of capital.

EXHIBIT 3-8 After-Tax Costs of Debt and Equity

Source of Capital	Amount Raised	Proportion	Marginal After-Tax Cost
Debt	€24,000	0.40	$0.05(1 - 0.4) = 0.03$
Equity	€36,000	0.60	0.10

The weighted average cost of capital is 7.2 percent calculated as $0.40(3 \text{ percent}) + 0.60(10 \text{ percent})$. Ignoring flotation costs for the moment, the net present value (NPV) of this project is

$$\text{NPV} = €69,591 - €60,000 = €9,591$$

If the flotation costs are, say, 5 percent of the new equity capital, the flotation costs are €1,800. The net present value considering flotation costs is

$$\text{NPV} = €69,591 - €60,000 - €1,800 = €7,791$$

if flotation costs are not tax deductible, or $€69,591 - €60,000 - €1,800(0.6) = €8,511$ if flotation costs are tax deductible. If, instead of considering the flotation costs as part of the cash flows, we adjust the cost of equity, the cost of capital is 7.3578 percent and the NPV is

$$\text{NPV} = €69,089 - €60,000 = €9,089$$

As you can see, we arrive at difference assessments of value using these two methods.

So, if it is preferred to deduct the flotation costs as part of the net present value calculation, why do we see the adjustment in the cost of capital so often in textbooks? The first reason is that it is often difficult to identify particular financing associated with a project. Using the adjustment for the flotation costs in the cost of capital may be useful if specific project financing cannot be identified. Second, by adjusting the cost of capital for the flotation costs, it is easier to demonstrate how costs of financing a company change as a company exhausts internally generated equity (i.e., retained earnings) and switches to externally generated equity (i.e., a new stock issue).

⁴³This argument is made by Ezzell and Porter (1976, 403–413). They argue that the correct treatment is to deduct flotation costs as part of the valuation as one of the initial-period cash flows.

4.5. What Do CFOs Do?

In this chapter, we have introduced you to methods that may be used to estimate the cost of capital for a company or a project. What do companies actually use when making investment decisions? In a survey of a large number of U.S. company CFOs, John Graham and Campbell Harvey asked about the methods that companies actually use.⁴⁴ Their survey revealed the following:

- The most popular method for estimating the cost of equity is the capital asset pricing model.
- Few companies use the dividend cash flow model to estimate a cost of equity.
- Publicly traded companies are more likely to use the capital asset pricing model than are private companies.
- In evaluating projects, the majority use a single company cost of capital, but a large portion apply some type of risk adjustment for individual projects.

The survey also reveals that the single-factor capital asset pricing model is the most popular method for estimating the cost of equity, though the next most popular methods, respectively, are average stock returns and multifactor return models. The lack of popularity of the dividend discount model indicates that this approach, which was once favored, has lost its following in practice.⁴⁵

In a survey of publicly traded multinational European companies, Franck Bancel and Usha Mittoo provide evidence consistent with the Graham and Harvey survey.⁴⁶ They find that over 70 percent of companies use the CAPM to determine the cost of equity; this compares with the 73.5 percent of U.S. companies that use the CAPM. In a survey of both publicly traded and private European companies, Dirk Brounen, Abe de Jong, and Kees Koedijk confirm the result of Graham and Harvey that larger companies are more likely to use the more sophisticated methods, such as CAPM, in estimating the cost of equity.⁴⁷ Brounen, Jong, and Koedijk find that the popularity of the use of CAPM is less for their sample (ranging from 34 percent to 55.6 percent, depending on the country) than for the other two surveys, which may reflect the inclusion of smaller, private companies in the latter sample.

We learn from the survey evidence that the CAPM is a popular method for estimating the cost of equity capital and that it is used less by smaller, private companies. This latter result is not surprising because of the difficulty in estimating systematic risk in cases in which the company's equity is not publicly traded.

5. SUMMARY

In this chapter, we provided an overview of the techniques used to calculate the cost of capital for companies and projects. We examined the weighted average cost of capital, discussing the methods commonly used to estimate the component costs of capital and the weights applied

⁴⁴Graham and Harvey (2002), 8–23.

⁴⁵A survey published in 1982 by Lawrence Gitman and V. Mercurio (1982, 21–29) indicated that fewer than 30 percent used the CAPM model in the estimation of the cost of equity.

⁴⁶Bancel and Mittoo (2004).

⁴⁷Brounen, de Jong, and Koedijk (2004).

to these components. The international dimension of the cost of capital, as well as key factors influencing the cost of capital, were also analyzed.

- The weighted average cost of capital is a weighted average of the after-tax marginal costs of each source of capital: $WACC = w_d r_d (1 - t) + w_p r_p + w_e r_e$
- An analyst uses the WACC in valuation. For example, the WACC is used to value a project using the net present value method: $NPV = \text{Present value of inflows} - \text{Present value of the outflows}$.
- The before-tax cost of debt is generally estimated by means of one of the two methods: yield to maturity or bond rating.
- The yield-to-maturity method of estimating the before-tax cost of debt uses the familiar bond valuation equation. Assuming semiannual coupon payments, the equation is

$$P_0 = \frac{PMT_1}{\left(1 + \frac{r_d}{2}\right)} + \dots + \frac{PMT_n}{\left(1 + \frac{r_d}{2}\right)^n} + \frac{FV}{\left(1 + \frac{r_d}{2}\right)^n} = \left(\sum_{t=1}^n \frac{PMT_t}{\left(1 + \frac{r_d}{2}\right)^t} \right) + \frac{FV}{\left(1 + \frac{r_d}{2}\right)^n}$$

We solve for the six-month yield ($r_d/2$) and then annualize it to arrive at the before-tax cost of debt, r_d .

- Because interest payments are generally tax deductible, the after-tax cost is the true, effective cost of debt to the company. If a current yield or bond rating is not available, such as in the case of a private company without rated debt or a project, the estimate of the cost of debt becomes more challenging.
- The cost of preferred stock is the preferred stock dividend divided by the current preferred stock price:

$$r_p = \frac{D_p}{P_p}$$

- The cost of equity is the rate of return required by a company's common stockholders. We estimate this cost using the CAPM (or its variants) or the dividend discount method.
- The CAPM is the approach most commonly used to calculate the cost of common stock. The three components needed to calculate the cost of common stock are the risk-free rate, the equity risk premium, and beta:

$$E(R_i) = R_F + \beta_i [E(R_M) - R_F]$$

- When estimating the cost of equity capital using the CAPM when we do not have publicly traded equity, we may be able to use the pure-play method in which we estimate the unlevered beta for a company with similar business risk, β_U ,

$$\beta_{U, \text{comparable}} = \frac{\beta_{L, \text{comparable}}}{\left[1 + \left((1 - t_{\text{comparable}}) \frac{D_{\text{comparable}}}{E_{\text{comparable}}} \right) \right]}$$

and then lever this beta to reflect the financial risk of the project or company:

$$\beta_{L,project} = \beta_{U,comparable} \left[1 + \left((1 - t_{project}) \frac{D_{project}}{E_{project}} \right) \right]$$

- It is often the case that country and foreign exchange risk are diversified so that we can use the estimated β in the CAPM analysis. However, in the case in which these risks cannot be diversified away, we can adjust our measure of systematic risk by a country equity premium to reflect this nondiversified risk:

$$\text{Country equity premium} = \text{Sovereign yield spread} \left(\frac{\text{Annualized standard deviation of equity index}}{\text{Annualized standard deviation of the sovereign bond market in terms of the developed market currency}} \right)$$

- The dividend discount model approach is an alternative approach to calculating the cost of equity, whereby the cost of equity is estimated as follows:

$$r_e = \frac{D_1}{P_0} + g$$

- We can estimate the growth rate in the dividend discount model by using published forecasts of analysts or by estimating the sustainable growth rate:

$$g = (1 - D/\text{EPS}) \text{ROE}$$

- In estimating the cost of equity, an alternative to the CAPM and dividend discount approaches is the bond yield plus risk premium approach. In this approach, we estimate the before-tax cost of debt and add a risk premium that reflects the additional risk associated with the company's equity.
- The marginal cost of capital schedule is a graph plotting the new funds raised by a company on the x -axis and the cost of capital on the y -axis. The cost of capital is level to the point at which one of the costs of capital changes, such as when the company bumps up against a debt covenant, requiring it to use another form of capital. We calculate a break point using information on when the different sources' costs change and the proportions that the company uses when it raises additional capital:

$$\text{Break point} = \frac{\text{Amount of capital at which the source's cost of capital changes}}{\text{Proportion of new capital raised from the source}}$$

- Flotation costs are costs incurred in the process of raising additional capital. The preferred method of including these costs in the analysis is as an initial cash flow in the valuation analysis.
- Survey evidence tells us that the CAPM method is the most popular method used by companies in estimating the cost of equity. The CAPM is more popular with larger, publicly traded companies, which is understandable considering the additional analyses and assumptions required in estimating systematic risk for a private company or project.

PROBLEMS

1. The cost of equity is equal to the:
 - A. expected market return.
 - B. rate of return required by stockholders.
 - C. cost of retained earnings plus dividends.
2. Which of the following statements is correct?
 - A. The appropriate tax rate to use in the adjustment of the before-tax cost of debt to determine the after-tax cost of debt is the average tax rate because interest is deductible against the company's entire taxable income.
 - B. For a given company, the after-tax cost of debt is generally less than both the cost of preferred equity and the cost of common equity.
 - C. For a given company, the investment opportunity schedule is upward sloping because as a company invests more in capital projects, the returns from investing increase.
3. Using the dividend discount model, what is the cost of equity capital for Zeller Mining if the company will pay a dividend of C\$2.30 next year, has a payout ratio of 30%, a return on equity (ROE) of 15%, and a stock price of C\$45?
 - A. 9.61%.
 - B. 10.50%.
 - C. 15.61%.
4. Dot.Com has determined that it could issue \$1,000 face value bonds with an 8% coupon paid semiannually and a five-year maturity at \$900 per bond. If Dot.Com's marginal tax rate is 38%, its after-tax cost of debt is *closest* to:
 - A. 6.2%.
 - B. 6.4%.
 - C. 6.6%.
5. The cost of debt can be determined using the yield-to-maturity and the bond rating approaches. If the bond rating approach is used, the:
 - A. coupon is the yield.
 - B. yield is based on the interest coverage ratio.
 - C. company is rated and the rating can be used to assess the credit default spread of the company's debt.
6. Morgan Insurance Ltd. issued a fixed-rate perpetual preferred stock three years ago and placed it privately with institutional investors. The stock was issued at \$25 per share with a \$1.75 dividend. If the company were to issue preferred stock today, the yield would be 6.5%. The stock's current value is:
 - A. \$25.00.
 - B. \$26.92.
 - C. \$37.31.
7. A financial analyst at Buckco Ltd. wants to compute the company's weighted average cost of capital (WACC) using the dividend discount model. The analyst has gathered the following data:

Before-tax cost of new debt	8%
Tax rate	40%
Target debt-to-equity ratio	0.8033
Stock price	\$30
Next year's dividend	\$1.50
Estimated growth rate	7%

Buckco's WACC is *closest* to:

- A. 8%.
 - B. 9%.
 - C. 12%.
8. The Gearing Company has an after-tax cost of debt capital of 4%, a cost of preferred stock of 8%, a cost of equity capital of 10%, and a weighted average cost of capital of 7%. Gearing intends to maintain its current capital structure as it raises additional capital. In making its capital-budgeting decisions for the average-risk project, the relevant cost of capital is:
- A. 4%.
 - B. 7%.
 - C. 8%.
9. Fran McClure of Alba Advisers is estimating the cost of capital of Frontier Corporation as part of her valuation analysis of Frontier. McClure will be using this estimate, along with projected cash flows from Frontier's new projects, to estimate the effect of these new projects on the value of Frontier. McClure has gathered the following information on Frontier Corporation:

	Current Year	Forecasted for Next Year
Book value of debt	\$50	\$50
Market value of debt	\$62	\$63
Book value of shareholders' equity	\$55	\$58
Market value of shareholders' equity	\$210	\$220

The weights that McClure should apply in estimating Frontier's cost of capital for debt and equity are, respectively:

- A. $w_d = 0.200$; $w_e = 0.800$.
 - B. $w_d = 0.185$; $w_e = 0.815$.
 - C. $w_d = 0.223$; $w_e = 0.777$.
10. Wang Securities had a long-term stable debt-to-equity ratio of 0.65. Recent bank borrowing for expansion into South America raised the ratio to 0.75. The increased leverage has what effect on the asset beta and equity beta of the company?
- A. The asset beta and the equity beta will both rise.
 - B. The asset beta will remain the same and the equity beta will rise.
 - C. The asset beta will remain the same and the equity beta will decline.

11. Brandon Wiene is a financial analyst covering the beverage industry. He is evaluating the impact of DEF Beverage's new product line of flavored waters. DEF currently has a debt-to-equity ratio of 0.6. The new product line would be financed with \$50 million of debt and \$100 million of equity. In estimating the valuation impact of this new product line on DEF's value, Wiene has estimated the equity beta and asset beta of comparable companies. In calculating the equity beta for the product line, Wiene is intending to use DEF's existing capital structure when converting the asset beta into a project beta. Which of the following statements is correct?
- A. Using DEF's debt-to-equity ratio of 0.6 is appropriate in calculating the new product line's equity beta.
 - B. Using DEF's debt-to-equity ratio of 0.6 is not appropriate, but rather the debt-to-equity ratio of the new product, 0.5, is appropriate to use in calculating the new product line's equity beta.
 - C. Wiene should use the new debt-to-equity ratio of DEF that would result from the additional \$50 million debt and \$100 million equity in calculating the new product line's equity beta.
12. Trumpit Resorts Company currently has 1.2 million common shares of stock outstanding and the stock has a beta of 2.2. It also has \$10 million face value of bonds that have five years remaining to maturity and 8% coupon with semiannual payments, and are priced to yield 13.65%. If Trumpit issues up to \$2.5 million of new bonds, the bonds will be priced at par and have a yield of 13.65%; if it issues bonds beyond \$2.5 million, the expected yield on the entire issuance will be 16%. Trumpit has learned that it can issue new common stock at \$10 a share. The current risk-free rate of interest is 3% and the expected market return is 10%. Trumpit's marginal tax rate is 30%. If Trumpit raises \$7.5 million of new capital while maintaining the same debt-to-equity ratio, its weighted average cost of capital is *closest* to:
- A. 14.5%.
 - B. 15.5%.
 - C. 16.5%.

The following information relates to Questions 13–18.

Jurgen Knudsen has been hired to provide industry expertise to Henrik Sandell, CFA, an analyst for a pension plan managing a global large-cap fund internally. Sandell is concerned about one of the fund's larger holdings, auto parts manufacturer Kruspa AB. Kruspa currently operates in 80 countries, with the previous year's global revenues at €5.6 billion. Recently, Kruspa's CFO announced plans for expansion into China. Sandell worries that this expansion will change the company's risk profile and wonders if he should recommend a sale of the position.

Sandell provides Knudsen with the basic information. Kruspa's global annual free cash flow to the firm is €500 million and earnings are €400 million. Sandell estimates that cash flow will level off at a 2 percent rate of growth. Sandell also estimates that Kruspa's after-tax free cash flow to the firm on the China project for next three years is, respectively, €48 million, €52 million, and €54.4 million. Kruspa recently announced a dividend of €4.00 per share of stock. For the initial analysis, Sandell requests that Knudsen ignore possible currency fluctuations. He expects the Chinese plant to sell only to customers within China for the first three years. Knudsen is asked to evaluate Kruspa's planned financing of the required €100 million with a €80 public offering of 10-year debt in Sweden and the remainder with an equity offering.

Additional information:

Equity risk premium, Sweden	4.82%
Risk-free rate of interest, Sweden	4.25%
Industry debt-to-equity ratio	0.3
Market value of Kruspa's debt	€900 million
Market value of Kruspa's equity	€2.4 billion
Kruspa's equity beta	1.3
Kruspa's before-tax cost of debt	9.25%
China credit A2 country risk premium	1.88%
Corporate tax rate	37.5%
Interest payments each year	Level

13. Using the capital asset pricing model, Kruspa's cost of equity capital for its typical project is *closest* to:
 - A. 7.62%.
 - B. 10.52%.
 - C. 12.40%.
14. Sandell is interested in the weighted average cost of capital of Kruspa AB prior to its investing in the China project. This weighted average cost of capital (WACC) is *closest* to:
 - A. 7.65%.
 - B. 9.23%.
 - C. 10.17%.
15. In his estimation of the project's cost of capital, Sandell would like to use the asset beta of Kruspa as a base in his calculations. The estimated asset beta of Kruspa prior to the China project is *closest* to:
 - A. 1.053.
 - B. 1.110.
 - C. 1.327.
16. Sandell is performing a sensitivity analysis of the effect of the new project on the company's cost of capital. If the China project has the same asset risk as Kruspa, the estimated project beta for the China project, if it is financed 80% with debt, is *closest* to:
 - A. 1.300.
 - B. 2.635.
 - C. 3.686.
17. As part of the sensitivity analysis of the effect of the new project on the company's cost of capital, Sandell is estimating the cost of equity of the China project considering that the China project requires a country equity premium to capture the risk of the project. The cost of equity for the project in this case is *closest* to:
 - A. 10.52%.
 - B. 19.91%.
 - C. 28.95%.

18. In his report, Sandell would like to discuss the sensitivity of the project's net present value to the estimation of the cost of equity. The China project's net present value calculated using the equity beta without and with the country risk premium are, respectively:
- €26 million and €24 million.
 - €28 million and €25 million.
 - €30 million and €27 million.

The following information relates to Questions 19–22.

Boris Duarte, CFA, covers initial public offerings for Zellweger Analytics, an independent research firm specializing in global small-cap equities. He has been asked to evaluate the upcoming new issue of TagOn, a U.S.-based business intelligence software company. The industry has grown at 26 percent per year for the previous three years. Large companies dominate the market, but sizable “pure-play” companies such as Relevant, Ltd., ABJ, Inc., and Opus Software Pvt. Ltd also compete. Each of these competitors is domiciled in a different country, but they all have shares of stock that trade on the U.S. NASDAQ. The debt ratio of the industry has risen slightly in recent years.

Company	Sales (in millions)	Market Value Equity (in millions)	Market Value Debt (in millions)	Equity Beta	Tax Rate	Share Price
Relevant Ltd.	\$752	\$3,800	\$0.0	1.702	23%	\$42
ABJ, Inc.	\$843	\$2,150	\$6.5	2.800	23%	\$24
Opus Software Pvt. Ltd.	\$211	\$972	\$13.0	3.400	23%	\$13

Duarte uses the information from the preliminary prospectus for TagOn's initial offering. The company intends to issue 1 million new shares. In his conversation with the investment bankers for the deal, he concludes the offering price will be between \$7 and \$12. The current capital structure of TagOn consists of a \$2.4 million five-year noncallable bond issue and 1 million common shares. Other information that Duarte has gathered:

Currently outstanding bonds	\$2.4 million five-year bonds, coupon of 12.5 percent, with a market value of \$2.156 million
Risk-free rate of interest	5.25%
Estimated equity risk premium	7%
Tax rate	23%

19. The asset betas for Relevant, ABJ, and Opus, respectively, are:
- 1.70, 2.52, and 2.73.
 - 1.70, 2.79, and 3.37.
 - 1.70, 2.81, and 3.44.

20. The average asset beta for the pure players in this industry, Relevant, ABJ, and Opus, weighted by market value of equity is *closest* to:
- A. 1.67.
 - B. 1.97.
 - C. 2.27.
21. Using the capital asset pricing model, the cost of equity capital for a company in this industry with a debt-to-equity ratio of 0.01, asset beta of 2.27, and a marginal tax rate of 23% is *closest* to:
- A. 17%.
 - B. 21%.
 - C. 24%.
22. The marginal cost of capital for TagOn, based on an average asset beta of 2.27 for the industry and assuming that new stock can be issued at \$8 per share, is *closest* to:
- A. 20.5%.
 - B. 21.0%.
 - C. 21.5%.
23. Two years ago, a company issued \$20 million in long-term bonds at par value with a coupon rate of 9%. The company has decided to issue an additional \$20 million in bonds and expects the new issue to be priced at par value with a coupon rate of 7%. The company has no other debt outstanding and has a tax rate of 40%. To compute the company's weighted average cost of capital, the appropriate after-tax cost of debt is *closest* to:
- A. 4.2%.
 - B. 4.8%.
 - C. 5.4%.
24. An analyst gathered the following information about a company and the market:

Current market price per share of common stock	\$28.00
Most recent dividend per share paid on common stock (D_0)	\$2.00
Expected dividend payout rate	40%
Expected return on equity (ROE)	15%
Beta for the common stock	1.3
Expected rate of return on the market portfolio	13%
Risk-free rate of return	4%

Using the discounted cash flow (DCF) approach, the cost of retained earnings for the company is *closest* to:

- A. 15.7%.
- B. 16.1%.
- C. 16.8%.

25. An analyst gathered the following information about a company and the market:

Current market price per share of common stock	\$28.00
Most recent dividend per share paid on common stock (D_0)	\$2.00
Expected dividend payout rate	40%
Expected return on equity (ROE)	15%
Beta for the common stock	1.3
Expected rate of return on the market portfolio	13%
Risk-free rate of return	4%

Using the capital asset pricing model (CAPM) approach, the cost of retained earnings for the company is *closest* to:

- A. 13.6%.
 B. 15.7%.
 C. 16.1%.
26. An analyst gathered the following information about a private company and its publicly traded competitor:

Comparable Companies	Tax Rate	Debt/Equity	Equity Beta
Private company	30.0%	1.00	N.A.
Public company	35.0%	0.90	1.75

Using the pure-play method, the estimated equity beta for the private company is *closest* to:

- A. 1.029.
 B. 1.104.
 C. 1.877%.
27. An analyst gathered the following information about the capital markets in the United States and in Paragon, a developing country.

Selected Market Information	
Yield on U.S. 10-year Treasury bond	4.5%
Yield on Paragon 10-year government bond	10.5%
Annualized standard deviation of Paragon stock index	35.0%
Annualized standard deviation of Paragon dollar-denominated government bond	25.0%

Based on the analyst's data, the estimated country equity premium for Paragon is *closest* to:

- A. 4.29%.
 B. 6.00%.
 C. 8.40%.

CHAPTER 4

MEASURES OF LEVERAGE

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LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- Define and explain leverage, business risk, sales risk, operating risk, and financial risk and classify a risk, given a description.
- Calculate and interpret the degree of operating leverage, the degree of financial leverage, and the degree of total leverage.
- Describe the effect of financial leverage on a company's net income and return on equity.
- Calculate the breakeven quantity of sales and determine the company's net income at various sales levels.
- Calculate and interpret the operating breakeven quantity of sales.

1. INTRODUCTION

This chapter presents elementary topics in leverage. **Leverage** is the use of fixed costs in a company's cost structure. The fixed costs that are operating costs (such as depreciation or rent) create operating leverage. Fixed costs that are financial costs (such as interest expense) create financial leverage.

Analysts refer to the use of fixed costs as leverage because these fixed costs act as a fulcrum for the company's earnings. Leverage can magnify earnings both up and down. The profits of highly leveraged companies might soar with small upturns in revenue. But the reverse is also true: Small downturns in revenue may lead to losses.

Analysts need to understand a company's use of leverage for three main reasons. First, the degree of leverage is an important component in assessing a company's risk and return characteristics. Second, analysts may be able to discern information about a company's business and future prospects from management's decisions about the use of operating and financial leverage. Knowing how to interpret these signals also helps the analyst evaluate the quality of management's decisions. Third, the valuation of a company requires forecasting future cash flows and assessing the risk associated with those cash flows. Understanding a company's use of leverage should help in forecasting cash flows and in selecting an appropriate discount rate for finding their present value.

The chapter is organized as follows: Section 2 introduces leverage and defines important terms. Section 3 illustrates and discusses measures of operating leverage and financial leverage, which combine to define a measure of total leverage that gauges the sensitivity of net income to a given percent change in units sold. This section also covers breakeven points in using leverage and corporate reorganization (a possible consequence of using leverage inappropriately). Section 4 summarizes the chapter.

2. LEVERAGE

Leverage increases the volatility of a company's earnings and cash flows and increases the risk of lending to or owning a company. Additionally, the valuation of a company and its equity is affected by the degree of leverage: The greater a company's leverage, the greater its risk and hence, the greater the discount rate that should be applied in its valuation. Further, highly leveraged (levered) companies have a greater chance of incurring significant losses during downturns, thus accelerating conditions that lead to financial distress and bankruptcy.

Consider the simple example of two companies, Impulse Robotics, Inc., and Malvey Aerospace, Inc. These companies have the following performance for the period of study.¹ (See Exhibit 4-1.)

EXHIBIT 4-1 Impulse Robotics and Malvey Aerospace

	Impulse Robotics	Malvey Aerospace
Revenues	\$1,000,000	\$1,000,000
Operating costs	<u>700,000</u>	<u>750,000</u>
Operating income	\$300,000	\$250,000
Financing expense	<u>100,000</u>	<u>50,000</u>
Net income	\$200,000	\$200,000

¹We are ignoring taxes for this example, but when taxes are included, the general conclusions remain the same.

These companies have the same net income, but are they identical in terms of operating and financial characteristics? Would we appraise these two companies at the same value? Not necessarily.

The risk associated with future earnings and cash flows of a company are affected by the company's cost structure. The **cost structure** of a company is the mix of variable and fixed costs. **Variable costs** fluctuate with the level of production and sales. Some examples of variable costs are the cost of goods purchased for resale, costs of materials or supplies, shipping charges, delivery charges, wages for hourly employees, sales commissions, and sales or production bonuses. **Fixed costs** are expenses that are the same regardless of the production and sales of the company. These costs include depreciation, rent, interest on debt, insurance, and wages for salaried employees.

Suppose that the cost structures of the companies differ in the manner shown in Exhibit 4-2.

EXHIBIT 4-2 Impulse Robotics and Malvey Aerospace

	Impulse Robotics	Malvey Aerospace
Number of units produced and sold	100,000	100,000
Sales price per unit	\$10	\$10
Variable cost per unit	\$2	\$6
Fixed operating cost	\$500,000	\$150,000
Fixed financing expense	\$100,000	\$50,000

The risk associated with these companies is different, although, as we saw in Exhibit 4-1, they have the same net income. They have different operating and financing cost structures, resulting in differing volatility of net income.

For example, if the number of units produced and sold is different from 100,000, the net income of the two companies diverges. If 50,000 units are produced and sold, Impulse Robotics has a loss of \$200,000 and Malvey Aerospace has \$0 earnings. If, on the other hand, the number of units produced and sold is 200,000, Impulse Robotics earns \$1 million whereas Malvey Aerospace earns \$600,000. In other words, the variability in net income is greater for Impulse Robotics, which has higher fixed costs in terms of both fixed operating costs and fixed financing costs.

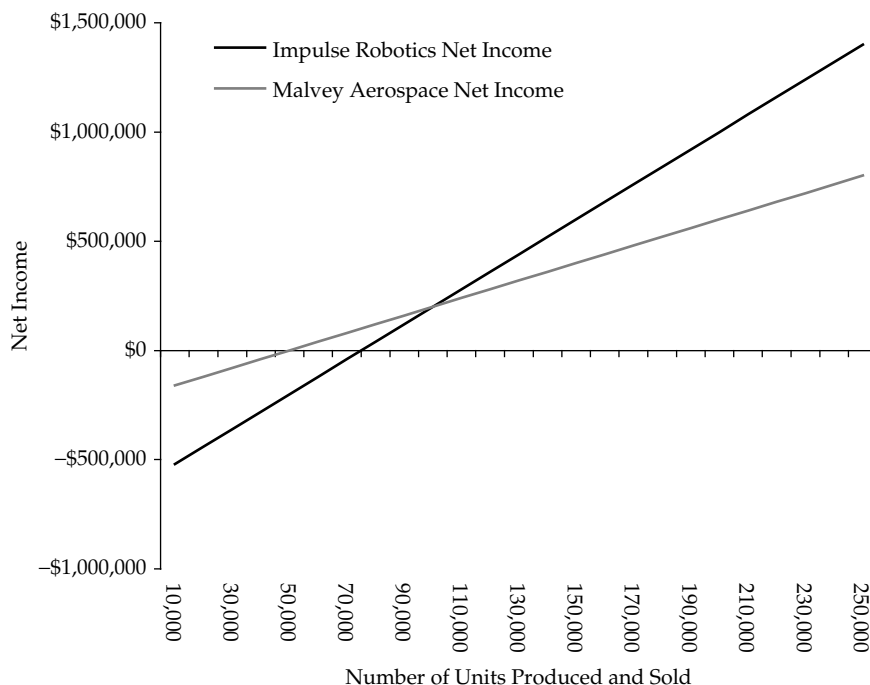
Impulse Robotics' cost structure results in more leverage than that of Malvey Aerospace. We can see this effect when we plot the net income of each company against the number of units produced and sold, as in Exhibit 4-3. The greater leverage of Impulse Robotics is reflected in the greater slope of the line representing net income. This means that as the number of units sold changes, Impulse Robotics experiences a greater change in net income than does Malvey Aerospace for the same change in units sold.

Companies that have more fixed costs relative to variable costs in their cost structures have greater variation in net income as revenues fluctuate and, hence, more risk.

3. BUSINESS RISK AND FINANCIAL RISK

Risk arises from both the operating and financing activities of a company. In the following, we address how that happens and the measures available to the analyst to gauge the risk in each case.

EXHIBIT 4-3 Net Income for Different Numbers of Units Produced and Sold



3.1. Business Risk and Its Components

Business risk is the risk associated with operating earnings. Operating earnings are risky because total revenues are risky, as are the costs of producing revenues. Revenues are affected by a large number of factors, including economic conditions, industry dynamics (including the actions of competitors), government regulation, and demographics. Therefore, prices of the company's goods or services or the quantity of sales may be different from what is expected. We refer to the uncertainty with respect to the price and quantity of goods and services as **sales risk**.

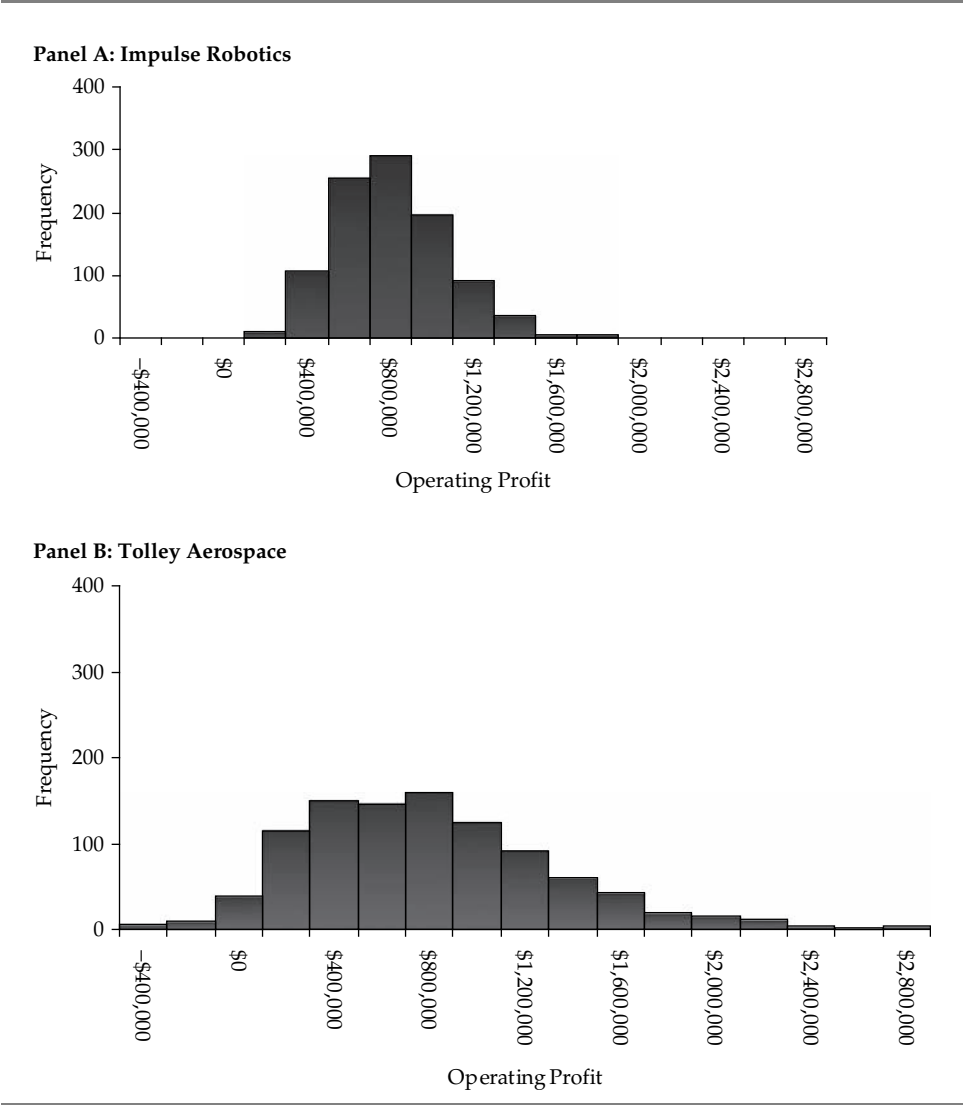
Operating risk is the risk attributed to the operating cost structure, in particular the use of fixed costs in operations. The greater the fixed operating costs relative to variable operating costs, the greater the operating risk. Business risk is therefore the combination of sales risk and operating risk. Companies that operate in the same line of business generally have similar business risk.

3.2. Sales Risk

Consider Impulse Robotics once again. Suppose that the forecasted number of units produced and sold in the next period is 100,000 but that the standard deviation of the number of units sold is 20,000. And suppose the price that the units sell for is expected to be \$10 per unit but the standard deviation is \$2. Contrast this situation with that of a company named Tolley Aerospace, Inc., which has the same cost structure but a standard deviation of units sold of 40,000 and a price standard deviation of \$4.

If we assume, for simplicity’s sake, that the fixed operating costs are known with certainty and that the units sold and price per unit follow a normal distribution, we can see the impact of the different risks on the operating income of the two companies through a simulation; the results are shown in Exhibit 4-4. Here, we see the differing distributions of operating income that result from the distributions of units sold and price per unit. So, even if the companies have the same cost structure, differing *sales risk* affects the potential variability of the company’s profitability. In our example, Tolley Aerospace has a wider distribution of likely outcomes in terms of operating profit. This greater volatility in operating earnings means that Tolley Aerospace has more sales risk than Impulse Robotics.

EXHIBIT 4-4 Operating Income Simulations for Impulse Robotics and Tolley Aerospace



3.3. Operating Risk

The greater the fixed component of costs, the more difficult it is for a company to adjust its operating costs to changes in sales. The mixture of fixed and variable costs depends largely on the type of business. Even within the same line of business, companies can vary their fixed and variable costs to some degree. We refer to the risk arising from the mix of fixed and variable costs as **operating risk**. The greater the fixed operating costs relative to variable operating costs, the greater the operating risk.

Next, we look at how operating risk affects the variability of cash flows. A concept taught in microeconomics is **elasticity**, which is simply a measure of the sensitivity of changes in one item to changes in another. We can apply this concept to examine how sensitive a company's operating income is to changes in demand, as measured by unit sales. We will calculate the operating income elasticity, which we refer to as the **degree of operating leverage (DOL)**. DOL is a quantitative measure of operating risk as it was defined earlier.

The degree of operating leverage is the ratio of the percentage change in operating income to the percentage change in units sold. We will simplify things and assume that the company sells all that it produces in the same period. Then,

$$\text{DOL} = \frac{\text{Percentage change in operating income}}{\text{Percentage change in units sold}} \quad (4-1)$$

For example, if DOL at a given level of unit sales is 2.0, a 5 percent increase in unit sales from that level would be expected to result in a $(2.0)(5\%) = 10$ percent increase in operating income. As illustrated later in relation to Exhibit 4-6, a company's DOL is dependent on the level of unit sales being considered.

Returning to Impulse Robotics, the price per unit is \$10, the variable cost per unit is \$2, and the total fixed operating costs are \$500,000. If Impulse Robotics' output changes from 100,000 units to 110,000 units—an increase of 10 percent in the number of units sold—operating income changes from \$300,000 to \$380,000.² (See Exhibit 4-5.)

EXHIBIT 4-5 Operating Leverage of Impulse Robotics

Item	Selling 100,000 units	Selling 110,000 units	Percentage Change
Revenues	\$1,000,000	\$1,100,000	+10.00%
Less variable costs	200,000	220,000	+10.00%
Less fixed costs	<u>500,000</u>	<u>500,000</u>	0.00%
Operating income	\$300,000	\$380,000	+26.67%

Operating income increases by 26.67 percent when units sold increases by 10 percent. What if the number of units *decreases* by 10 percent, from 100,000 to 90,000? Operating income is \$220,000, representing a *decline* of 26.67 percent.

²We provide the variable and fixed operating costs for our sample companies used in this chapter to illustrate the leverage and breakeven concepts. In reality, however, the financial analyst does not have these breakdowns but rather is faced with interpreting reported account values that often combine variable and fixed costs and costs for different product lines.

What is happening is that for a 1 percent change in units sold, the operating income changes by 2.67 times that percentage, in the same direction. If units sold increases by 10 percent, operating income increases by 26.7 percent; if units sold decreased by 20 percent, operating income would decrease by 53.3 percent.

We can represent the degree of operating leverage as given in Equation 4-1 in terms of the basic elements of the price per unit, variable cost per unit, number of units sold, and fixed operating costs. Operating income is revenue minus total operating costs (with variable and fixed cost components):

$$\begin{aligned} \text{Operating income} = & \left[\left(\frac{\text{Price}}{\text{per unit}} \right) \left(\frac{\text{Number of}}{\text{units sold}} \right) \right] - \left[\left(\frac{\text{Variable cost}}{\text{per unit}} \right) \left(\frac{\text{Number of}}{\text{units sold}} \right) \right] \\ & - \left[\frac{\text{Fixed operating}}{\text{costs}} \right] \end{aligned}$$

or

$$\begin{aligned} \text{Operating income} = & \left(\frac{\text{Number of}}{\text{units sold}} \right) \underbrace{\left[\left(\frac{\text{Price}}{\text{per unit}} \right) - \left(\frac{\text{Variable cost}}{\text{per unit}} \right) \right]}_{\text{Contribution margin}} - \left[\frac{\text{Fixed operating}}{\text{costs}} \right] \end{aligned}$$

The **per unit contribution margin** is the amount that each unit sold contributes to covering fixed costs—that is, the difference between the price per unit and the variable cost per unit. That difference multiplied by the quantity sold is the **contribution margin**, which equals revenue minus variable costs.

How much does operating income change when the number of units sold changes? Fixed costs do not change; therefore, operating income changes by the contribution margin. The percentage change in operating income for a given change in units sold simplifies to

$$\text{DOL} = \frac{Q(P - V)}{Q(P - V) - F} \quad (4-2)$$

where Q is the number of units, P is the price per unit, V is the variable operating cost per unit, and F is the fixed operating cost. Therefore, $P - V$ is the per unit contribution margin and $Q(P - V)$ is the contribution margin.

Applying the formula for DOL using the data for Impulse Robotics, we can calculate the sensitivity to change in units sold from 100,000 units:

$$\text{DOL @ } 100,000 \text{ units} = \frac{100,000(\$10 - \$2)}{100,000(\$10 - \$2) - \$500,000} = 2.67$$

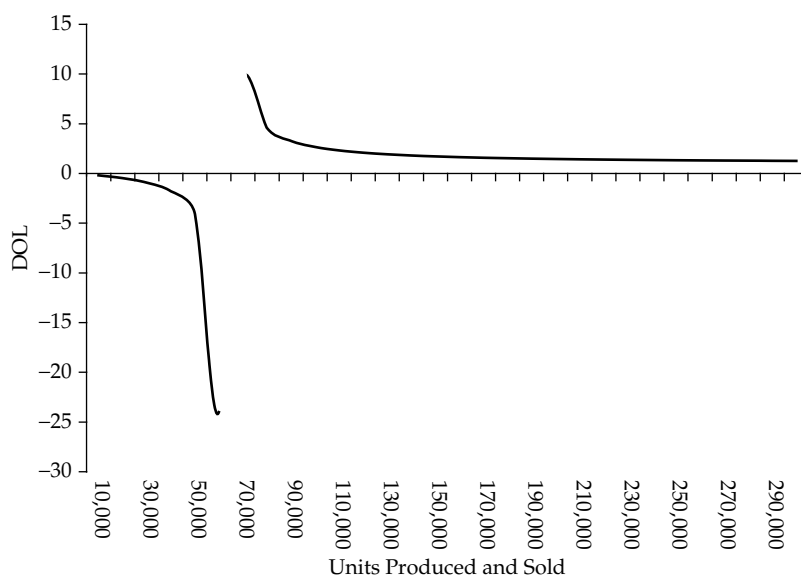
A DOL of 2.67 means that a 1 percent change in units sold results in a $1\% \times 2.67 = 2.67\%$ change in operating income; a DOL of 5 means that a 1 percent change in units sold results in a 5 percent change in operating income, and so on.

Why do we specify that the DOL is at a particular quantity sold (in this case, 100,000 units)? Because the DOL is different at different numbers of units produced and sold. For example, at 200,000 units,

$$\text{DOL @ } 200,000 \text{ units} = \frac{200,000(\$10 - \$2)}{200,000(\$10 - \$2) - \$500,000} = 1.45$$

We can see the sensitivity of the DOL for different numbers of units produced and sold in Exhibit 4-6. When operating profit is negative, the DOL is negative. At positions just below and just above the point where operating income is \$0, operating income is at its most sensitive on a percentage basis to changes in units produced and sold. At the point at which operating income is \$0 (at 62,500 units produced and sold in this example), the DOL is undefined because the denominator in the DOL calculation is \$0. After this point, the DOL gradually declines as more units are produced and sold.

EXHIBIT 4-6 Impulse Robotics' Degree of Operating Leverage for Different Number of Units Produced and Sold



$P = \$10$; $V = \$2$; $F = \$500,000$

We will now look at a similar situation in which the company has shifted some of the operating costs away from fixed costs and into variable costs. Malvey Aerospace has a unit sales price of \$10, a variable cost of \$6 a unit, and \$150,000 in fixed costs. A change in units sold from 100,000 to 110,000 (a 10 percent change) changes operating profit from \$250,000 to \$290,000, or 16 percent. The DOL in this case is 1.6:

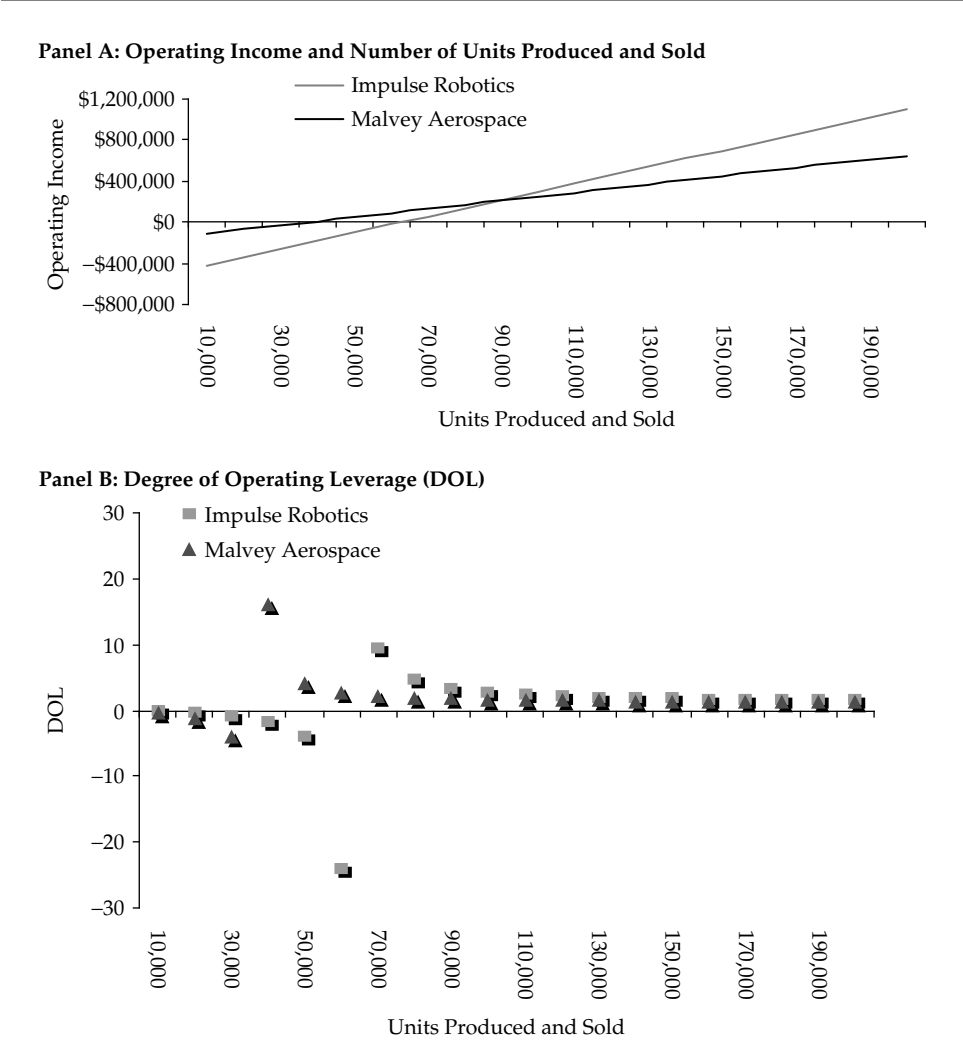
$$\text{DOL @ } 100,000 \text{ units} = \frac{100,000(\$10 - \$6)}{100,000(\$10 - \$6) - \$150,000} = 1.6$$

and the change in operating income is 16 percent:

$$\text{Percentage change in operating income} = (\text{DOL}) \left(\text{Percentage change in units sold} \right) = (1.6)(10\%) = 16\%$$

We can see the difference in leverage in the case of Impulse Robotics and Malvey Aerospace companies in Exhibit 4-7. In Panel A, we see that Impulse Robotics has higher operating income than Malvey Aerospace when both companies produce and sell more than 87,500 units, but lower operating income than Malvey when both companies produce and sell less than 87,500 units.³

EXHIBIT 4-7 Profitability and the DOL for Impulse Robotics and Malvey Aerospace



Impulse Robotics: $P = \$10$; $V = \$2$; $F = \$500,000$ Malvey Aerospace: $P = \$10$; $V = \$6$; $F = \$150,000$

³We can calculate the number of units that produce the same operating income for these two companies by equating the operating incomes and solving for the number of units. Let X be the number of units. The X at which Malvey Aerospace and Impulse Robotics generate the same operating income is the X that solves the following: $10X - 2X - 500,000 = 10X - 6X - 150,000$; that is, $X = 87,500$.

This example confirms what we saw earlier in our reasoning of fixed and variable costs: The greater the use of fixed, relative to variable, operating costs, the more sensitive operating income is to changes in units sold and, therefore, the more operating risk. Impulse Robotics has more operating risk because it has more operating leverage. However, as Panel B of Exhibit 4-7 shows, the degrees of operating leverage are similar for the two companies for larger numbers of units produced and sold.

Both sales risk and operating risk influence a company's business risk. And both sales risk and operating risk are determined in large part by the type of business the company is in. But management has more opportunity to manage and control operating risk than sales risk.

Suppose a company is deciding which equipment to buy to produce a particular product. The sales risk is the same no matter what equipment is chosen to produce the product. But the available equipment may differ in terms of the fixed and variable operating costs of producing the product. Financial analysts need to consider how the operating cost structure of a company affects the company's risk.

EXAMPLE 4-1 Calculating the Degree of Operating Leverage

Arnaud Kenigswald is analyzing the potential impact of an improving economy on earnings at Global Auto, one of the world's largest car manufacturers. Global is headquartered in Berlin. Two Global Auto divisions manufacture passenger cars and produce combined revenues of €93 billion. Kenigswald projects that sales will improve by 10 percent due to increased demand for cars. He wants to see how Global's earnings might respond given that level of increase in sales. He first looks at the degree of leverage at Global, starting with operating leverage.

Global sold 6 million passenger cars in 2009. The average price per car was €24,000, fixed costs associated with passenger car production total €15 billion per year, and variable costs per car are €14,000. What is the degree of operating leverage of Global Auto?

Solution.

$$\text{DOL @ 6 million units} = \frac{6 \text{ million } (\text{€}24,000 - \text{€}14,000)}{6 \text{ million } (\text{€}24,000 - \text{€}14,000) - \text{€}15 \text{ billion}} = 1.333$$

For a 10 percent increase in cars sold, operating income increases by $1.333 \times 10\% = 13.33\%$.

Industries that tend to have high operating leverage are those that invest up front to produce a product but spend relatively little on making and distributing it. Software developers and pharmaceutical companies fit this description. Alternatively, retailers have low operating leverage because much of the cost of goods sold is variable.

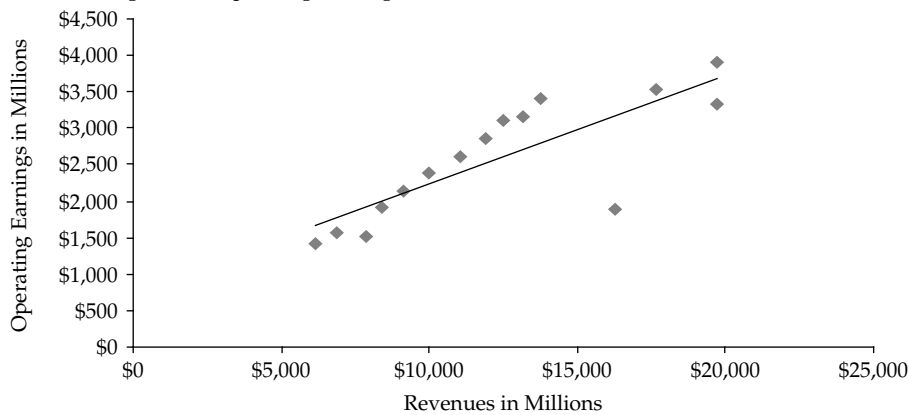
Because most companies produce more than one product, the ratio of variable to fixed costs is difficult to obtain. We can get an idea of the operating leverage of a company by looking at changes in operating income in relation to changes in sales for the entire company. This relation can be estimated by regressing changes in operating income (the variable to be explained) on

changes in sales (the explanatory variable) over a recent time period.⁴ Although this approach does not provide a precise measure of operating risk, it can help provide a general idea of the amount of operating leverage present. For example, compare the relation between operating earnings and revenues for Abbott Laboratories, a pharmaceutical company, and Wal-Mart Stores, a discount retailer, as shown in Exhibit 4-8. Note that the slope of the least-squares regression line is greater for Abbott (with a slope coefficient of 0.1488) than for Wal-Mart (with a slope coefficient of 0.0574). (A visual comparison of slopes should not be relied upon because the scales of the x - and y -axes are different in diagrams for the two regressions.) We can see that operating earnings are more sensitive to changes in revenues for the higher-operating-leveraged Abbott Laboratories as compared to the lower-operating-leveraged Wal-Mart Stores.

EXHIBIT 4-8 Relation between Operating Earnings and Revenues

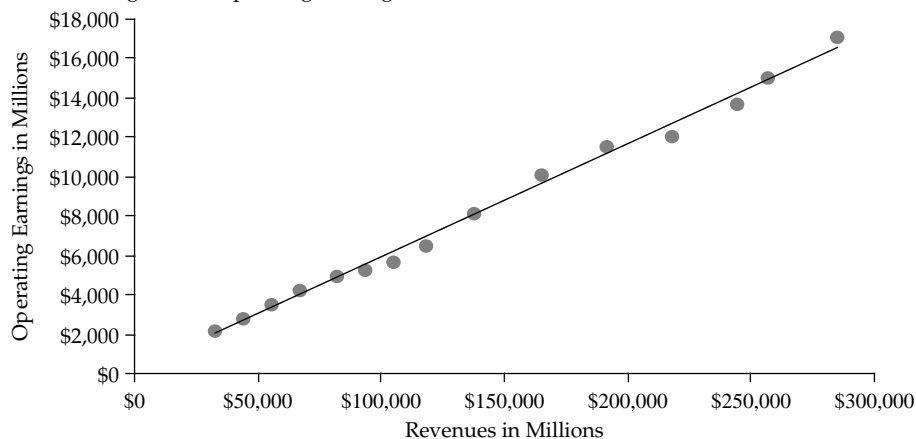
Panel A: Abbott Laboratories Operating Earnings and Revenues, 1990–2004

Estimated Regression: Operating Earnings = \$754.77 + 0.1488 Revenues, $R^2 = 66.25\%$



Panel B: Wal-Mart Stores Operating Earnings and Revenues, 1990–2004

Estimated Regression: Operating Earnings = \$152.762 + 0.0574 Revenues, $R^2 = 99.38\%$



Source: Abbott Laboratories 10-K filings and Wal-Mart Stores 10-K filings, various years.

⁴A least-squares regression is a procedure for finding the best-fitting line (called the least squares regression line) through a set of data points by minimizing the squared deviations from the line.

3.4. Financial Risk

We can expand on the concept of risk to accommodate the perspective of owning a security. A security represents a claim on the income and assets of a business; therefore, the risk of the security goes beyond the variability of operating earnings to include how the cash flows from those earnings are distributed among the claimants—the creditors and owners of the business. The risk of a security is therefore affected by both business risk and financial risk.

Financial risk is the risk associated with how a company finances its operations. If a company finances with debt, it is legally obligated to pay the amounts that make up its debts when due. By taking on fixed obligations, such as debt and long-term leases, the company increases its financial risk. If a company finances its business with common equity, generated either from operations (retained earnings) or from issuing new common shares, it does not incur fixed obligations. The more fixed-cost financial obligations (e.g., debt) incurred by the company, the greater its financial risk.

We can quantify this risk in the same way we did for operating risk, looking at the sensitivity of the cash flows available to owners when operating income changes. This sensitivity, which we refer to as the **degree of financial leverage (DFL)**, is

$$\text{DFL} = \frac{\text{Percentage change in net income}}{\text{Percentage change in operating income}} \quad (4-3)$$

For example, if DFL at a given level of operating income is 1.1, a 5 percent increase in operating income would be expected to result in a $(1.1)(5\%) = 5.5$ percent increase in net income. A company's DFL is dependent on the level of operating income being considered.

Net income is equal to operating income, less interest and taxes.⁵ If operating income changes, how does net income change? Consider Impulse Robotics. Suppose the interest payments are \$100,000 and, for simplicity, the tax rate is 0 percent: If operating income changes from \$300,000 to \$360,000, net income changes from \$200,000 to \$260,000. (See Exhibit 4-9.)

EXHIBIT 4-9 Financial Risk of Impulse Robotics (1)

	Operating Income of \$300,000	Operating Income of \$360,000	Percentage Change
Operating income	\$300,000	\$360,000	+20%
Less interest	<u>100,000</u>	<u>100,000</u>	0%
Net income	\$200,000	\$260,000	+30%

⁵More complex entities than we have been using for our examples may also need to account for other income (losses) and extraordinary income (losses) together with operating income as the basis for earnings before interest and taxes.

A 20 percent increase in operating income increases net income by \$60,000, or 30 percent. What if the fixed financial costs are \$150,000? A 20 percent change in operating income results in a 40 percent change in the net income, from \$150,000 to \$210,000. (See Exhibit 4-10.)

EXHIBIT 4-10 Financial Risk of Impulse Robotics (2)

	Operating Income of \$300,000	Operating Income of \$360,000	Percentage Change
Operating income	\$300,000	\$360,000	+20%
Less interest	<u>150,000</u>	<u>150,000</u>	0%
Net income	\$150,000	\$210,000	+40%

Using more debt financing, which results in higher fixed costs, increases the sensitivity of net income to changes in operating income. We can represent the sensitivity of net income to a change in operating income, continuing the notation from before and including the fixed financial cost, C , and the tax rate, t , as

$$DFL = \frac{[Q(P - V) - F](1 - t)}{[Q(P - V) - F - C](1 - t)} = \frac{[Q(P - V) - F]}{[Q(P - V) - F - C]} \quad (4-4)$$

As you can see in Equation 4-4, the factor that adjusts for taxes, $(1 - t)$, cancels out of the equation. In other words, the DFL is not affected by the tax rate.

In the case in which operating income is \$300,000 and fixed financing costs are \$100,000, the degree of financial leverage is

$$DFL @ \$300,000 \text{ operating income} = \frac{\$300,000}{\$300,000 - \$100,000} = 1.5$$

If, instead, fixed financial costs are \$150,000, the DFL is equal to 2.0:

$$DFL @ \$300,000 \text{ operating income} = \frac{\$300,000}{\$300,000 - \$150,000} = 2.0$$

Again, we need to qualify our degree of leverage by the level of operating income because DFL is different at different levels of operating income.

The greater the use of financing sources that require fixed obligations, such as interest, the greater the sensitivity of net income to changes in operating income.

EXAMPLE 4-2 Calculating the Degree of Financial Leverage

Global Auto also employs debt financing. If Global can borrow at 8 percent, the interest cost is €40 billion. What is the degree of financial leverage of Global Auto if 6 million cars are produced and sold?

Solution. At 6 million cars produced and sold, operating income = €45 billion. Therefore:

$$\text{DFL @ } \frac{\text{€45 billion operating income}}{\text{€45 billion} - \text{€40 billion}} = \frac{\text{€45 billion}}{\text{€45 billion} - \text{€40 billion}} = 9.0$$

For every 1 percent change in operating income, net income changes 9 percent due to financial leverage.

Unlike operating leverage, the degree of financial leverage is most often a choice by the company's management. Whereas operating costs are very similar among companies in the same industry, competitors may decide on differing capital structures.

Companies with relatively high ratios of tangible assets to total assets may be able to use higher degrees of financial leverage than companies with relatively low ratios because the claim on the tangible assets that lenders would have in the event of a default may make lenders more confident in extending larger amounts of credit. In general, businesses with plants, land, and equipment that can be used to collateralize borrowings and businesses whose revenues have below-average business cycle sensitivity may be able to use more financial leverage than businesses without such assets and with relatively high business-cycle sensitivity.

Using financial leverage generally increases the variability of return on equity (net income divided by shareholders' equity). In addition, its use by a profitable company may increase the level of return on equity. Example 4-3 illustrates both effects.

Business is generally an uncertain venture. Changes in the macroeconomic and competitive environments that influence sales and profitability are typically difficult to discern and forecast. The larger the proportion of debt in the financing mix of a business, the greater is the chance that it will face default. Similarly, the greater the proportion of debt in the capital structure, the more earnings are magnified upward in improving economic times. The bottom line? Financial leverage tends to increase the risk of ownership for shareholders.

3.5. Total Leverage

The degree of operating leverage gives us an idea of the sensitivity of operating income to changes in revenues. And the degree of financial leverage gives us an idea of the sensitivity of net income to changes in operating income. But often we are concerned about the combined effect of both operating leverage and financial leverage. Owners are concerned about the combined effect because both factors contribute to the risk associated with their future cash flows. And financial managers, making decisions intended to maximize owners' wealth, need to be concerned with how investment decisions (which affect the operating cost structure) and financing decisions (which affect the capital structure) affect lenders' and owners' risk.

EXAMPLE 4-3 The Leveraging Role of Debt

Consider the Capital Company, which is expected to generate \$1,500,000 in revenues and \$500,000 in operating earnings next year. Currently, the Capital Company does not use debt financing and has assets of \$2,000,000.

Suppose Capital were to change its capital structure, buying back \$1,000,000 of stock and issuing \$1,000,000 in debt. If we assume that interest on debt is 5 percent and income is taxed at a rate of 30 percent, what is the effect of debt financing on Capital's net income and return on equity if operating earnings may vary as much as 40 percent from expected earnings?

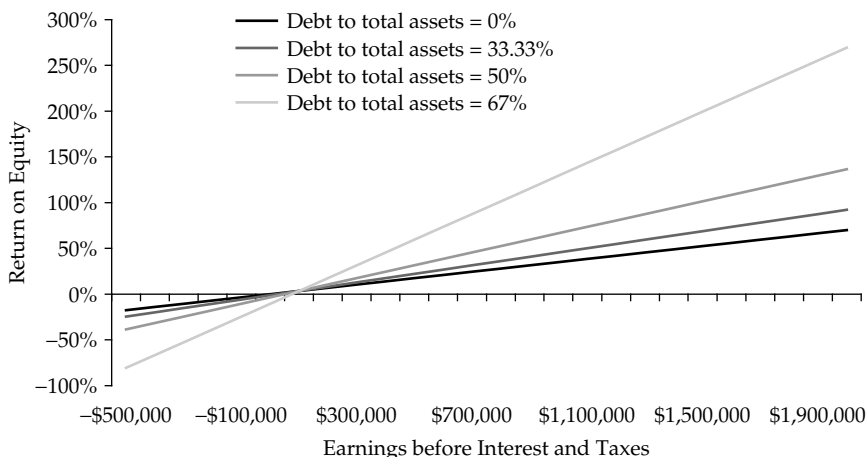
EXHIBIT 4-11 Return on Equity of Capital Company

No Debt			
Shareholders' Equity = \$2 million	Expected Operating Earnings, less 40%	Expected Operating Earnings	Expected Operating Earnings, plus 40%
Earnings before interest and taxes	\$300,000	\$500,000	\$700,000
Interest expense	<u>0</u>	<u>0</u>	<u>0</u>
Earnings before taxes	\$300,000	\$500,000	\$700,000
Taxes	<u>90,000</u>	<u>150,000</u>	<u>210,000</u>
Net income	\$210,000	\$350,000	\$490,000
Return on equity ⁶	10.5%	17.5%	24.5%
Debt to Total Assets = 50%			
Shareholders' Equity = \$1 million	Expected Operating Earnings, less 40%	Expected Operating Earnings	Expected Operating Earnings, plus 40%
Earnings before interest and taxes	\$300,000	\$500,000	\$700,000
Interest expense	<u>50,000</u>	<u>50,000</u>	<u>50,000</u>
Earnings before taxes	\$250,000	\$450,000	\$650,000
Taxes	<u>75,000</u>	<u>135,000</u>	<u>195,000</u>
Net income	\$175,000	\$315,000	\$455,000
Return on equity	17.5%	31.5%	45.5%

⁶Recall that ROE is calculated as net income/shareholders' equity.

Depicting a broader array of capital structures and operating earnings, ranging from an operating loss of \$500,000 to operating earnings of \$2,000,000, Exhibit 4-12 shows the effect of leverage on the return on equity for Capital Company:

EXHIBIT 4-12 Return on Equity of Capital Company for Different Levels of Operating Earnings and Different Financing Choices



Look back at the example of Impulse Robotics. The sensitivity of owners' cash flow to a given change in units sold is affected by both operating and financial leverage. Consider using 100,000 units as the base number produced and sold. A 10 percent increase in units sold results in a 27 percent increase in operating income and a 40 percent increase in net income; a like decrease in units sold results in a similar decrease in operating income and net income. (See Exhibit 4-13.)

Combining a company's degree of operating leverage with its degree of financial leverage results in the **degree of total leverage (DTL)**, a measure of the sensitivity of the cash flows to owners to changes in the number of units produced and sold. We again make the simplifying assumption that a company sells all that it produces in the same period:

$$\text{DTL} = \frac{\text{Percentage change in net income}}{\text{Percentage change in the number of units sold}} \quad (4-5)$$

or

$$\text{DTL} = \frac{Q(P - V)}{Q(P - V) - F} \times \frac{[Q(P - V) - F]}{[Q(P - V) - F - C]} = \frac{Q(P - V)}{Q(P - V) - F - C} \quad (4-6)$$

DOL × DFL

EXHIBIT 4-13 Total Leverage of Impulse Robotics

	Units Produced and Sold:		
	90,000	100,000	110,000
Revenues	\$900,000	\$1,000,000	\$1,100,000
Less variable costs	180,000	200,000	220,000
Less fixed costs	<u>500,000</u>	<u>500,000</u>	<u>500,000</u>
Operating income	\$220,000	\$300,000	\$380,000
Less interest	<u>100,000</u>	<u>100,000</u>	<u>100,000</u>
Net income	\$120,000	\$200,000	\$280,000
Relative to 100,000 units produced and sold			
Percentage change in units sold	−10%		+10%
Percentage change in operating profit	−27%		+27%
Percentage change in net income	−40%		+40%

Suppose

Number of units sold	=	Q	=	100,000
Price per unit	=	P	=	\$10
Variable cost per unit	=	V	=	\$2
Fixed operating cost	=	F	=	\$500,000
Fixed financing cost	=	C	=	\$100,000

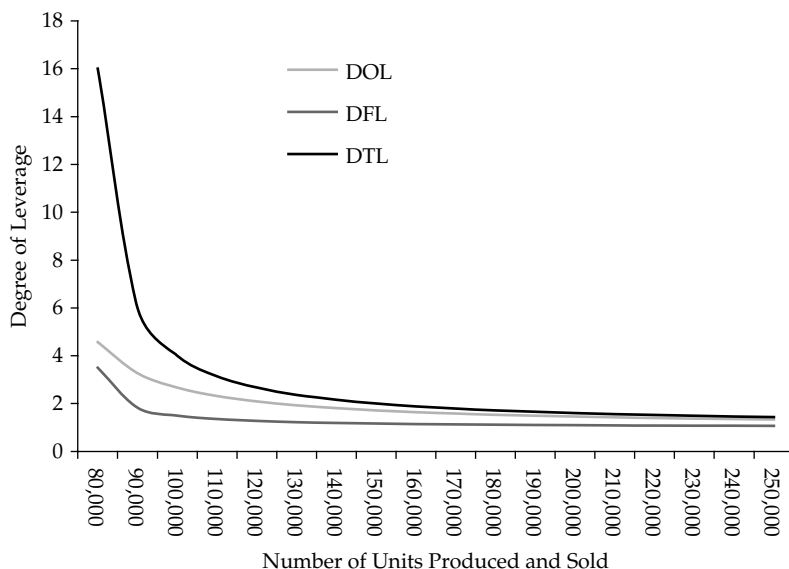
Then,

$$DTL = \frac{100,000(\$10 - \$2)}{100,000(\$10 - \$2) - \$500,000 - \$100,000} = 4.0$$

which we could also have determined by multiplying the DOL, 2.67, by the DFL, 1.5. This means that a 1 percent increase in units sold will result in a 4 percent increase in net income; a 50 percent increase in units produced and sold results in a 200 percent increase in net income; a 5 percent decline in units sold results in a 20 percent decline in income to owners; and so on.

Because the DOL is relative to the base number of units produced and sold and the DFL is relative to the base level of operating earnings, DTL is different depending on the number of units produced and sold. We can see the DOL, DFL, and DTL for Impulse Robotics for different numbers of units produced and sold, beginning at the number of units for which the degrees are positive, in Exhibit 4-14.

EXHIBIT 4-14 DOL, DFL, and DTL for Different Numbers of Units Produced and Sold



$P = \$10$, $V = \$2$, $F = \$500,000$, $C = \$100,000$

In the case of operating leverage, the fixed operating costs act as a fulcrum. The greater the proportion of operating costs that are fixed, the more sensitive operating income is to changes in sales. In the case of financial leverage, the fixed financial costs, such as interest, act as a fulcrum. The greater the proportion of financing with fixed cost sources, such as debt, the more sensitive cash flows available to owners are to changes in operating income. Combining the effects of both types of leverage, we see that fixed operating and financial costs together increase the sensitivity of earnings to owners.

EXAMPLE 4-4 Calculating the Degree of Total Leverage

Continuing from Example 4-2, Global Auto's total leverage is

$$\text{DTL @ 6 million units} = \text{DOL @ 6 million units} \times \text{DFL @ €45 million operating income}$$

$$\text{DTL @ 6 million units} = \frac{6 \text{ million } (\text{€}24,000 - \text{€}14,000)}{6 \text{ million } (\text{€}24,000 - \text{€}14,000) - \text{€}15 \text{ billion}} \times \frac{\text{€}45 \text{ billion}}{\text{€}45 \text{ billion} - \text{€}40 \text{ billion}}$$

$$\text{DTL @ 6 million units} = 1.333 \times 9.0 = 12$$

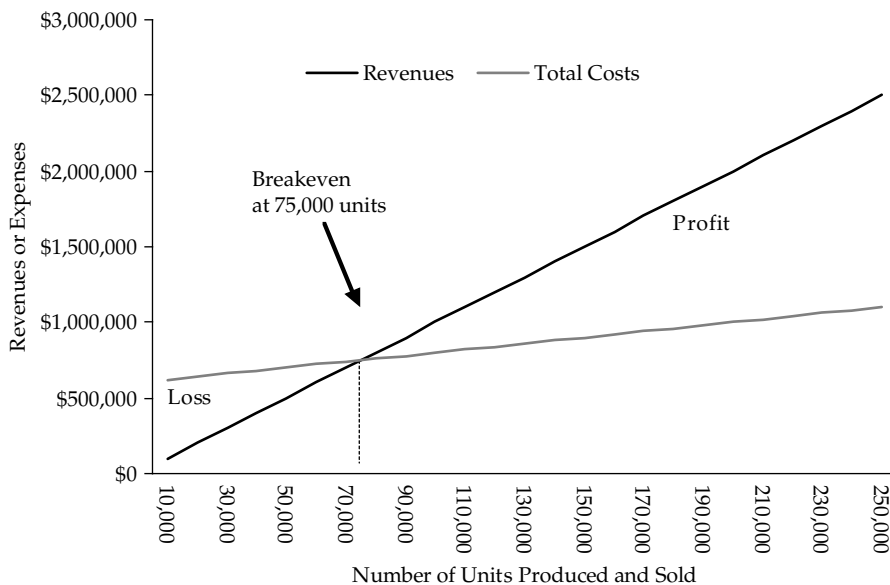
Given Global Auto's operating and financial leverage, a 1 percent change in unit sales changes net income by 12 percent.

3.6. Breakeven Points and Operating Breakeven Points

Looking back at Exhibit 4-3, we see that there is a number of units at which the company goes from being unprofitable to being profitable—that is, the number of units at which the net income is zero. This number is referred to as the breakeven point. The **breakeven point**, Q_{BE} , is the number of units produced and sold at which the company's net income is zero—the point at which revenues are equal to costs.

Plotting revenues and total costs against the number of units produced and sold, as in Exhibit 4-15, indicates that the breakeven is at 75,000 units. At this number of units produced and sold, revenues are equal to costs and, hence, profit is zero.

EXHIBIT 4-15 Impulse Robotics Breakeven



We can calculate this breakeven point for Impulse Robotics and Malvey Aerospace. Consider that net income is zero when the revenues are equal to the expenses. We can represent this equality of revenues and costs (summing variable operating costs, fixed operating costs, and fixed financing costs) by the following equation:

$$PQ = VQ + F + C$$

where

- P is the price per unit
- Q is the number of units produced and sold
- V is the variable cost per unit
- F is the fixed operating costs
- C is the fixed financial cost

Therefore,

$$PQ_{BE} = VQ_{BE} + F + C$$

and the breakeven number of units, Q_{BE} , is⁷

$$Q_{BE} = \frac{F + C}{P - V} \quad (4-7)$$

In the case of Impulse Robotics and Malvey Aerospace, Impulse Robotics has a higher breakeven point. Using numbers taken from Exhibit 4-2:

$$\text{Impulse Robotics: } Q_{BE} = \frac{\$500,000 + \$100,000}{\$10 - \$2} = 75,000 \text{ units}$$

$$\text{Malvey Aerospace: } Q_{BE} = \frac{\$150,000 + \$50,000}{\$10 - \$6} = 50,000 \text{ units}$$

This means that Impulse Robotics must produce and sell more units to achieve a profit. So, while the higher-leveraged Impulse Robotics has a greater breakeven point relative to Malvey Aerospace, the profit that Impulse Robotics generates beyond this breakeven point is greater than that of Malvey Aerospace. Therefore, leverage has its rewards in terms of potentially greater profit, but it also increases risk.

In addition to breakeven point specified in terms of net income, Q_{BE} , we can also specify the breakeven point in terms of operating profit, which we refer to as the **operating breakeven point**, Q_{OBE} . Revenues at the operating breakeven point are set equal to operating costs at the operating breakeven point to solve for the operating breakeven number of units, Q_{OBE} . The expression shows Q_{OBE} as equal to fixed operating costs divided by the difference between price per unit and variable cost per unit:

$$PQ_{OBE} = VQ_{OBE} + F$$

$$Q_{OBE} = \frac{F}{P - V}$$

For the two companies in our example, Impulse Robotics and Malvey Aerospace, the operating breakevens are 62,500 and 37,500 units, respectively:

$$\text{Impulse Robotics : } Q_{OBE} = \frac{\$500,000}{\$10 - \$2} = 62,500 \text{ units}$$

$$\text{Malvey Aerospace : } Q_{OBE} = \frac{\$150,000}{\$10 - \$6} = 37,500 \text{ units}$$

Impulse Robotics has a higher operating breakeven point in terms of the number of units produced and sold.

⁷You will notice that we did not consider taxes in our calculation of the breakeven point. This is because at the point of breakeven, taxable income is zero.

EXAMPLE 4-5 Calculating Operating Breakeven and Breakeven Points

Continuing with his analysis, Kenigswald considers the effect of a possible downturn on Global Auto's earnings. He divides the fixed costs of €15 billion by the per unit contribution margin:

$$Q_{\text{OBE}} = \frac{\text{€15 billion}}{\text{€24,000} - \text{€14,000}} = 1,500,000 \text{ cars}$$

The operating breakeven for Global is 1,500,000 cars, or €36 billion in revenues. We calculate the breakeven point by dividing fixed operating costs, plus interest costs, by the contribution margin:

$$Q_{\text{BE}} = \frac{\text{€15 billion} + \text{€40 billion}}{\text{€24,000} - \text{€14,000}} = \frac{\text{€55 billion}}{\text{€10,000}} = 5,500,000 \text{ cars}$$

Considering the degree of total leverage, Global's breakeven is 5.5 million cars, or revenues of €132 billion.

We can verify these calculations by constructing an income statement for the breakeven sales (in € billions):

	1,500,000 Cars	5,500,000 Cars
Revenues ($= P \times Q$)	€36	€132
Variable operating costs ($= V \times Q$)	21	77
Fixed operating costs (F)	15	15
Operating income	€0	€40
Fixed financial costs (C)	40	40
Net income	-€40	€0

As business expands or contracts beyond or below breakeven points, fixed costs do not change. The breakeven points for companies with low operating and financial leverage are less important than those for companies with high leverage. Companies with greater total leverage must generate more revenue to cover fixed operating and financing costs. The farther unit sales are from the breakeven point for high-leverage companies, the greater the magnifying effect of this leverage.

3.7. The Risks of Creditors and Owners

As we discussed earlier, business risk refers to the effect of economic conditions as well as the level of operating leverage. Uncertainty about demand, output prices, and costs are among the many factors that affect business risk. When conditions change for any of these factors, companies with higher business risk experience more volatile earnings. Financial risk is the

additional risk that results from the use of debt and preferred stock. The degree of financial risk grows with greater use of debt. Who bears this risk?

The risk for providers of equity and debt capital differs because of the relative rights and responsibilities associated with the use of borrowed money in a business. Lenders have a prior claim on assets relative to shareholders, so they have greater security. In return for lending money to a business, lenders require the payment of interest and principal when due. These contractual payments to lenders must be made regardless of the profitability of the business. A business must satisfy these claims in a timely fashion or face the pain of bankruptcy should it default. In return for their higher priority in claims, lenders get predefined yet limited returns.

In contrast, equity providers claim whatever is left over after all expenses, including debt service, have been paid. So, unlike the fixed and known commitments to the lenders, what is left over for the owners may be a great deal or may be nothing. In exchange for this risk, providers of equity capital exercise the decision-making power over the business, including the right to hire, guide, and if necessary, fire managers. In public companies, ownership rights are usually exercised through an elected board of directors. They undertake the decisions over what portion of the business's earnings should be paid out as dividends for common shareholders.

Legal codes in most countries provide for these rights, as well as conditions for companies to file for bankruptcy (with reference to businesses, often called insolvency). A number of bankruptcy codes provide in some form for two categories of bankruptcies. One form provides for a temporary protection from creditors so that a viable business may reorganize. In the United States, the U.S. Bankruptcy Code sets the terms for the form of negotiated **reorganization** of a company's capital structure that allows it to remain a going concern in Chapter 11.⁸ For businesses that are not viable, the second form of bankruptcy process allows for the orderly satisfaction of the creditors' claims. In the United States, this form of bankruptcy is referred to as **liquidation**.⁹ Whereas both types of bankruptcy lead to major dislocations in the rights and privileges of owners, lenders, employees, and managers, it is in this latter category of bankruptcy that the original business ceases to exist.

The difference between a company that reorganizes and emerges from bankruptcy and one that is liquidated is often the difference between operating and financial leverage. Companies with high operating leverage have less flexibility in making changes, and bankruptcy protection does little to help reduce operating costs. Companies with high financial leverage use bankruptcy laws and protection to change their capital structure and, once the restructuring is complete, can emerge as ongoing concerns.

EXAMPLE 4-6 Chapter 11 Reorganization and Owens Corning

The world's largest manufacturer of glass fiber insulation, Owens Corning Corporation of Toledo, Ohio, filed for Chapter 11 bankruptcy on 5 October 2000, as it faced growing asbestos liability claims. With revenues exceeding \$6 billion per year, Owens

⁸U.S. Code, Title 11—Bankruptcy, Chapter 11—Reorganization. Companies filing for bankruptcy under this code are referred to as having filed for Chapter 11 bankruptcy.

⁹U.S. Code, Title 11—Bankruptcy, Chapter 7—Liquidation.

Corning was one of the largest corporations ever afforded bankruptcy protection by the U.S. courts.

From 1952 to 1972, Owens Corning produced an asbestos-containing high-temperature pipe coating called Kaylo, and at the time of its bankruptcy filing, it had received more than 460,000 asbestos personal injury claims and had paid or agreed to pay more than \$5 billion for asbestos-related awards and settlements, legal expenses, and claims processing fees. While the company had assets of \$7 billion and liabilities of \$5.7 billion, the trust fund it set aside to pay those claims appeared inadequate.

The company's stock traded at between \$15 and \$25 per share in the year prior to the announcement; the price fell to \$1 per share when Owens Corning declared bankruptcy and admitted that it had been overwhelmed by the asbestos liabilities.

EXAMPLE 4-7 Chapter 7 and Webvan Do Not Deliver

Since the peak of the NASDAQ in March of 2000, many technology companies have found either that they cannot raise enough capital to implement their business plans or that they have an untenable business plan. Some have simply shut their doors and gone out of business, while others have filed for bankruptcy. Either way, these companies have left many unsatisfied creditors.

For example, Webvan.com was a start-up company in the late 1990s that raised over \$1.2 billion in equity, \$375 million of which came from an IPO in November 1999. It had very ambitious business plans to build a series of warehouses and deliver groceries to fulfill customer orders placed over the Internet. Webvan.com, however, faced a number of challenges, including a downturn in the economy, and quickly ran through its capital.

Webvan.com filed for Chapter 11 bankruptcy protection in July 2001 and reported that it owed \$106 million to creditors. By the time it began liquidation under Chapter 7 in January 2002, it reported that the value of its liquidated assets totaled only \$25 million, leaving its creditors to receive pennies on the dollar and its investors to receive little or nothing for their \$1.2 billion investment in the company.

Whereas the ability to file for bankruptcy is important to the economy, the goal of most investors is to avoid ownership of companies that are heading toward this extreme step, as well as to be able to evaluate opportunities among companies already in bankruptcy. Under both Chapter 7 and Chapter 11, providers of equity capital generally lose all value during the bankruptcy. On the other hand, debtholders typically receive at least a portion of their capital, but the payments of principal and interest are delayed during the period of bankruptcy protection.

4. SUMMARY

In this chapter, we have reviewed the fundamentals of business risk, financial risk, and measures of leverage.

- Leverage is the use of fixed costs in a company's cost structure. Business risk is the risk associated with operating earnings and reflects both sales risk (uncertainty with respect to the price and quantity of sales) and operating risk (the risk related to the use of fixed costs in operations). Financial risk is the risk associated with how a company finances its operations (i.e., the split between equity and debt financing of the business).
- The degree of operating leverage (DOL) is the ratio of the percentage change in operating income to the percentage change in units sold. We can use the following formula to measure the degree of operating leverage:

$$\text{DOL} = \frac{Q(P - V)}{Q(P - V) - F}$$

- The degree of financial leverage (DFL) is the percentage change in net income for a given percentage change in operating income. We can use the following formula to measure the degree of financial leverage:

$$\text{DFL} = \frac{[Q(P - V) - F](1 - t)}{[Q(P - V) - F - C](1 - t)} = \frac{[Q(P - V) - F]}{[Q(P - V) - F - C]}$$

- The degree of total leverage (DTL) is a measure of the sensitivity of the cash flows to owners to changes in unit sales, which is equivalent to $\text{DTL} = \text{DOL} \times \text{DFL}$.
- The breakeven point, Q_{BE} , is the number of units produced and sold at which the company's net income is zero, which we calculate as

$$Q_{\text{BE}} = \frac{F + C}{P - V}$$

- The operating breakeven point, Q_{OBE} , is the number of units produced and sold at which the company's operating income is zero, which we calculate as

$$Q_{\text{OBE}} = \frac{F}{P - V}$$

PROBLEMS

1. If two companies have identical unit sales volume and operating risk, they are *most likely* to also have identical:
 - A. sales risk.
 - B. business risk.
 - C. sensitivity of operating earnings to changes in the number of units produced and sold.
2. Degree of operating leverage is *best* described as a measure of the sensitivity of:
 - A. net earnings to changes in sales.
 - B. fixed operating costs to changes in variable costs.
 - C. operating earnings to changes in the number of units produced and sold.

3. The Fulcrum Company produces decorative swivel platforms for home televisions. If Fulcrum produces 40 million units, it estimates that it can sell them for \$100 each. Variable production costs are \$65 per unit and fixed production costs are \$1.05 billion. Which of the following statements is *most* accurate? Holding all else constant, the Fulcrum Company would:
 - A. generate positive operating income if unit sales were 25 million.
 - B. have less operating leverage if fixed production costs were 10% greater than \$1.05 billion.
 - C. generate 20% more operating income if unit sales were 5% greater than 40 million.
4. The business risk of a particular company is *most* accurately measured by the company's:
 - A. debt-to-equity ratio.
 - B. efficiency in using assets to generate sales.
 - C. operating leverage and level of uncertainty about demand, output prices, and competition.
5. Consider two companies that operate in the same line of business and have the same degree of operating leverage: the Basic Company and the Grundlegend Company. The Basic Company and the Grundlegend Company have, respectively, no debt and 50 percent debt in their capital structure. Which of the following statements is *most* accurate? Compared to the Basic Company, the Grundlegend Company has:
 - A. a lower sensitivity of net income to changes in unit sales.
 - B. the same sensitivity of operating income to changes in unit sales.
 - C. the same sensitivity of net income to changes in operating income.
6. Myundia Motors now sells 1 million units at ¥3,529 per unit. Fixed operating costs are ¥1,290 million and variable operating costs are ¥1,500 per unit. If the company pays ¥410 million in interest, the levels of sales at the operating breakeven and breakeven points are, respectively:
 - A. ¥1,500,000,000 and ¥2,257,612,900.
 - B. ¥2,243,671,760 and ¥2,956,776,737.
 - C. ¥2,975,148,800 and ¥3,529,000,000.
7. Juan Alavanca is evaluating the risk of two companies in the machinery industry: The Gearing Company and Hebelkraft, Inc. Alavanca used the latest fiscal year's financial statements and interviews with managers of the respective companies to gather the following information:

	The Gearing Company	Hebelkraft, Inc.
Number of units produced and sold	1 million	1.5 million
Sales price per unit	\$200	\$200
Variable cost per unit	\$120	\$100
Fixed operating cost	\$40 million	\$90 million
Fixed financing expense	\$20 million	\$20 million

Based on this information, the breakeven points for The Gearing Company and Hebelkraft, Inc. are:

- A. 0.75 million and 1.1 million units, respectively.
- B. 1 million and 1.5 million units, respectively.
- C. 1.5 million and 0.75 million units, respectively.

*The following information relates to Questions 8–16.*¹⁰

Mary Benn, CFA, is a financial analyst for Twin Fields Investments, located in Storrs, Connecticut, U.S.A. She has been asked by her supervisor, Bill Cho, to examine two small Japanese cell phone component manufacturers: 4G, Inc., and Qphone Corp. Cho indicates that his clients are most interested in the use of leverage by 4G and Qphone. Benn states, “I will have to specifically analyze each company’s respective business risk, sales risk, operating risk, and financial risk.”

“Fine, I’ll check back with you shortly,” Cho answers.

Benn begins her analysis by examining the sales prospects of the two firms. The results of her sales analysis appear in Exhibit A. She also expects very little price variability for these cell phones. She next gathers more data on these two companies to assist her analysis of their operating and financial risk.

When Cho inquires as to her progress, Benn responds, “I have calculated Qphone’s degree of operating leverage (DOL) and degree of financial leverage (DFL) at Qphone’s 2009 level of unit sales. I have also calculated Qphone’s breakeven level for unit sales. I will have 4G’s leverage results shortly.”

Cho responds, “Good, I will call a meeting of some potential investors for tomorrow. Please help me explain these concepts to them, and the differences in use of leverage by these two companies.” In preparation for the meeting, Cho says he has a number of questions:

- “You mentioned business risk; what is included in that?”
- “How would you classify the risk due to the varying mix of variable and fixed costs?”
- “Could you conduct an analysis and tell me how the two companies will fare relative to each other in terms of net income if their unit sales increased by 10 percent above their 2009 unit sales levels?”
- “Finally, what would be an accurate verbal description of the degree of total leverage?”

The relevant data for analysis of 4G is contained in Exhibit B, while Benn’s analysis of the Qphone data appears in Exhibit C.

EXHIBIT A Benn’s Unit Sales Estimates for 4G, Inc., and Qphone Corp.

Company	2009 Unit Sales	Standard Deviation of Unit Sales	2010 Expected Unit Sales Growth Rate
4G, Inc.	1,000,000	25,000	15%
Qphone Corp.	1,500,000	10,000	15%

¹⁰Questions developed by Philip Fanara, CFA.

EXHIBIT B Sales, Cost, and Expense Data for 4G, Inc.
(At Unit Sales of 1,000,000)

Number of units produced and sold	1,000,000
Sales price per unit	¥108
Variable cost per unit	¥72
Fixed operating cost	¥22,500,000
Fixed financing expense	¥9,000,000

EXHIBIT C Benn's Analysis of Qphone (At Unit
Sales of 1,500,000)

Degree of operating leverage	1.40
Degree of financial leverage	1.15
Breakeven quantity (units)	571,429

8. Based on Benn's analysis, 4G's sales risk relative to Qphone's is *most likely* to be:
 - A. lower.
 - B. equal.
 - C. higher.
9. What is the *most* appropriate response to Cho's question regarding the components of business risk?
 - A. Sales risk and financial risk.
 - B. Operating risk and sales risk.
 - C. Financial risk and operating risk.
10. The *most* appropriate response to Cho's question regarding the classification of risk arising from the mixture of variable and fixed costs is:
 - A. sales risk.
 - B. financial risk.
 - C. operating risk.
11. Based on the information in Exhibit B, the degree of operating leverage (DOL) of 4G, Inc., at unit sales of 1,000,000, is *closest* to:
 - A. 1.60.
 - B. 2.67.
 - C. 3.20.
12. Based on the information in Exhibit B, 4G, Inc.'s degree of financial leverage (DFL), at unit sales of 1,000,000, is *closest* to:
 - A. 1.33.
 - B. 2.67.
 - C. 3.00.

-
13. Based on the information in Exhibit A and Exhibit C, Qphone's expected percentage change in operating income for 2010 is *closest* to:
- A. 17.25%.
 - B. 21.00%.
 - C. 24.30%.
14. 4G's breakeven quantity of unit sales is *closest* to:
- A. 437,500 units.
 - B. 625,000 units.
 - C. 875,000 units.
15. In response to Cho's question regarding an increase in unit sales above 2009 unit sales levels, it is *most likely* that 4G's net income will increase at:
- A. a slower rate than Qphone's.
 - B. the same rate as Qphone's.
 - C. a faster rate than Qphone's.
16. The *most* appropriate response to Cho's question regarding a description of the degree of total leverage is that degree of total leverage is:
- A. the percentage change in net income divided by the percentage change in units sold.
 - B. the percentage change in operating income divided by the percentage change in units sold.
 - C. the percentage change in net income divided by the percentage change in operating income.

CHAPTER 5

CAPITAL STRUCTURE

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LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- Explain the Modigliani–Miller propositions concerning capital structure, including the impact of leverage, taxes, financial distress, agency costs, and asymmetric information on a company's cost of equity, cost of capital, and optimal capital structure.
- Explain the target capital structure and why actual capital structure may fluctuate around the target.
- Describe the role of debt ratings in capital structure policy.
- Explain factors an analyst should consider in evaluating the impact of capital structure policy on valuation.
- Describe international differences in financial leverage and their implications for investment analysis.

1. INTRODUCTION

The most important decision a company makes in its pursuit of maximizing its value is typically the decision concerning what products to manufacture and/or what services to offer. The decision on how to finance investments (e.g., in factories and equipment), the so-called capital structure decision, is often seen as less important, even secondary. As we will see

in this chapter, the importance of the capital structure decision depends on the assumptions one makes about capital markets and the agents operating in it.

Under the most restrictive set of assumptions, the capital structure decision—the choice between how much debt and how much equity a company uses in financing its investments—is irrelevant. That is, any level of debt is as good as any other, and the capital structure decision is not only secondary, it is irrelevant. However, as some of the underlying assumptions are relaxed, the choice of how much debt to have in the capital structure becomes meaningful. Under a particular set of assumptions, it is even possible to have an optimal level of debt in the capital structure; that is, a level of debt at which company value is maximized.

The chapter is organized as follows: In Section 2 we introduce the capital structure decision, and discuss the assumptions and theories that lead to alternative capital structures. In Section 3 we present important practical issues for the analyst, such as the role of debt ratings in the capital structure decision and international differences in capital structure policies. The final section summarizes the chapter.

2. THE CAPITAL STRUCTURE DECISION

A company's **capital structure** is the mix of debt and equity the company uses to finance its business. The goal of a company's capital structure decision is to determine the financial leverage or capital structure that maximizes the value of the company by minimizing the weighted average cost of capital. The **weighted average cost of capital (WACC)** is given by the weighted average of the marginal costs of financing for each type of financing used. For a company with both debt and equity in its capital structure for which interest expense is tax deductible at a rate t , the WACC, which we will denote r_{wacc} is

$$r_{wacc} = \left(\frac{D}{V}\right)r_d(1-t) + \left(\frac{E}{V}\right)r_e \quad (5-1)$$

where r_d is the before-tax marginal cost of debt, r_e is the marginal cost of equity, and t is the marginal tax rate.¹ Variables D and E denote the market value of the shareholders' outstanding debt and equity, respectively, and the value of the company is given by $V = D + E$. You will notice that the debt and equity costs of capital and the tax rate are all understood to be "marginal" rates. The overall cost of capital is therefore a marginal cost also: what it costs the company to raise additional capital using the specified mixture of debt and equity. Further, this is the current cost: what it would cost the company today. What it cost in the past is not relevant. Therefore, the cost of equity, the cost of debt, and the tax rate that we use throughout the remainder of this chapter are marginal: the cost or tax rate for additional capital.

In the following section, we first consider the theoretical relationship between leverage and a company's value. We then examine the practical relationship between leverage and company value in equal depth.

¹For simplicity, this discussion ignores preferred stock.

2.1. Proposition I without Taxes: Capital Structure Irrelevance

In a now classic paper, Nobel Prize-winning economists Franco Modigliani and Merton Miller argued the important theory that, given certain assumptions, a company's choice of capital structure does not affect its value.² The assumptions relate to expectations and markets:

1. Investors agree on the expected cash flows from a given investment. This means that all investors have the same expectations with respect to the cash flows from an investment in bonds or stocks. In other words, expectations are homogeneous.
2. Bonds and shares of stock are traded in **perfect capital markets**. This means that there are no transactions costs, no taxes, no bankruptcy costs, and everyone has the same information. In a perfect capital market, any two investments with identical cash flow streams and risk must trade for the same price.
3. Investors can borrow and lend at the risk-free rate.
4. There are no agency costs. This means that managers always act to maximize shareholder wealth.
5. The financing decision and the investment decision are independent of each other. This means that operating income is unaffected by changes in the capital structure.

Many of these assumptions are unrealistic, and we will examine the consequences of relaxing some of them later in this section. The important point is that Modigliani and Miller provided a basis for thinking about capital structure and the starting point for analysis. Consider the capital of a company to be a pie: Each slice represents how much of total capital is provided by a specific type of capital, for example, by common equity. One can split it in any number of ways, but the size of the pie remains the same. Saying that the pie remains the same size is equivalent to saying that the present value of cash flows to the company remains the same. This can only happen if the future cash flow stream is expected to remain the same and the risk of that cash flow stream, as reflected by the cost of capital, remains the same. Modigliani and Miller prove that under these conditions, and given their assumptions, changing the capital structure (i.e., how the pie is sliced) does not affect value. In other words, in a perfect capital market with risk-free borrowing and lending and with investment and financing decisions independent of each other, investors can create the capital structure they individually prefer for the company by borrowing and lending on their own accounts. The capital structure chosen by management does not matter because it can be adjusted to the desired capital structure by investors at no cost.

Suppose that a company has a capital structure consisting of 50 percent debt and 50 percent equity and that an investor would prefer that the company's capital structure be 70 percent debt and 30 percent equity. The investor uses borrowed money to finance his or her share purchases so that effectively ownership of company assets reflects the preferred 70 percent debt financing. To the extent this changing capital structure has no effect on the company's expected operating cash flows, the capital structure decision has no impact on company value. Modigliani and Miller use the concept of arbitrage to demonstrate their point: If the value of an unlevered company—that is, a company without any debt—is not

²Modigliani and Miller (1958).

equal to that of a levered company, investors could make an arbitrage profit. The arbitrage operation (selling the overvalued asset and using the proceeds to buy the undervalued asset) would quickly force the values to be equivalent.

The importance of the Modigliani and Miller theory is that it demonstrates that managers cannot create value simply by changing the company's capital structure. Consider why this might be true. The operating earnings of a business are available to the providers of its capital. In an all-equity company (that is, a company with no debt), all of the operating earnings are available to the equityholders and the value of the company is the present value of these operating earnings. If, on the other hand, a company is partially financed by debt, these operating earnings are split between the providers of capital: the equityholders and the debtholders. Under market equilibrium, the sum of the values of debt and equity in such a case should equal the value of the all-equity company. In other words, the value of a company is determined solely by its cash flows, not by the relative reliance on debt and equity capital.

This principle does not change the fact of the relative risks of leverage to debtholders versus equityholders. Adding leverage does increase the risk faced by the equityholders. In such a case, equityholders seek compensation for this extra risk by requiring a higher return. Indeed, in equilibrium, the increase in equity returns is exactly offset by increases in the risk and the associated increase in the required rate of return on equity, so that there is no change in the value of the company.³

Modigliani and Miller (MM) first illustrated the capital structure irrelevance proposition under the condition of no taxes:

MM Proposition I:

The market value of a company is not affected by the capital structure of the company.

In other words, the value of the company levered (V_L) is equal to the value unlevered (V_U), or $V_L = V_U$. A crucial implication of MM Proposition I is that the weighted average cost of capital for a company in the no-tax case is unaffected by its capital structure.

To understand this proposition, we can think about two companies with the same expected, perpetual cash flows and uncertainty and, hence, the same discount rate applied to value these cash flows. Even if the companies have different capital structures, these two companies must have the same present value using discounted cash flow models. If capital structure changes were to have any effect on a company's value, there would exist an arbitrage opportunity to make riskless profits.

In a perfect market, investors can substitute their own leverage for a company's leverage by borrowing or lending appropriate amounts in addition to holding shares of the company. Because this process is costless for investors (we assume perfect markets), a company's financial leverage should have no impact on its value. Therefore, a company's capital structure is irrelevant in perfect markets (which assume no taxes).

³As a final point, in the absence of taxes, MM's capital structure irrelevance result holds whether debt is assumed to be risk-free (as MM assumed in their 1958 article) or risky, so long as there are no bankruptcy costs.

2.2. Proposition II without Taxes: Higher Financial Leverage Raises the Cost of Equity

Modigliani and Miller's second proposition focuses on the cost of capital of the company:

MM Proposition II:

The cost of equity is a linear function of the company's debt/equity ratio.

Assuming that financial distress has no costs and that debtholders have prior claim to assets and income relative to equityholders, the cost of debt is less than the cost of equity. According to this proposition, as the company increases its use of debt financing, the cost of equity rises. We know from MM Proposition I that the value of the company is unchanged and the weighted average cost of capital remains constant if the company changes its capital structure. What Proposition II then means is that the cost of equity increases in such a manner as to exactly offset the increased use of cheaper debt in order to maintain a constant WACC.

The risk of the equity depends on two factors: the risk of the company's operations (business risk) and the degree of financial leverage (financial risk). Business risk determines the cost of capital, whereas the capital structure determines financial risk.

The weighted average cost of capital, or r_{wacc} , *ignoring taxes*, is

$$r_{wacc} = \left(\frac{D}{V}\right)r_d + \left(\frac{E}{V}\right)r_e \quad (5-2)$$

where

r_{wacc} is the weighted average cost of capital of the company

r_d is the before-tax marginal cost of debt capital, and is equal to the after-tax marginal cost of debt because there are no taxes by assumption

r_e is the marginal cost of equity capital

D is the market value of debt

E is the market value of equity

V is the value of the company, which is equal to $D + E$

Let us define r_0 as the cost of capital for a company financed only by equity (an "all-equity company"). Then, by MM Proposition I, $r_{wacc} = r_0$, so

$$r_{wacc} = \left(\frac{D}{V}\right)r_d + \left(\frac{E}{V}\right)r_e = r_0 \quad (5-3)$$

Recalling that $D + E = V$ and using this to substitute for V , we can rearrange Equation 5-3 to solve for the cost of equity:

$$r_e = r_0 + (r_0 - r_d)\frac{D}{E} \quad (5-4)$$

Equation 5-4 is the precise expression for the cost of equity in MM Proposition II. As shown in Equation 5-4, the cost of equity is a linear function of the debt/equity ratio (D/E) with the intercept equal to r_0 and the slope coefficient equal to the positive quantity $(r_0 - r_d)$. We know that $(r_0 - r_d)$ is positive because the cost of equity must be an increasing function of

the debt/equity ratio for WACC to be unchanged as the use of debt in financing is increased, as required by Proposition I. Thus, as the debt/equity ratio increases, the cost of equity capital also increases. See Exhibit 5-1 later in this section.

Consider the example of the Leverkin Company, which currently has an all-equity capital structure. Leverkin has an expected operating income of \$5,000 and a cost of equity, which is also its WACC, of 10 percent. Adopting a common practice, we represent operating income by earnings before interest and taxes, EBIT. For simplicity, we will assume that the EBIT and other cash flows are perpetual. Let us suppose that Leverkin is planning to issue \$15,000 in debt at a cost of 5 percent in order to buy back \$15,000 worth of its equity.

Because there are no taxes and the EBIT is a perpetuity, we can compute the value of the all-equity Leverkin as the present value of its expected cash flows:

$$V = \frac{\text{EBIT}}{r_{\text{wacc}}} = \frac{\$5,000}{0.10} = \$50,000$$

Under MM Proposition I, because $V_L = V_U$, the value of Leverkin remains the same whether it is all-equity financed or has \$15,000 of debt. When it issues the debt, Leverkin pays an interest charge of 5 percent on this debt. That is, Leverkin's interest payment is $0.05 (\$15,000) = \750 .

By MM Proposition II, the cost of Leverkin's equity when it has \$15,000 debt and $\$50,000 - \$15,000 = \$35,000$ equity is

$$r_e = 0.10 + (0.10 - 0.05) \frac{\$15,000}{\$35,000} \approx 0.12143 = 12.143\%$$

The value of Leverkin with \$15,000 debt in its capital structure must equal the sum of the present value of cash flows to debtholders and equityholders. With \$15,000 debt, Leverkin makes an interest payment of \$750 to debtholders, leaving $\$5,000 - \$750 = \$4,250$ for equityholders.

$$V = D + E = \frac{\$750}{0.05} + \frac{\$4,250}{0.12143} = \$15,000 + \$34,999.59 \approx \$50,000$$

It is straightforward to demonstrate that Leverkin's value remains at \$50,000 at any level of debt.⁴ We can also confirm, using Equation 5-3, that Leverkin's WACC with the new capital structure remains at 10 percent as required by Proposition I:

$$r_{\text{wacc}} = \left(\frac{\$15,000}{\$50,000} \right) 0.05 + \left(\frac{\$35,000}{\$50,000} \right) 0.12143 = 0.10 = 10\%$$

Just as we can express the beta of any investment portfolio as a market-value weighted average of the betas of the investments in that portfolio, we can express the systematic risk of each of the sources of a company's capital in a similar manner.⁵ In other words, we can represent the systematic risk of the assets of the entire company as a weighted average of the systematic risk of the company's debt and equity:

⁴Note that this statement is true even with 100 percent debt financing because in that case, the debtholders are effectively the company's owners (equityholders).

⁵Hamada (1972).

$$\beta_a = \left(\frac{D}{V}\right)\beta_d + \left(\frac{E}{V}\right)\beta_e \quad (5-5)$$

where β_a is the asset's systematic risk, or **asset beta**, β_d is the beta of debt, and β_e is the equity beta. The asset beta represents the amount of the assets' risk that is nondiversifiable (cannot be eliminated by holding those assets as part of a large, well-diversified portfolio).

According to Modigliani and Miller, the company's cost of capital does not depend on its capital structure but rather is determined by the business risk of the company. On the other hand, as the level of debt rises, the risk of the company defaulting on its debt increases. These costs are borne by the equityholders. So as the proportionate use of debt rises, the equity's beta, β_e , also rises. By reordering the formula of β_a to solve for β_e , we get

$$\beta_e = \beta_a + (\beta_a - \beta_d)\left(\frac{D}{E}\right) \quad (5-6)$$

In the next section, we look at the decision to use debt financing given the taxes and market imperfections found in the real world.

2.3. Taxes, the Cost of Capital, and the Value of the Company

Taxes are the first practical consideration in modifying the results of the MM propositions. In the discussion below we will present MM Propositions I and II with taxes.

Because interest paid is deductible from income for tax purposes in most countries, the use of debt provides a tax shield that translates into savings that enhance the value of a company. Indeed, ignoring other practical realities of costs of financial distress and bankruptcy, the value of the company increases with increasing levels of debt. In effect, by making the interest costs deductible for income taxes, the government subsidizes companies' use of debt. The actual cost of debt is reduced by the level of the company's tax benefit:

$$\text{After-tax cost of debt} = \text{Before-tax cost of debt} \times (1 - \text{Marginal tax rate})$$

Modigliani and Miller show that, in the presence of corporate taxes,⁶ the value of the company with debt is greater than that of the all-equity company by an amount equal to the tax rate multiplied by the value of the debt. That is, MM Proposition I with corporate taxes is:

$$V_L = V_U + tD \quad (5-7)$$

where t is the marginal tax rate. The term tD is often referred to as the debt tax shield.

By introducing corporate tax, we adjust the weighted average cost of capital formula to reflect the impact of the tax benefit:

$$r_{wacc} = \left(\frac{D}{V}\right)r_d(1 - t) + \left(\frac{E}{V}\right)r_e \quad (5-8)$$

Because by Proposition I with taxes the value of a company with debt is greater than that of the same company without debt, *for the same level of operating income*, it must follow that

⁶We continue to assume that there are no personal taxes.

the WACC for the company with debt *must be lower* than that for the all-equity company. If we continue to define r_0 as the cost of capital for an all-equity company, MM show that the cost of equity for the same company with debt is:

$$r_e = r_0 + (r_0 - r_d)(1 - t) \frac{D}{E} \quad (5-9)$$

This is MM Proposition II when there are corporate taxes.⁷ Notice that the difference between Equation 5-9 and MM Proposition II in the no-tax case (Equation 4) is the presence of the term $(1 - t)$. When t is not zero, the term $(1 - t)$ is less than 1 and serves to lower the cost of leveraged equity when compared to the no-tax case.⁸ That is, the cost of equity becomes greater as the company increases the amount of debt in its capital structure, but the cost of equity does not rise as fast as it does in the no-tax case. Equivalently, the slope coefficient is $(r_0 - r_d)(1 - t)$, which is smaller than the slope coefficient $(r_0 - r_d)$ in the case of no taxes. As a consequence, the WACC for the leveraged company falls as debt increases, and overall company value increases. Therefore, if taxes are considered but financial distress and bankruptcy costs are not, debt financing is highly advantageous, and in the extreme, a company's optimal capital structure is all debt.

Let us return to the example of the Leverkin Company, which is currently all-equity, has an EBIT of \$5,000, and a WACC—which is also its cost of equity—of 10 percent. As before, Leverkin is planning to issue \$15,000 of debt in order to buy back an equivalent amount of equity. Now, however, Leverkin pays corporate taxes at a rate of 25 percent.

Because Leverkin must pay taxes, the after-tax cash flow available to its shareholders is earnings before taxes, EBT, times $(1 - t)$, or $EBT(1 - t)$. $EBT(1 - t)$ is the same here as EBIT $(1 - t)$ because $I = 0$. If we continue to assume perpetual cash flows, the value of the all-equity, or unlevered, Leverkin is:

$$V_U = \frac{EBT(1 - t)}{WACC} = \frac{\$5,000(1 - 0.25)}{0.10} = \$37,500$$

Note that the value of Leverkin when there are corporate taxes is less than its value in the no-tax case. This is simply because a new claimant on Leverkin's cash flows, the government through its ability to impose taxes, has entered the picture.

Let us now see what happens to Leverkin's value when it issues \$15,000 in debt and buys back stock. According to MM Proposition I when there are corporate taxes, that is, Equation 5-7,

$$V_L = V_U + tD = \$37,500 + 0.25(\$15,000) = \$41,250$$

Because the value of the debt is \$15,000, the value of the equity (after the buy back) must be $(\$41,250 - \$15,000) = \$26,250$. According to MM Proposition II with corporate taxes (Equation 5-9), the cost of the levered equity is:

⁷The derivation of Equation 5-9 can be found in more advanced texts. See, for example, Copeland, Weston, and Shastri (2005).

⁸*Leveraged* and *levered* as used in discussion of capital structure are synonyms. Both terms are commonly used.

$$r_e = 0.10 + (0.10 - 0.05)(1 - 0.25) \frac{\$15,000}{\$26,250} = 0.12143 = 12.143\%$$

Because the value of the company must equal the present value of cash flows to debt and to equity,

$$V_L = D + E = \frac{r_d D}{r_d} + \frac{(\text{EBIT} - r_d D)(1 - t)}{r_e} = \frac{\$750}{0.05} + \frac{(\$5,000 - \$750)(1 - 0.25)}{0.12143} \\ \approx \$41,250$$

This is the value of the company as given by MM Proposition I. As a further check, using Equation 5-8, the WACC for the levered Leverkin is:

$$r_{wacc} = \frac{\$15,000}{\$41,250}(0.05)(1 - 0.25) + \frac{\$26,250}{\$41,250}(0.12143) = 0.09091 = 9.091\%$$

As expected, this is lower than the unlevered WACC of 10 percent. Because after taxes are paid whatever is left of the cash flows can be claimed by debtholders and equityholders, we must also have:

$$V_L = \frac{\text{EBIT}(1 - t)}{\text{WACC}} = \frac{\$5,000(1 - 0.25)}{0.09091} \approx \$41,250$$

We can see the effect of taxes on the cost of capital in Exhibit 5-1. Here, we see that if there are no taxes, as shown in Panel B, the cost of capital is constant at $r_{wacc} = r_0$. If, on the other hand, interest is tax deductible, the cost of capital declines for ever-increasing use of debt financing, as shown in Panel C.

Miller (1977) introduced another aspect into the analysis of the tax benefits from the use of debt financing. He argued that if investors face different tax rates on dividend and interest income for their personal taxes, this situation may reduce the advantage of debt financing somewhat. If investors face a higher personal rate of tax on income from debt investments relative to stock investments, they will demand a higher return on debt—driving up the cost of debt to the company.⁹ Thus, in the Miller model, whether or not financing with debt adds value to the company depends on the corporate tax rate, the personal tax rate on interest income, and the personal tax rate on dividend income. It is therefore possible in the Miller model, depending on the levels of the various tax rates, for debt to add value, lower value, or to have no effect on value.

In practice, however, the value of a levered company is affected by more than the tax issues surrounding the use of debt. The analysis gets more complicated once we introduce factors such as the cost of financial distress, agency costs, and asymmetric information. We address these additional factors next.

⁹It can be argued that there is a higher personal tax on debt income because debt instruments typically provide investors with taxable interest periodically, whereas taxable income from stock investments could, conceivably, be lower because the tax consequences of investing in non-dividend-paying stocks are deferred until the stock is sold.

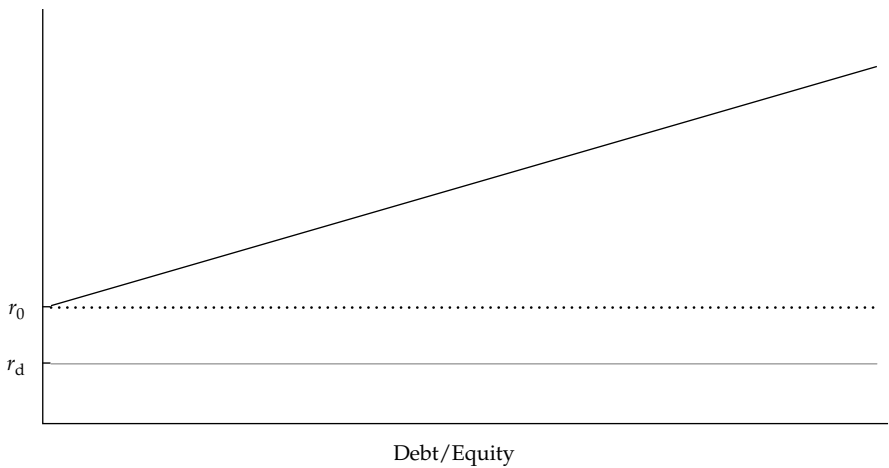
EXHIBIT 5-1 Modigliani and Miller Propositions

Panel A: Value of the Company and Cost of Capital for Propositions without and with taxes

	Without Taxes	With Taxes
Proposition I	$V_L = V_U$	$V_L = V_U + tD$
Proposition II	$r_e = r_o + (r_o - r_d) \frac{D}{E}$	$r_e = r_o + (r_o - r_d)(1-t) \frac{D}{E}$

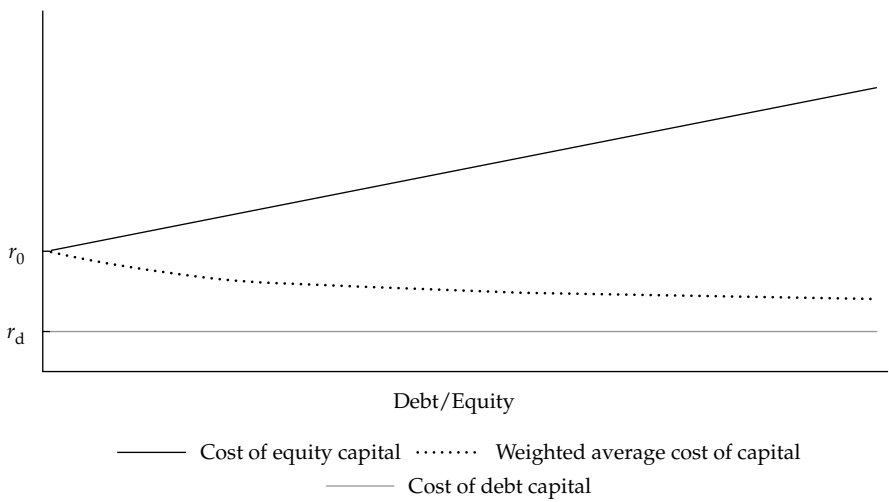
Panel B: Costs of Capital If There Are No Taxes

Cost of Capital



Panel C: Costs of Capital If There Are Taxes

Cost of Capital



EXAMPLE 5-1 The After-Tax Cost of Debt

Payment People, a provider of temporary accounting workers, is considering an \$85 million acquisition. The company could raise capital by selling either debt or equity. If the company finances the acquisition with debt at 8 percent interest, what is the after-tax cost of issuing debt if the company's marginal tax rate is 34 percent?

Solution: Annual interest expense on \$85 million at 8 percent is \$6.8 million. The \$6.8 million is deducted from income, saving $\$6.8 \text{ million} \times 0.34 = \2.312 million in taxes. The after-tax interest cost is $\$6.8 \text{ million} - \$2.312 \text{ million} = \4.488 million . The before-tax cost of debt is 8 percent; the after-tax cost of debt is

After-tax cost of debt = $\$4.488 \text{ million} / \$85 \text{ million} = 5.28\%$, or, equivalently,
 $0.08(1 - 0.34) = 0.0528$, or 5.28%.

EXAMPLE 5-2 The Cost of Equity

Hotel chain Hostales Vacaciones finances land purchases for new hotels. Its current cost of capital, as an all-equity company, is 13 percent. The company is opening ten new hotels and is considering issuing debt at 9 percent for its financing needs. If it issues debt, its debt to equity ratio would be 0.5. The corporate tax rate is 32 percent. What would be the company's cost of equity with and without the consideration of taxes?

Solution:

Without taxes

$$r_e = r_0 + (r_0 - r_d) \left(\frac{D}{E} \right)$$

$$r_e = 0.13 + [(0.13 - 0.09)(0.5)] = 0.15, \text{ or } 15\%$$

With taxes

$$r_e = r_0 + (r_0 - r_d)(1 - t) \frac{D}{E}$$

$$r_e = 0.13 + [(0.13 - 0.09)(1 - 0.32)(0.5)] = 0.1436, \text{ or } 14.36\%$$

Thus, as expected, the cost of equity rises in both the cases due to the addition of debt, but the increase is less when taxes are considered.

2.4. Costs of Financial Distress

The downside of operating and financial leverage is that earnings are magnified downward during economic slowdowns. Lower or negative earnings put companies under stress, and this **financial distress** adds costs—both explicit and implicit—to a company. Even before taking the drastic step of filing for bankruptcy, companies under stress may lose customers, creditors, suppliers, and valuable employees to more secure competitors.

EXAMPLE 5-3 Costs of Financial Distress

Enron is an extreme example of the loss of value due to financial distress. Up until its demise in 2001, Enron was a large player in the natural gas industry. Events leading up to the eventual bankruptcy protection filing caused investors to flee the common stock as creditors refused new lending. Enron went from a favored to a disdained company in record time.

According to a company presentation made 10 days after its 2 December 2001 bankruptcy filing, the company's common stock price plunged from \$80 per share to \$1 per share prior to the bankruptcy announcement, losing \$25 billion in market value.¹⁰ This loss in value was due to a number of factors, including:

- Investors' and creditors' lost confidence.
- Financial market reaction from a lack of access to capital markets.
- Current maturities greatly exceeding operating cash flow because of the inability to refinance debt.
- Nervous trade creditors.
- Dynegy pulling out of the merger on 28 November 2001.
- The bond ratings downgrade on 28 November 2001.

Cash bankruptcy expenses listed in the bankruptcy filing documents totaled \$17.3 million, though the bankruptcy costs including accountants', advisors', and lawyers' fees were over \$500 million by November of 2003.¹¹

The expected cost of financial distress is composed of two key ingredients: (1) the costs of financial distress and bankruptcy, in the event they happen, and (2) the probability that financial distress and bankruptcy happen. We can classify the costs of financial distress into direct and indirect costs. Direct costs of financial distress include the actual cash expenses associated with the bankruptcy process, such as legal and administrative fees. Indirect costs of financial distress include forgone investment opportunities, impaired ability to conduct

¹⁰Enron Corporation Organizational Meeting, 12 December 2001.

¹¹*Houston Business Journal*, 19 November 2003.

business, and agency costs associated with the debt during periods in which the company is near or in bankruptcy.

Companies whose assets have a ready secondary market have lower costs associated with financial distress. Companies with relatively marketable tangible assets, such as airlines, shipping companies, and steel manufacturers, incur lower costs from financial distress because such assets are usually more readily marketable. On the other hand, companies with few tangible assets, such as high-tech growth companies, pharmaceutical companies, information technology companies, and others in the service industry, have less to liquidate and therefore have a higher cost associated with financial distress.

The probability of bankruptcy increases as the degree of leverage increases. The probability of bankruptcy for a given company depends on how the fixed costs of debt service interact with the instability of the business environment and the reserves available to the company to delay bankruptcy. In other words, the probability of bankruptcy depends, in part, on the company's business risk. Other factors that affect the likelihood of bankruptcy include the company's corporate governance structure and the management of the company.

2.5. Agency Costs

Agency costs are the costs associated with the fact that all public companies and the larger private companies are managed by nonowners. Agency costs are the incremental costs arising from conflicts of interest when an agent makes decisions for a principal. In the context of a corporation, agency costs arise from conflicts of interest between managers, shareholders, and bondholders. In the following, "perquisite consumption" refers to items that executives may legally authorize for themselves that have a cost to shareholders, such as subsidized dining, a corporate jet fleet, chauffeured limousines, and so forth.

The smaller the stake that managers have in the company, the less is their share in bearing the cost of excessive perquisite consumption or not giving their best efforts in running the company. The costs arising from this conflict of interest have been called the **agency costs of equity**. Given that outside shareholders are aware of this conflict, they will take actions to minimize the loss, such as requiring audited financial statements. The net agency costs of equity therefore have three components:¹²

1. **Monitoring costs.** These are the costs borne by owners to monitor the management of the company and include the expenses of the annual report, board of director expenses, and the cost of the annual meeting.
2. **Bonding costs.** These are the costs borne by management to assure owners that they are working in the owners' best interest. These include the implicit cost of noncompetitive employment contracts and the explicit cost of insurance to guarantee performance.
3. **Residual loss.** This consists of the costs that are incurred even when there is sufficient monitoring and bonding, because monitoring and bonding mechanisms are not perfect.

The better a company is governed, the lower the agency costs. Good governance practices translate into higher shareholder value, reflecting the fact that managers' interests are better aligned with those of shareholders. Additionally, agency theory predicts that a reduction in net agency costs of equity results from an increase in the use of debt versus equity. That is,

¹²Jensen and Meckling (1976) provide this breakdown of agency costs.

there are equity-agency cost savings associated with the use of debt. Similarly, the more financially leveraged a company is, the less freedom managers have to either take on more debt or unwisely spend cash. This is the foundation of Michael Jensen's **free cash flow hypothesis**.¹³ According to Jensen's hypothesis, higher debt levels discipline managers by forcing them to manage the company efficiently so the company can make its interest and principal payments and by reducing the company's free cash flow and thus management's opportunities to misuse cash.¹⁴

2.6. Costs of Asymmetric Information

Asymmetric information (an unequal distribution of information) arises from the fact that managers have more information about a company's performance and prospects (including future investment opportunities) than do outsiders such as owners and creditors. Whereas all companies have a certain level of asymmetric information, companies with comparatively high asymmetry in information are those with complex products like high-tech companies, companies with little transparency in financial accounting information, or companies with lower levels of institutional ownership. Providers of both debt and equity capital demand higher returns from companies with higher asymmetry in information because they have a greater likelihood of agency costs.

Some degree of asymmetric information always exists because investors never know as much as managers and other insiders. Consequently, investors often closely watch manager behavior for insight into insider opinions on the company's future prospects. Being aware of this scrutiny, managers take into account how their actions might be interpreted by outsiders. The signaling model of capital structure suggests there may be a hierarchy ("pecking order") to the selection of methods for financing new investments.

The **pecking order theory**, developed by Myers and Majluf (1984), suggests that managers choose methods of financing according to a hierarchy that gives first preference to methods with the least potential information content (internally generated funds) and lowest preference to the form with the greatest potential information content (public equity offerings).¹⁵ In brief, managers prefer internal financing; and if internal financing is insufficient, managers next prefer debt, and finally, equity. Another implication of the work of Myers and Majluf is that financial managers tend to issue equity when they believe the stock is overvalued but are reluctant to issue equity if they believe the stock is undervalued. Thus, additional issuance of stock is often interpreted by investors as a negative signal.

We can read the signals that managers provide in their choice of financing method. For example, commitments to fixed payments, such as dividends and debt service payments, may be interpreted as the company's management having confidence in the company's future prospects of making payments. Such signals are considered too costly for poorly performing companies to afford. Alternatively, the signal of raising money at the top of the pecking order and issuing equity at the bottom of the pecking order holds other clues. If, for instance, the company's cost of capital increases after an equity issuance, we may interpret this effect as an

¹³Jensen (1986).

¹⁴Harvey, Lins, and Roper (2004) observe that this discipline is especially important in emerging markets, in which there is a tendency to overinvest.

¹⁵In general, public equity offerings are very closely scrutinized because investors are typically skeptical that existing owners would share ownership of a company with a great future with other investors.

indication that management needed capital beyond what comes cheaply; in other words, this is a negative signal regarding the company's future prospects.

2.7. The Optimal Capital Structure According to the Static Trade-Off Theory

When companies make decisions about financial leverage, they must weigh the value-enhancing effects of leverage from the tax deductibility of interest against the value-reducing impact of the costs of financial distress or bankruptcy, agency costs of debt, and asymmetric information. Putting together all the pieces of the theory of Modigliani and Miller, along with the taxes, costs of financial distress, debt agency costs, and asymmetric information, we see that as financial leverage is increased, there comes a point beyond which further increases in value from value-enhancing effects are offset completely by value-reducing effects. This point is known as the **optimal capital structure**. In other words, the optimal capital structure is that capital structure at which the value of the company is maximized.

Considering only the tax shield provided by debt and the costs of financial distress, the expression for the value of a leveraged company becomes

$$V_L = V_U + tD - PV(\text{Costs of financial distress}) \quad (5-10)$$

Equation 5-10 represents the **static trade-off theory of capital structure**. It results in an optimal capital structure such that debt constitutes less than 100 percent of a company's capital structure. We diagram this optimum in Exhibit 5-2.

The static trade-off theory of capital structure is based on balancing the expected costs from financial distress against the tax benefits of debt service payments, as shown in Panel A of Exhibit 5-2. Unlike the Modigliani and Miller proposition of no optimal capital structure, or a structure with almost all debt when the tax shield is considered, static trade-off theory puts forth an optimal capital structure with an optimal proportion of debt. Optimal debt usage is found at the point where any additional debt would cause the costs of financial distress to increase by a greater amount than the benefit of the additional tax shield.

We cannot say precisely at which level of debt financing a company reaches its optimal capital structure. The optimal capital structure depends on the company's business risk, combined with its tax situation, corporate governance, and financial accounting information transparency, among other factors. However, what we can say, based on this theory, is that a company should consider a number of factors, including its business risk and the possible costs of financial distress, in determining its capital structure.

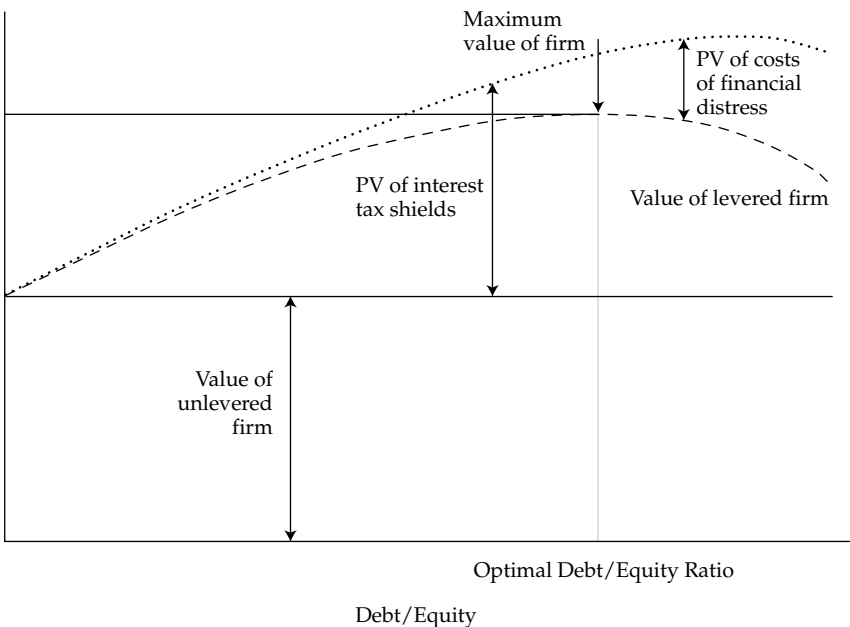
A company's management uses these tools to decide the level of debt appropriate for the company. The tax benefit from the deductibility of the interest expense on debt must be balanced against the risk associated with the use of debt. The extent of financial leverage used should thus depend on owners' and management's appetites for risk, as well as the stability of the company's business environment. Indeed, as shown in Panel B of Exhibit 5-2, as the proportion of debt in a business rises, the costs of both debt and equity are likely to rise to offset the higher risks associated with higher levels of debt. These cost increases reduce or even negate the cost savings due to the greater use of debt, the cheaper source of financing. The result is a **U-shaped** weighted average cost of capital curve.

When the company recognizes its most appropriate or best capital structure, it may adopt this as its **target capital structure**. Because management may exploit short-term opportunities in one or another financing source and because market-value fluctuations continuously

EXHIBIT 5-2 Trade-Off Theory with Taxes and Cost of Financial Distress

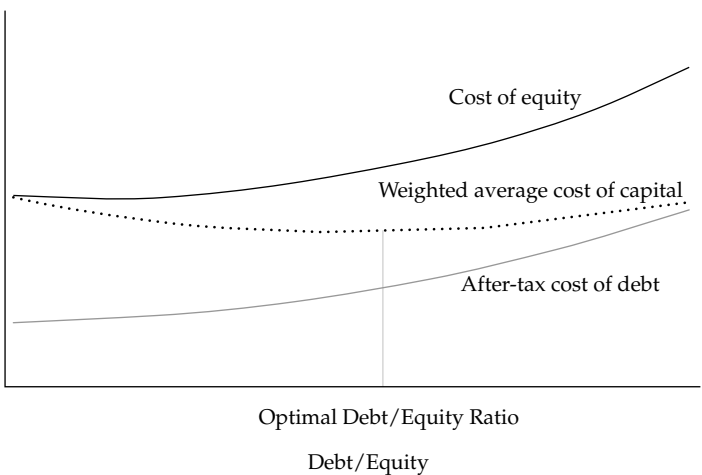
Panel A: Value of the Company and the Debt/Equity Ratio

Market Value of the Firm



Panel B: Cost of Capital and the Debt/Equity Ratio

Cost of Capital



affect the company's capital structure, a company's capital structure at any point in time may differ from the target. In addition, it may be impractical (due to market conditions making it inadvisable to raise capital) and expensive (because of flotation costs) for a company to continuously maintain its target structure. Nevertheless, so long as the assumptions of the analysis and the target are unchanged, analysts and management should focus on the target capital structure.

EXAMPLE 5-4 Financial Leverage and the Cost of Capital

The (hypothetical) Singapore-based Chuang Ho Company provides copper wired components for cellular telephone manufacturers globally. Chuang Ho is going to establish a subsidiary that would require assets of SGD 3 billion, and wants to select a capital structure that would minimize its cost of capital for the subsidiary. Alex Ahn, the company's CFO, wants to evaluate a target leverage structure and uses a scenario approach to evaluate the cost of capital for the present 0 percent debt and possible 50 percent debt or 80 percent debt. Chuang Ho's marginal tax rate is 35 percent. Ahn has gathered the following information regarding costs of capital:

- The marginal cost of equity rises with increased levels of debt from 13.5 percent (no debt) to 18 percent (50 percent debt), to 28 percent (80 percent debt).
- The marginal cost of borrowing is 12 percent on 50 percent debt, and 18 percent on 80 percent debt.

Which capital structure is expected to have the lowest cost of capital?

Solution. First, calculate the cost of capital under the three scenarios:

EXHIBIT 5-3 Chuang Ho Subsidiary

	Leverage		
	No Debt	50% Debt	80% Debt
Assets	\$3,000,000,000	\$3,000,000,000	\$3,000,000,000
Debt	\$0	\$1,500,000,000	\$2,400,000,000
Equity	\$3,000,000,000	\$1,500,000,000	\$600,000,000
Debt/equity ratio	0	1	4
Proportion of debt	0%	50%	80%
Proportion of equity	100%	50%	20%
Before-tax cost of debt	—	12%	18%
Cost of equity	13.5%	18%	28%
After-tax cost of debt = $r_d(1 - t)$	—	7.8%	11.7%
Weighted average cost of capital	13.5%	12.9%	14.96%

Of the three capital structures that we are evaluating, the cost of capital is lowest for 50 percent debt.

3. PRACTICAL ISSUES IN CAPITAL STRUCTURE POLICY

Although capital structure theories should serve to inform an analyst's decision-making process in valuing a company, there are several practical aspects of capital structure to consider. These include the evaluation of company creditworthiness by independent agencies, an understanding of the industry to which the company belongs, and an analysis of the legal, institutional, and macroeconomic environment in which the company operates. We consider these factors in the next section.

3.1. Debt Ratings

Debt ratings are an important consideration in the practical management of leverage. As leverage rises, rating agencies tend to lower the ratings of the company's debt to reflect the higher credit risk resulting from the increasing leverage. Lower ratings signify higher risk to both equity and debt capital providers, who therefore demand higher returns.

Most large companies pay one or more rating services to rate their bonds. Debt issues are rated for creditworthiness by credit rating agencies. Among credit ratings agencies with status as "Nationally Recognized Statistical Rating Organizations" from the U.S. Securities and Exchange Commission (SEC), the three largest are Moody's, Standard & Poor's, and Fitch. Rating agencies perform a financial analysis of the company's ability to pay the promised cash flows, as well as an analysis of the bond's indenture, the set of complex legal documents associated with the issuance of debt instruments.

EXHIBIT 5-4 Bond Ratings by Moody's, Standard & Poor's, and Fitch

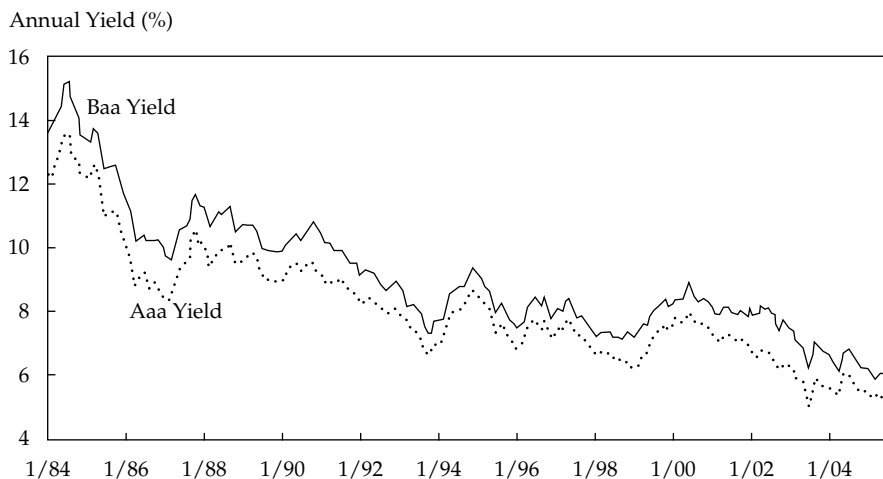
	Moody's	Standard & Poor's	Fitch	
Highest quality	Aaa	AAA	AAA	} Investment grade
High quality	Aa	AA	AA	
Upper medium grade	A	A	A	
Medium grade	Baa	BBB	BBB	
Speculative	Ba	BB	BB	} Speculative grade
Highly speculative	B	B	B	
Substantial risk	Caa	CCC	CCC	
Extremely speculative	Ca			
Possibly in default	C			
Default		D	DDD-D	

These agencies evaluate a wealth of information about the issuer and the bond, including the bond's characteristics and indenture, and provide investors with an assessment of the company's ability to pay the interest and principal on the bond as promised. We provide the bond rating classifications in Exhibit 5-4. Although there is significant agreement in ratings among the three major services, some disagreements do occur. For example, Standard

& Poor's lowered the credit rating of General Motors to speculative grade in early May of 2005, but Moody's did not do so until late August of 2005.

In practice, most managers consider the company's debt rating in their policies regarding capital structure. Managers must be mindful of their company's bond ratings because the cost of capital is tied closely to bond ratings. Consider the difference in the yields on Aaa and Baa rated corporate bonds, as shown in Exhibit 5-5. Typically, a difference of 100 basis points exists between the yields of Aaa and Baa bonds, though this spread widens in economic recessions.¹⁶ The cost of debt increases significantly when a bond's rating drops from investment grade to speculative grade. For example, when the rating of General Motors' unsecured 7.2 percent bond maturing in 2011 was changed by Moody's from Baa to Ba, the bond's price fell by over 7.5 percent and its yield rose from 7.541 percent to 9.364 percent.

EXHIBIT 5-5 Yields on Aaa and Baa Rated Corporate Bonds, 1984–2005



Source: Board of Governors of the Federal Reserve System, release H.15.

3.2. Evaluating Capital Structure Policy

In evaluating a company's capital structure, the financial analyst must look at the capital structure of the company over time, the capital structure of competitors that have similar business risk, and company-specific factors, such as the quality of corporate governance, that may affect agency costs, among other factors.¹⁷ The financial analyst is not privy to the company's target capital structure but rather can evaluate the company's ability to handle its

¹⁶The Board of Governors of the Federal Reserve System H.15 series of Aaa and Baa corporate yields shows an average spread of 119 basis points (bps) between Aaa and Baa rated bonds, on average, from 1919 to mid-2005. The largest spread occurred in 1932, with 565 bps, and the lowest spread occurred in 1966, with a 32 bp difference.

¹⁷Good corporate governance should lower the net agency costs of equity.

financial obligations and the potential role of costs of financial distress in determining how much financial leverage a company can handle.

Several practical considerations are important in this regard, such as the industry in which a company operates, the volatility of the company's cash flows, and its need for financial flexibility. Regulatory aspects can also play a role. For example, companies in the utility industry have relatively stable cash flows because they have a natural monopoly. Such companies usually also have a low degree of information asymmetry. As a result, utility companies tend to have much more debt than companies in other industries. Similarly, the guarantee afforded by deposit insurance in the United States, for example, allows banks in the United States to have debt levels in excess of 80 percent of assets. In contrast, companies in the technology or pharmaceutical industries tend to have little or no debt for the following reasons: (1) they have few tangible assets (their assets are chiefly human capital, patents, ideas, etc.), (2) there is a high degree of information asymmetry (such companies spend a lot on research and development and are very secretive about their products), and (3) they have a great need for financial flexibility (they need to respond quickly to competitive and other changes in their operating environment).

A common goal of capital structure decisions is to finance at the lowest cost of capital. Analysts can use a scenario approach to assess this point for a particular company, starting with the current cost of capital for a company and considering various changes to answer the following questions:

1. What happens to the cost of capital as the debt ratio is changed?
2. At what debt ratio is the cost of capital minimized and company value maximized?
3. To what extent are stock price and company value affected when market conditions make it difficult or impossible for a company to maintain its optimal capital structure?

3.3. Leverage in an International Setting

Modigliani and Miller told us that under several conditions the market value of a company is independent of its capital structure. However, we know that a company's capital structure is indeed relevant in the real world because of the effects of taxation, the costs of financial distress, and agency costs. The static trade-off theory suggests that the optimal level of leverage should be the level at which the value of the company is maximized; this is the level of debt financing at which any additional debt increases the costs of financial distress by an amount greater than the benefit from interest deductibility.

A company's capital structure largely depends on company-specific factors such as the probability of bankruptcy, profitability, quality and structure of assets, and growth opportunities. Beyond these factors, the company's industry affiliation, as well as the characteristics of the country where the company operates, can also account for differences in capital structure.

The general business environment differs from one country to another, and researchers show that country-specific factors have explanatory power similar to or even greater than that of the company's industry affiliation in determining a company's capital structure.¹⁸ Comparing financial leverage indicators of a U.S.-based energy company and a Japanese energy company is not meaningful if we do not take country-specific differences into account. Tradition, tax policy, and regulation may largely explain the different degrees of leverage in the two countries.

¹⁸See, for example, Fan, Titman, and Twite (2004).

In examining the capital structure and debt maturity structure of corporations in an international context, researchers generally find that differences in the capital structures exist between developed and emerging markets, as well as across the developed countries. Moreover, the debt maturity structure—another important capital structure decision—also tends to vary across the international setting. Therefore, when analysts focus on the capital structure of companies in an international setting, they must consider both the relative use of debt and the maturity structure of debt. In fact, short-term and long-term debt ratios follow very different patterns in an international comparison:

- Taking total debt into account, companies in France, Italy, and Japan tend to be more highly levered than companies in the United States and the United Kingdom.
- Focusing on the use of long-term debt, on the other hand, a different picture emerges: North American companies tend to use more long-term debt than do Japanese companies.
- Companies in developed markets typically use more long-term debt and tend to have higher long-term debt to total debt ratios compared to their emerging market peers.

Beyond the pure comparison of the capital structures, it is equally or even more important to identify and understand the country-specific factors that explain the cross-country differences.¹⁹ Three major types of factors may be used to explain most capital structure differences in an international comparison:

1. *Institutional and legal environment*: These factors represent the legal and regulatory environment in which companies operate, as well as the requirements related to financial reporting. These institutional factors—including taxation, accounting standards, and even the presence or lack of corruption—may affect a company's optimal capital structure.
2. *Financial markets and banking sector*: These factors include characteristics of the banking sector, as well as the size and activity of the financial markets. Financial institutions are crucial for companies' access to financing.
3. *Macroeconomic environment*: These factors capture the general economic and business environment, addressing the influence of economic growth and inflation on the capital structure.

3.3.1. Institutional and Legal Environment

Taxation, financial legislation, the content of laws (e.g., bankruptcy law), and the quality of their enforcement all differ from one country to another. These differences may influence the capital structures of companies and explain many of the differences that we observe across countries.

The apparent conflict of interest between a company's management and outside investors has already been addressed as the agency problem. This problem is, in fact, one of the key determinants of a company's ability to obtain capital; hence, agency costs are one of the major factors determining the capital structure. This conflict may be mitigated by carefully prepared

¹⁹We should note that conclusions drawn in different studies are not always consistent with each other. The results of empirical studies, in fact, may depend on several factors, such as the set of countries and companies taken into the data sample, the analyzed historical period, the hypotheses that the researchers intended to test, and even the definition of leverage that they considered.

contracts. The quality of investors' legal protections depends on both the content and the enforcement of the contracts and laws. As a result, we expect to see higher financial leverage in those countries that have weaker legal systems. Further, in countries with weaker legal systems, we expect a greater use of short-term debt financing versus long-term debt financing. Researchers find that companies operating in countries with an efficient legal system tend to use more long-term debt than short-term debt and exhibit lower leverage than comparable companies in countries with weaker legal systems.

Some researchers assume that legal systems based on common law offer external capital providers (both equity and debt providers) better protection compared to the legal systems of civil-law countries. Common law originated in England and is also followed in other countries, such as the United States, Canada, Australia, New Zealand, Singapore, India, and Malaysia. Civil law, on the other hand, has origins going back to ancient Rome; the countries of continental Europe and most of the rest of the world have legal systems based on this tradition. Researchers find mixed and limited evidence that companies operating in common-law countries tend to have longer debt maturity structures compared to their peers in civil-law countries, and use less debt and more equity in their capital structure.

Similar to the rationale described in the case of legal system efficiency, a high level of information asymmetry between insiders and outsiders encourages a greater use of debt relative to equity, as well as a greater reliance on short-term debt than on long-term debt in the capital structure. This is likely due to the fact that enforcing the debt contract is easier than enforcing the less clearly contracted shareholders' rights. Auditors and financial analysts can help reduce information asymmetries and increase the level of transparency.²⁰ Researchers confirm that the presence of auditors and analysts is associated with lower financial leverage. The importance of auditors is usually strongest in emerging markets, whereas the presence of analysts is more important in developed markets.

As we discussed earlier, taxes affect the capital structure decision by lowering the cost of debt financing to the issuer in those jurisdictions in which interest expense is tax deductible. In the absence of debt agency costs and bankruptcy costs, the benefit from the tax deductibility of interest encourages companies to use debt financing instead of equity financing. However, if dividend income is taxed at lower rates than interest income, some of the advantage of debt versus equity financing may be reduced from the corporate perspective because the price at which equity can be sold should reflect that advantage. Taxes are an important factor in a company's capital structure decision.

Researchers find mixed results on the effect of the corporate tax rate on capital structures, but they find that personal tax rates do matter. Because the tax treatment of dividends differs across countries, researchers can examine the importance of different tax treatments of dividend income.²¹ They find that companies in countries that have lower tax rates on dividend income also have less debt in their capital structures.

3.3.2. Financial Markets and Banking Sector

The size, activity, and liquidity of capital markets are crucial for corporations' access to capital. Several researchers have analyzed the impact of capital markets' characteristics on companies' capital structures. Some find that liquid and active capital markets affect companies' debt maturity structure. Specifically, they find that companies in countries that have liquid and active capital markets tend to use more long-term (as opposed to short-term) debt

²⁰Fan et al. (2003).

²¹Fan et al. (2003).

with longer maturity (30-year maturity is preferred to 15-year maturity). Researchers attribute this finding to the heightened external monitoring of companies by market participants in active markets.²²

The banking sector is one of the primary sources of funds for the corporate sector in many countries, and its role is especially significant in countries that do not have a corporate bond market. The importance of the banking sector relative to the capital markets can vary from one country to another, however. Countries with a common-law tradition, where the shareholders' rights are stronger, tend to be more market-based, whereas civil-law countries tend to be more bank-based. Because the relationship between a bank and a company is stronger and closer than between a company and a bondholder, banks can handle information asymmetries more efficiently. This effect may partly explain why civil-law countries are more bank-oriented.

However, researchers' findings are mixed regarding the effect of the banking system. Some researchers claim that banks have no effect on companies' financial leverage and that the difference between the bank-oriented and market-oriented countries is more reflected by the relative importance of public financing (i.e., stock and bonds) and private financing (i.e., bank loans).²³ On the other hand, some researchers find that companies in bank-based countries exhibit higher financial leverage compared to those that operate in market-based countries.²⁴

The presence of institutional investors may also affect the companies' capital structure choice. Some institutional investors may have preferred debt maturities ("preferred habitats"), and this preference may affect companies' debt maturity structure. Insurance companies and pension plans, for example, may prefer investing in long-term debt securities in order to match the interest rate risk of their long-term liabilities. Researchers find limited results regarding the influence of preferred habitats; companies in countries that have more institutional investors in their markets tend to have more long-term debt and somewhat lower debt to equity ratios.²⁵

3.3.3. Macroeconomic Environment

Inflation is a widely recognized macroeconomic indicator. High inflation has a negative impact on both the level of debt financing and the use of long-maturity debt.²⁶ Companies in higher-inflation countries usually exhibit lower levels of financial leverage, rely more on equity financing, and have a shorter debt maturity structure compared to their peers in lower-inflation countries.

Researchers have also found that the growth in gross domestic product is associated with longer debt maturity in developed markets. In addition, researchers focusing on developing countries find that companies in countries with high growth rely more on equity financing.²⁷

3.3.4. Conclusions

Financial analysts must consider country-specific factors when analyzing and comparing companies that operate in different countries. We have summarized these factors in Exhibit 5-6.

²²See Demirguc-Kunt and Maksimovic (1998).

²³Rajan (1995).

²⁴See, for example, Claessens, Djankov, and Nevova (2001).

²⁵See Fan et al. and Domowitz, Glen, and Madhavan (2000).

²⁶Demirguc-Kunt and Maksimovic (1999), Domowitz et al., and Fan et al.

²⁷See Domowitz et al.

EXHIBIT 5-6 Country-Specific Factors and Their Assumed Impacts on the Companies' Capital Structure

Country-Specific Factor	If a Country	... then D/E Ratio Is Potentially	... and Debt Maturity Is Potentially
<i>Institutional framework</i>			
Legal system efficiency	is more efficient	Lower	Longer
Legal system origin	has common law as opposed to civil law	Lower	Longer
Information intermediaries	has auditors and analysts	Lower	Longer
Taxation	has taxes that favor equity	Lower	
<i>Banking system, financial markets</i>			
Equity and bond markets	has active bond and stock markets		Longer
Bank-based or market-based country	has a bank-based financial system	Higher	
Investors	has large institutional investors	Lower	Longer
<i>Macroeconomic environment</i>			
Inflation	has high inflation	Lower	Shorter
Growth	has high GDP growth	Lower	Longer

These factors include the differences in the business and legal environments in other countries, taxes, and macroeconomic factors, among others. Companies' optimal capital structures may differ simply as a consequence of these many country-specific differences. In addition to presenting challenges for international financial and credit analysis, these international differences in debt ratios present some challenges in developing debt policies for the foreign subsidiaries of multinational companies. Theory provides little guidance, and corporate practices in this area seem to vary widely.

4. SUMMARY

In this chapter, we have reviewed theories of capital structure and considered practical aspects that an analyst should examine when making investment decisions.

- The goal of the capital structure decision is to determine the financial leverage that maximizes the value of the company (or minimizes the weighted average cost of capital).
- In the Modigliani and Miller theory developed without taxes, capital structure is irrelevant and has no effect on company value.
- The deductibility of interest lowers the cost of debt and the cost of capital for the company as a whole. Adding the tax shield provided by debt to the Modigliani and Miller framework suggests that the optimal capital structure is all debt.

- In the Modigliani and Miller propositions with and without taxes, increasing a company's relative use of debt in the capital structure increases the risk for equity providers and, hence, the cost of equity capital.
- When there are bankruptcy costs, a high debt ratio increases the risk of bankruptcy.
- Using more debt in a company's capital structure reduces the net agency costs of equity.
- The costs of asymmetric information increase as more equity is used versus debt, suggesting the pecking order theory of leverage, in which new equity issuance is the least preferred method of raising capital.
- According to the static trade-off theory of capital structure, in choosing a capital structure, a company balances the value of the tax benefit from deductibility of interest with the present value of the costs of financial distress. At the optimal target capital structure, the incremental tax shield benefit is exactly offset by the incremental costs of financial distress.
- A company may identify its target capital structure, but its capital structure at any point in time may not be equal to its target for many reasons, including that management may exploit tactical opportunities in financing sources, market-value fluctuations in its securities, or just be unable to maintain the capital structure due to market conditions.
- Many companies have goals for maintaining a certain credit rating, and these goals are influenced by the relative costs of debt financing among the different rating classes.
- In evaluating a company's capital structure, the financial analyst must look at the capital structure of the company over time, the capital structure of competitors that have similar business risk, and company-specific factors, such as the quality of corporate governance, that may affect agency costs, among other factors.
- Good corporate governance and accounting transparency should lower the net agency costs of equity.
- When comparing capital structures of companies in different countries, an analyst must consider a variety of characteristics that might differ and affect both the typical capital structure and the debt maturity structure. The major characteristics fall into three categories: institutional and legal environment, financial markets and banking sector, and macroeconomic environment.

PROBLEMS

1. If investors have homogeneous expectations, the market is efficient, and there are no taxes, no transactions costs, and no bankruptcy costs, the Modigliani and Miller Proposition I states that:
 - A. bankruptcy risk rises with more leverage.
 - B. managers cannot change the value of the company by using more or less debt.
 - C. managers cannot increase the value of the company by employing tax saving strategies.
2. According to Modigliani and Miller's Proposition II without taxes:
 - A. the capital structure decision has no effect on the cost of equity.
 - B. investment and the capital structure decisions are interdependent.
 - C. the cost of equity increases as the use of debt in the capital structure increases.

3. Suppose the weighted average cost of capital of the Gadget Company is 10%. If Gadget has a capital structure of 50% debt and 50% equity, a before-tax cost of debt of 5%, and a marginal tax rate of 20%, then its cost of equity capital is *closest* to:
 - A. 12%.
 - B. 14%.
 - C. 16%.
4. The current weighted average cost of capital (WACC) for Van der Welde is 10%. The company announced a debt offering that raises the WACC to 13%. The *most likely* conclusion is that for Van der Welde:
 - A. the company's prospects are improving.
 - B. equity financing is cheaper than debt financing.
 - C. the company's debt/equity ratio has moved beyond the optimal range.
5. All else equal, the use of long-maturity debt is expected to be greater in those markets in which:
 - A. inflation is low.
 - B. capital markets are passive and illiquid.
 - C. the legal system's protection of bondholders' interests is weak.
6. According to the pecking order theory:
 - A. new debt is preferable to new equity.
 - B. new debt is preferable to internally generated funds.
 - C. new equity is always preferable to other sources of capital.
7. According to the static trade-off theory:
 - A. debt should be used only as a last resort.
 - B. companies have an optimal level of debt.
 - C. the capital structure decision is irrelevant.

The following information relates to Questions 8–13.

Barbara Andrade is an equity analyst who covers the entertainment industry for Greengable Capital Partners, a major global asset manager. Greengable owns a significant position with a large unrealized capital gain in Mosely Broadcast Group (MBG). On a recent conference call, MBG's management states that they plan to increase the proportion of debt in the company's capital structure. Andrade is concerned that any changes in MBG's capital structure will negatively affect the value of Greengable's investment.

To evaluate the potential impact of such a capital structure change on Greengable's investment, she gathers the information about MBG given in Exhibit A.

Andrade expects that an increase in MBG's financial leverage will increase its costs of debt and equity. Based on an examination of similar companies in MBG's industry, Andrade estimates MBG's cost of debt and cost of equity at various debt-to-total capital ratios, as shown in Exhibit B.

EXHIBIT A Current Selected Financial Information for MBG

Yield to maturity on debt	8.00%
Market value of debt	\$100 million
Number of shares of common stock	10 million
Market price per share of common stock	\$30
Cost of capital if all equity-financed	10.3%
Marginal tax rate	35%

EXHIBIT B Estimates of MBG's Before-Tax Costs of Debt and Equity

Debt-to-Total Capital Ratio	Cost of Debt	Cost of Equity
20%	7.7%	12.5%
30%	8.4%	13.0%
40%	9.3%	14.0%
50%	10.4%	16.0%

8. MBG is *best* described as currently:
- A. 25% debt financed and 75% equity financed.
 - B. 33% debt financed and 66% equity financed.
 - C. 75% debt financed and 25% equity financed.
9. Based on Exhibits A and B, the current after-tax cost of debt for MBG is *closest* to:
- A. 2.80%.
 - B. 5.20%.
 - C. 7.65%.
10. Based on Exhibits A and B, MBG's current cost of equity capital is *closest* to:
- A. 10.30%.
 - B. 10.80%.
 - C. 12.75%.
11. Based on Exhibits A and B, what debt-to-total capital ratio would minimize MBG's weighted average cost of capital?
- A. 20%.
 - B. 30%.
 - C. 40%.
12. Holding operating earnings constant, an increase in the marginal tax rate to 40% would:
- A. result in a lower cost of debt capital.
 - B. result in a higher cost of debt capital.
 - C. not affect the company's cost of capital.

13. According to the pecking order theory, MBG's announced capital structure change:
- is optimal because debt is cheaper than equity on an after-tax basis.
 - may be optimal if new debt is issued after new equity is made complete use of as a source of capital.
 - may be optimal if new debt is issued after internally generated funds are made complete use of as a source of capital.

*The following information relates to Questions 14–19.*²⁸

Lindsay White, CFA, is an analyst with a firm in London, England. She is responsible for covering five companies in the Consumer Staples industry. White believes the domestic and global economies will grow slightly below average over the next two years, but she is also concerned about the possibility of a mild recession taking hold. She has been asked to review the companies that she covers and has collected information about them, presented in Exhibit C. White has estimated that earnings before interest and taxes (EBIT) will remain constant for all five companies for the foreseeable future. Currency is in terms of the British pound (£). The marginal corporate tax rate is 30 percent for all five companies.

EXHIBIT C Selected Company Financial Data

	Aquarius	Bema	Garth	Holte	Vega
EBIT (£)	600,000	600,000	400,000	400,000	400,000
Debt-to-equity ratio (market value)	0.60	0.00	0.00	0.71	0.62
Debt (market value) (£)	2,000,000	0	0	2,000,000	2,000,000
S&P debt rating	A+	n.a.	n.a.	A–	A
Weighted average cost of capital	–	10%	10%	–	–

Based on conversations with management of the five companies, as well as on her own independent research and analysis, White notes the following:

Aquarius:

- Has lower bonding costs than does Bema.
- Has a higher percentage of tangible assets to total assets than does Bema.
- Has a higher degree of operating leverage than does Bema.

Garth:

- Invests significantly less in Research and Development than does Holte.
- Has a more highly developed corporate governance system than does Holte.
- Has more business risk than does Holte.

²⁸Item set developed by Sean Cleary, CFA (Ontario, Canada).

In addition, White has reached various conclusions regarding announcements by Bema, Garth, and Vega:

Announcement: Bema has announced that it will issue debt and use the proceeds to repurchase shares. As a result of this debt-financed share repurchase program, Bema indicates that its debt/equity ratio will increase to 0.6 and its before-tax cost of debt will be 6 percent.

Conclusion: As result of the announced program, Bema's total market value should decrease relative to Aquarius's.

Announcement: Garth has announced that it plans to abandon the prior policy of all-equity financing by the issuance of £1 million in debt in order to buy back an equivalent amount of equity. Garth's before-tax cost of debt is 6 percent.

Conclusion: This change in capital structure is reasonable, but Garth should take care subsequently to maintain a lower D/E ratio than Holte.

Announcement: Vega has announced that it intends to raise capital next year, but is unsure of the appropriate method of raising capital.

Conclusion: White has concluded that Vega should apply the pecking order theory to determine the appropriate method of raising capital.

14. Based on the Modigliani and Miller (MM) propositions with corporate taxes, Aquarius's WACC is *closest* to:
 - A. 3.38%.
 - B. 7.87%.
 - C. 11.25%.
15. Based on MM propositions with corporate taxes, what is Bema's weighted average cost of capital after the completion of their announced debt-financed share repurchase program?
 - A. 6.52%.
 - B. 7.83%.
 - C. 8.88%.
16. Based on Exhibit C and White's notes, which of the following is *least* consistent with White's conclusion regarding Bema's announcement?
 - A. Bema's bonding costs will be higher than Aquarius's.
 - B. Bema will have a lower degree of operating leverage than does Aquarius.
 - C. Bema will have a lower percentage of tangible assets to total assets than does Aquarius.
17. Based on the MM propositions with corporate taxes, Garth's cost of equity after the debt issuance is *closest*. to:
 - A. 10.00%.
 - B. 10.85%.
 - C. 11.33%.

18. Based on Exhibit C and White's notes, which of the following is *most* consistent with White's conclusion regarding Garth's announcement?
- A. Garth has more business risk than does Holte.
 - B. Garth invests significantly less in Research and Development than does Holte.
 - C. Garth has a more highly developed corporate governance system than does Holte.
19. Based on White's conclusion regarding determining the appropriate method of raising capital, Vega should raise capital in the following order:
- A. debt, internal financing, equity.
 - B. equity, debt, internal financing.
 - C. internal financing, debt, equity.

CHAPTER 6

DIVIDENDS AND SHARE REPURCHASES: BASICS¹

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LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- Describe regular cash dividends, extra dividends, stock dividends, stock splits, and reverse stock splits, including their expected effect on a shareholder's wealth and a company's financial ratios.
- Describe dividend payment chronology, including the significance of declaration, holder-of-record, ex-dividend, and payment dates.
- Compare share repurchase methods.
- Calculate and compare the effects of a share repurchase on earnings per share when (1) the repurchase is financed with the company's excess cash and (2) the company uses funded debt to finance the repurchase.
- Calculate the effect of a share repurchase on book value per share.
- Explain why a cash dividend and a share repurchase of the same amount are equivalent in terms of the effect on shareholders' wealth, all else being equal.

1. INTRODUCTION

This chapter covers the features and characteristics of dividends and share repurchases, the two ways a company can distribute cash to its shareholders. A **dividend** is a distribution paid

¹CFA Institute gratefully acknowledges the contributions of Catherine E. Clark, CFA, as coauthor of a prior version of this chapter.

to shareholders based on the number of shares owned. Dividends are declared by a corporation's board of directors, whose actions may require approval by shareholders (e.g., in most of Europe and in China) or may not require such approval (e.g., in the United States). In contrast to the payment of interest and principal on a bond by its issuer, the payment of dividends is discretionary rather than a legal obligation and may be limited by legal statutes (e.g., in relation to not impairing such accounting quantities as stated capital) and by debt contract provisions (to protect more senior interests). Interest and dividends in many jurisdictions are subject to different tax treatment at the corporate level. Interest on debt is usually tax deductible on a corporate tax return, whereas dividends are not. Dividends are taxed a second time in some jurisdictions at the shareholder level. Dividends may also be taxed differently from capital gains. In this chapter, we focus on dividends on common shares (as opposed to preferred shares) and on publicly traded companies. (Synonyms for *common shares* include *ordinary shares* and *common stock*; for brevity, the chapter often uses *shares* or *stock* to refer to such securities.) Taken together, cash dividends and the value of shares repurchased in any given year constitute a company's **payout** for the year. A company's **payout policy** is the set of principles guiding payouts.

Dividends and share repurchases concern analysts because, as distributions to shareholders, they affect investment returns and financial ratios. When share price volatility is high, investors sometimes forget the importance of dividends as a source of return. From its inception at year-end 1969 to the end of 2008, the gross total return on the MSCI EAFE Index was 9.7 percent compounded annually with dividends reinvested, as compared with 6.7 percent on the basis of price alone.² The contribution of dividends to total return for large-cap U.S. stocks over the 1926–2008 period is even more formidable. From the inception of the Ibbotson U.S. large-cap data at the beginning of 1926, the total compound annual return with dividends reinvested from the beginning of 1926 to the end of 2008 was 9.6 percent, as compared with 5.3 percent on the basis of price alone.³ Dividends also may provide important information about future company performance and investment returns. Analysts should strive to become familiar with all investment-relevant aspects of dividends and share repurchases.

The chapter is organized as follows: Section 2 describes how cash and stock dividends are paid and the mechanics of stock splits. Section 3 describes the chronology of dividend payment procedures, including record date, ex-dividend date, and payment date. Section 4 presents share repurchases, including their income statement and balance sheet effects and equivalence to cash dividends (making certain assumptions). Section 5 offers concluding remarks, and a summary and practice problems complete the chapter.

2. DIVIDENDS: FORMS

Companies can pay dividends in a number of ways. Cash dividends can be distributed to shareholders through regular, extra (also called special or irregular), or liquidating dividends.

²See www.mscibarra.com. Gross return is in U.S. dollars and before withholding taxes. Gross return is used to make the MSCI returns comparable to Ibbotson returns.

³See *2009 Ibbotson SBBI Classic Yearbook* (Chicago: Morningstar, 2009): 59. The first monographs of SBBI containing the Ibbotson return data were published by the Institute of Chartered Financial Analysts in 1977, 1979, and 1982.

Other forms of dividends include stock dividends and stock splits. In this section, we will explore the different forms that dividends can take and their impact on both the shareholder and the issuing company.

2.1. Regular Cash Dividends

Many companies choose to distribute cash to their shareholders on a regular schedule. The customary frequency of payment, however, may vary among markets. In the United States and Canada, most companies that pay dividends choose a quarterly schedule of payments, whereas in Europe and Japan, the most common choice is to pay dividends twice a year (i.e., semiannually). Elsewhere in Asia, companies often favor paying dividends once a year (i.e., annually). Exhibit 6-1 summarizes typical dividend payment schedules for selected markets.

EXHIBIT 6-1 Geographic Differences in Frequency of Payment of Cash Dividends

Market	Most Common Frequency
United States and Canada	Quarterly
Europe	Semiannually
Japan	Semiannually
China	Annually
Thailand	Annually

Source: Author’s survey of CFA charterholders (June 2009).

Most companies that pay cash dividends strive to maintain or increase their dividends. A record of consistent dividends over a long period of time is important to many companies and shareholders because such a record is widely interpreted as evidence of consistent profitability. At a minimum, most dividend-paying companies strive not to reduce dividends when they are experiencing transitory problems, whereas some companies seek to consistently increase the dividend so as to indicate to investors that their shares are of high investment quality.

Regular dividends, and especially increasing regular dividends, also signal to investors that their company is growing and will share profits with their shareholders. Perhaps more importantly, management can use dividend announcements to communicate confidence in their company’s future. Consistent with that, an increase in the regular dividend (especially if it is unexpected) often has a positive effect on share price.

2.1.1. Dividend Reinvestment Plans (DRPs)

In some world markets, companies are permitted⁴ to have in place a system that allows shareholders to automatically reinvest all or a portion of cash dividends from a company in additional shares of the company. Such a dividend reinvestment plan is referred to as a DRP (pronounced “drip” and therefore often represented also as “DRIP”). Shareholders wishing to

⁴In some cases, after registering the plan with or gaining approval of the plan from local securities regulators.

participate in a DRP must so indicate to the entity administering it. The three types of DRPs are distinguished by the company's source of shares for dividend reinvestment:⁵

- **Open-market DRPs** in which the company purchases shares in the open market to acquire the additional shares credited to plan participants.
- **New-issue DRPs** (also referred to as *scrip dividend schemes* in the United Kingdom)⁶ in which the company meets the need for additional shares by issuing them instead of purchasing them.
- Plans that are permitted to obtain shares through either open-market purchases or new share issuance.

A company may have several advantages in offering such plans. They may encourage a diverse shareholder base by providing small shareholders an easy means to accumulate additional shares. They may stimulate long-term investment in the company by encouraging shareholders to build loyalty to the company. New-issue DRPs allow the company to raise new equity capital without the flotation costs associated with secondary equity issuance using investment bankers. The potential advantages to the shareholder include the facts that such plans allow the accumulation of shares using cost averaging and that they are a cost-effective means for small shareholders to make additional investments in the company. Participating shareholders typically have no transaction costs in obtaining the additional shares through a DRP. Some companies, typically new-issue DRPs, offer the additional benefit to DRP participants of purchasing shares at a discount (usually 2–5 percent) to the market price. Note that such discounts dilute the holdings of shareholders who do not participate in the DRP.

A disadvantage to the shareholder is the extra recordkeeping involved in jurisdictions in which capital gains are taxed. Shares purchased through such plans change the average cost basis for capital gains tax purposes. If the share price for the reinvested dividend is higher (lower) than the original purchase price, reinvesting the dividend will increase (decrease) the average cost basis. Either way, detailed records must be kept to accurately compute gains or losses when shares are sold. A further perceived disadvantage to the shareholder is that cash dividends are fully taxed in the year received even when reinvested, which means the shareholder is paying tax on cash not actually received. For these reasons, use of such plans may be especially appropriate in a tax-deferred account (in which current investment earnings are not taxed), such as certain types of retirement accounts.

2.2. Extra or Special (Irregular) Dividends

An **extra** or **special dividend**, also known as an irregular dividend, is a dividend paid by a company that does not pay dividends on a regular schedule, or a dividend that supplements regular cash dividends with an extra payment. These extra dividend payments may be brought about by special circumstances. For example, in 2004, Microsoft Corporation had a huge amount of excess cash and paid a \$3.08 cash dividend when the stock price was \$30.

⁵See He (2009) for more details.

⁶For a detailed description of one such plan, see www.hsbc.com/1/2/investor-relations/dividends/scrip-dividend. Sometimes a contrast is drawn between “scrip dividend schemes” and “dividend repurchase plans,” in which the latter term is understood to be only what the text describes as “open-market dividend reinvestment plans.”

Companies, particularly in cyclical industries, have sometimes chosen to use special dividends as a means of distributing more earnings only during strong earnings years. During economic downturns, when earnings are low or negative, cash that might otherwise be used for dividends is conserved. For example, a company may choose to declare a small regular dividend and then, when operating results are good, declare an extra dividend at the end of the year. Prior to the recession that began in 2008, which led to the suspension⁷ of all Ford Motor Company and General Motors common dividends, Ford and GM often declared moderate regular quarterly dividends and used an “extra dividend” at the end of the year in particularly good earnings years.

Example 6-1 concerns a company with a stated policy regarding the payment of extra dividends. In the example, the dividend payout ratio refers to common share cash dividends divided by net income available to common shares over the same time period.

EXAMPLE 6-1 TeliaSonera’s Dividend Policy

TeliaSonera AB (OMX AB: TLSN) is the leading provider of telecommunication services in Sweden and Finland, with an important presence in other Nordic and Baltic markets. The company is headquartered in Stockholm, Sweden, and TLSN’s shares trade on the Swedish and Finnish stock exchanges. TLSN’s financial data are reported in Swedish kronor (SEK). In October 2007, TLSN’s board of directors modified its dividend policy, stating:

“The company shall target a solid investment grade long-term credit rating (A– to BBB+) to secure the company’s strategically important financial flexibility for investments in future growth, both organically and by acquisitions. The ordinary dividend shall be at least 40 percent of net income attributable to shareholders of the parent company. In addition, excess capital shall be returned to shareholders, after the Board of Directors has taken into consideration the company’s cash at hand, cash flow projections and investment plans in a medium term perspective, as well as capital market conditions.”

Source: www.teliasonera.com/investor_relations/share_data/dividend.

Selected TLSN Financial per Share Data

	2008	2007
Shares outstanding	4,490.5 million	4,490.5 million
Earnings per share	SEK4.23	SEK3.94
Cash dividends per share	SEK1.80	SEK4.00

Source: www.teliasonera.com/investor_relations.

⁷Suspension occurs when a company stops paying any cash dividends.

1. Calculate the cash dividend payout ratio for 2008 and 2007.
2. Assuming the board's new dividend policy became effective in 2008, calculate the amount of the annual ordinary dividend on the basis of TLSN's minimum payout policy in 2008 and the amount that could be considered an extra dividend.

Solution to 1. With the same number of shares outstanding, the dividend payout ratio on a per share basis is dividends per share divided by earnings per share.

$$\text{For 2008 : SEK1.80/SEK4.23} = 42.6 \text{ percent.}$$

$$\text{For 2007 : SEK4.00/SEK3.94} = 101.5 \text{ percent.}$$

Solution to 2. Under a policy of 40 percent of earnings, the minimum amount of dividends would be $\text{SEK4.23} \times 0.40 = \text{SEK1.69}$, and the amount of the extra dividend would then be $\text{SEK1.80} - \text{SEK1.69} = \text{SEK0.11}$.

2.3. Liquidating Dividends

A dividend may be referred to as a **liquidating dividend** when a company:

- Goes out of business and the net assets of the company (after all liabilities have been paid) are distributed to shareholders.
- Sells a portion of its business for cash and the proceeds are distributed to shareholders.
- Pays a dividend that exceeds its accumulated retained earnings (impairs stated capital).

2.4. Stock Dividends

Stock dividends are a non-cash form of dividends. With a **stock dividend** (also known as a **bonus issue of shares**), the company distributes additional shares (typically 2–10 percent of the shares then outstanding) of its common stock to shareholders instead of cash. Although the shareholder's total cost basis remains the same, the cost per share held is reduced. For example, if a shareholder owns 100 shares with a purchase price of \$10 per share, the total cost basis would be \$1,000. After a 5 percent stock dividend, the shareholder would own 105 shares of stock at a total cost of \$1,000. However, the cost per share would decline to \$9.52 ($\$1,000/105$).

Superficially, the stock dividend might seem an improvement on the cash dividend from both the shareholders' and the company's point of view. Each shareholder ends up with more shares, which did not have to be paid for, and the company did not have to spend any actual money issuing a dividend. Furthermore, stock dividends are generally not taxable to shareholders because a stock dividend merely divides the "pie" (the market value of shareholders' equity) into smaller pieces. The stock dividend, however, does not affect the shareholder's proportionate ownership in the company (because other shareholders receive the same proportionate increase in shares), nor does it change the value of each shareholder's ownership position (because the increase in the number of shares held is accompanied by an offsetting decrease in earnings per share, and other measures of value per share, resulting from the greater number of shares outstanding).

The second point is illustrated in Exhibit 6-2, which shows the impact of a 3 percent stock dividend to a shareholder who owns 10 percent of a company with a market value of \$20 million.

As one can see, the market value of the shareholder's wealth does not change, assuming an unchanged price-to-earnings ratio (the ratio of share price, P , to earnings per share, E , or P/E). That assumption is reasonable because a stock dividend does not alter a company's asset base or earning power. (As the reader will see shortly, the same is true of a stock split.) In effect, the total market value of the company is unaffected by the stock dividend because the decrease in the share price is exactly offset by the increase in the number of shares outstanding.

EXHIBIT 6-2 Illustration of the Effect of a Stock Dividend

	Before Dividend	After Dividend
Shares outstanding	1,000,000	1,030,000
Earnings per share	\$1.00	\$0.97 (1,000,000/1,030,000)
Stock price	\$20.00	\$19.4175 (20×0.9709)
P/E	20	20
Total market value	\$20 million	\$20 million ($1,030,000 \times \19.4175)
Shares owned	100,000 ($10\% \times 1,000,000$)	103,000 ($10\% \times 1,030,000$)
Ownership value	\$2,000,000 ($100,000 \times \20)	\$2,000,000 ($103,000 \times \19.4175)

Note: The exhibit shows intermediate results rounded to four decimal places, but final results are based on carrying intermediate results at full precision.

The propensity to pay stock dividends varies by market. Stock dividends are very commonly used in China, for example. Some 78 percent of the companies in the Shanghai A-share Index paid stock dividends in 2009 according to Bloomberg data, whereas an additional 7 percent of A-shares had a stock split.

Companies that regularly pay stock dividends see some advantages to this form of dividend payment. From the company's point of view, more shares outstanding broaden the shareholder base. With more shares outstanding, there is a higher probability that more individual shareholders will own the stock—almost always a plus for companies. A traditional belief is that a lower stock price will attract more investors, all else equal. U.S. companies often view the optimal share price range as \$20 to \$80. For a growing company, a systematic stock dividend will be more likely to keep the stock in the "optimal" range. For example, Tootsie Roll Industries (NYSE: TR) has issued a 3 percent stock dividend every year since 1966 in addition to its regular quarterly cash dividend.⁸ When the company pays the same dividend rate on the new shares as it did on the old shares, a shareholder's dividend income increases, but the company could have accomplished the same result by increasing the cash dividend.

From a company's perspective, the key difference between a stock dividend and a cash dividend is that a cash dividend affects a company's capital structure whereas a stock dividend has no economic impact on a company. Cash dividends reduce assets (because cash is being paid out) and shareholders' equity (by reducing retained earnings). All else equal, liquidity ratios, such as the cash ratio (cash and short-term marketable securities divided by current liabilities) and current ratio (current assets divided by current liabilities), should

⁸It should be noted that Tootsie Roll follows a practice of increasing its cash dividend as well as paying a stock dividend.

decrease (reflecting the reduction in cash). Financial leverage ratios, such as the debt-to-equity ratio (total debt divided by total shareholders' equity) and debt-to-assets ratio (total debt divided by total assets), should also increase. Stock dividends, on the other hand, do not affect assets or shareholders' equity. Although retained earnings are reduced by the value of the stock dividends paid (i.e., by the number of shares issued \times price per share), contributed capital increases by the same amount (i.e., the value of the shares issued). As a result, total shareholders' equity does not change. Neither stock dividends nor stock splits (which are discussed in the next section) should affect either liquidity ratios or financial leverage ratios.

2.5. Stock Splits

Stock splits are similar to stock dividends in that they have no economic effect on the company and the shareholders' total cost basis does not change. For example, if a company announces a two-for-one stock split, each shareholder will be issued an additional share for each share currently owned. Thus, a shareholder will have twice as many shares after the split as before the split. Therefore, earnings per share (and all other per share data) will decline by half, leaving the P/E and equity market value unchanged. Assuming the corporation maintains the same dividend payout ratio⁹ as before the split, **dividend yield** (annual dividends per share divided by share price) will also be unchanged. Apart from the effect of any information or benefit that investors perceive a stock split to convey, stock splits (like stock dividends) should be neutral in their effect on shareholders' wealth.

Although two-for-one and three-for-one stock splits are the most common, unusual splits, such as five-for-four or seven-for-three, sometimes occur. It is important for each shareholder to recognize that their wealth is not changed by the stock split (just as it was not changed for a stock dividend, all else equal). Exhibit 6-3 shows an example of a two-for-one split and its impact on stock price, earnings per share, dividends per share, dividend payout ratio, dividend yield, P/E, and market value.

EXHIBIT 6-3 Before and After a Two-for-One Stock Split

	Before Split	After Split
Number of shares outstanding	4 million	8 million
Stock price	€40.00	€20.00 (€40/2)
Earnings per share	€1.50	€0.75 (€1.50/2)
Dividends per share	€0.50	€0.25 (€0.50/2)
Dividend payout ratio	1/3	1/3
Dividend yield	1.25%	1.25% (€0.25/€20.00)
P/E	26.7	26.7 (€20.00/€0.75)
Market value of company	€160 million	€160 million (€20.00 \times 8 million)

As can be seen, a two-for-one stock split is basically the same as a 100 percent stock dividend because all per share data have been reduced by 50 percent. The only difference is in the accounting treatment: Although both stock dividends and stock splits have no effect on

⁹The dividend payout ratio is dividends declared during a fiscal year divided by net income available for common shares for the same fiscal year.

total shareholders' equity, a stock dividend is accounted for as a transfer of retained earnings to contributed capital. A stock split, however, does not affect any of the balances in shareholder equity accounts.

A company may announce a stock split at any time. Typically, a split is announced after a period in which the stock price has risen. Many investors view the announcement of a stock split as a positive sign pointing to future stock price increases. More often, however, announced stock splits merely recognize that the stock has risen enough to justify a stock split to return the stock price to a lower, more marketable price range.

Several of the largest companies in the world (as measured by market value) had stock splits or large stock dividends in the mid-2000s. For example, Total SA (France) had a two-for-one split in 2006, Proctor & Gamble (United States) had a two-for-one split in 2004, and Unilever PLC (United Kingdom) had an 80 percent stock dividend in 2006. In each of these cases, the stock split or the stock dividend came after a significant rise in stock price but was not, in and of itself, a meaningful predictor of future price action.

Much less common than stock splits are reverse stock splits. A **reverse stock split** increases the share price and reduces the number of shares outstanding—again, with no effect on the market value of a company's equity or on shareholders' total cost basis. Just as a high stock price might lead a company to consider a stock split, so too a low stock price may lead a company to consider a reverse stock split. The objective of a reverse stock split is to increase the price of the stock to a higher, more marketable range. As reported in *Barron's*, companies execute reverse splits "to attract institutional investors and mutual funds that often shy from buying stocks trading below \$5."¹⁰ Reverse stock splits are perhaps most common for companies in, or coming out of, financial distress. As part of its government-aided recapitalization, shareholders of American International Group (NYSE: AIG), a global financial insurance company, approved a 1-for-20 reverse stock split effective 1 July 2009. On 30 June 2009, AIG shares closed at US\$1.16, which implies a post-reverse-split price of about US \$23.¹¹ KIT digital, a Dubai, UAE-based global provider of Internet-protocol-based video enhancement technology, announced a 1-for-35 reverse split effective 6 March 2009 in order to meet minimum share price listing criteria on NASDAQ Global Markets.

Reverse splits are less common in Asia. For example, reverse stock splits were not permitted in Japan under Corporation Law until 2001.

EXAMPLE 6-2 Citigroup Announces a Planned Reverse Split

In March 2009, Citigroup, a major U.S.-based global bank, was in severe financial distress and required significant U.S. government investment. Citigroup announced it would seek shareholder approval for up to a 1-for-30 reverse split. At that time, the stock was perilously close to the \$1 a share minimum price required for continued

¹⁰Sears (2009), M10. Furthermore, some brokerages do not permit clients to buy stocks on margin (i.e., with money lent by the brokerage) if the stocks are trading at less than \$5 per share.

¹¹*Wall Street Journal* (2 July 2009):C5.

listing on the NYSE. In July 2009, the reverse split had not yet taken place, but the shares were trading at \$2.90.

1. If the reverse split were to take place when the share price was \$2.90 on the day before the ex-dividend date, find the expected stock price after a 1-for-30 split, all other factors remaining unchanged.
2. Comment on the following statement: “Shareholder wealth is negatively affected by a reverse stock split.”

Solution to 1. If the stock was \$2.90 before the reverse split, for every 30 shares, a shareholder would have 1 share priced at $30 \times \$2.90 = \87 .

Solution to 2. The statement is not generally correct. Considering the reverse split on its own, the market capitalization of the common equity would be unchanged. If the reverse split was interpreted as a good decision (e.g., because the company will be able to retain the advantages of being listed on the NYSE), the market capitalization might increase. But other factors—such as continued deterioration of its loan and derivative portfolios, or more required government investment leading to further common share dilution—could drive down the share’s value.

3. DIVIDENDS: PAYMENT CHRONOLOGY

In the previous section, we saw that dividends can take several forms. Once a company’s board of directors votes to pay a dividend, a fairly standard dividend chronology is set in motion. The following sections describe dividend payment chronology. Although payment chronology has some differences across world markets, declaration dates, ex-dividend dates, and record dates are common on global exchanges.

3.1. Declaration Date

The first date on the time line is the **declaration date**, the day that the corporation issues a statement declaring a specific dividend. Whether it is a regular, irregular, special, liquidating, or stock dividend, a dividend begins with a company’s board of directors authorizing its payment. In China and several European countries, company shareholders must approve the payment. In Japan, the requirement of shareholder approval of dividend payments was abolished in 2006.

On the declaration date, the company will also announce the holder-of-record date and the payment date. Company websites, as well as some financial websites, post dividends declared, as well as record and payment dates.

3.2. Ex-Dividend Date

After the declaration date, the next pertinent date is the **ex-dividend date** (also referred to as the **ex-date**). In most global markets, the ex-date is two business days before the holder-of-record date, but in Hong Kong it is one business day. The amount of time between the

ex-date and the holder-of record date is linked to the trade settlement cycle of the particular exchange on which the shares are listed for trading.¹² The ex-date is the first date that a share trades without (i.e., “ex”) the dividend. Investors who own shares on the ex-date or who purchase shares on the business day before the ex-date will receive the dividend. For example, if the ex-date is Monday, shares must be purchased by Friday (assuming that is a business day rather than a holiday on which markets are closed) to receive the dividend (most global markets are not open on Saturday and Sunday). The ex-dividend trading day is often designated in the share price tables of business publications with an *x* in the volume column. This indicates that the monetary value of the upcoming dividend has been subtracted from the previous day’s closing price. For example, if a share closes at \$20 on Friday (the day before the ex-date) and the upcoming dividend is \$0.25, then on Monday (the ex-date), all other things being equal, the shares will begin trading at \$19.75. If it closes at \$20 on Monday, the gain will be \$0.25 for the day, even though the closing price is the same as it was the previous Friday.

3.3. Holder-of-Record Date

The **holder-of-record date** (also called the owner-of-record date, shareholder-of-record date, record date, date of record, or date of book closure) is typically two business days after the ex-dividend date. It is the date that a shareholder listed in the corporation’s records will be deemed to have ownership of the shares for purposes of receiving the upcoming dividend. Although the ex-date is determined by the security exchange on which the shares are listed, the holder-of-record date is determined by the corporation.

3.4. Payment Date

The final pertinent date in the dividend chronology is the **payment date** (also called the payable date). It is the day that the company actually mails out (or, more recently, electronically transfers) the dividend payment. As discussed earlier, the company states the payment date when the dividend declaration is made. Unlike other pertinent dates, such as the ex-date and record date, which occur only on business days, the payment date can occur on a weekend or holiday. For example, a company may list its payment dates as 15 March, 15 June, 15 September, and 15 December, even though some of those dates will inevitably fall on a Saturday, Sunday, or holiday.

3.5. Interval between Key Dates in the Dividend Payment Chronology

The time between the ex-date and the record date is fixed (generally at two business days) but the time between the other pertinent dates is determined by each company and can vary substantially. For example, record dates typically occur anywhere from a week to a month after the declaration date but can occur later for less common irregular dividends, special dividends, liquidating dividends, and stock dividends. Similarly, the time between the record date and the payment date is typically anywhere from a few days to a month or more. Most

¹²In most of the world’s equity markets, trades settle three business days after the trade date (“ $T + 3$ settlement”), so a trade two business days before the record date settles one day too late for the buyer in the trade to be recorded as an owner. The Hong Kong Stock Exchange, however, has $T + 2$ settlement, so the ex-date is one business day before the record date.

companies follow a fairly set routine for their regular cash dividends, whether quarterly, semiannual, or annual. Some business publications, such as *The Value Line Investment Survey*, include in their individual company reports the approximate date of a company's next dividend meeting, the ex-date, and the payment date. Example 6-3 deals with a typical dividend chronology time line.

EXAMPLE 6-3 NYSE Euronext Dividend Payment Time Line

On 1 May 2009, NYSE Euronext (NYSE Euronext: NYX), the largest global stock exchange, announced in both Paris and New York City its annual dividend of US\$1.20, payable on a quarterly basis. The first quarterly dividend of $\$1.20/4 = \0.30 was payable on 30 June. The record date on the interim payment was 15 June, and the ex-dividend date was fixed at 11 June. Note that 11 June 2009 was a Thursday, so the second business day after the ex-day was Monday, 15 June 2009. Shareholders could elect to be paid in U.S. dollars or in euros on the basis of exchange rates on the payment date. Draw a time line for the upcoming NYSE Euronext quarterly dividend.

Solution.

EXHIBIT 6-4 Time Line for a NYSE Euronext Quarterly Dividend

Declaration Date	Ex-Date	Holder-of-Record Date	Payment Date
1 May	11 June	15 June	30 June
		2009	

Source for data: www.nyse.com/press/1241172979897.html.

EXAMPLE 6-4 Capturing Dividends

In mid-2009, Paul Desroches, a France-based investor, is considering investment in the shares of Paris-headquartered Total SA (Euronext Paris: FP), one of the world's largest integrated oil companies and a major chemical manufacturer. Total pays a cash dividend twice a year, so the amount of the semiannual cash dividend is significant: almost a 3 percent cash dividend yield per six-month period, or 6 percent annually, based on current share prices. Desroches reasons that Total's high dividend yield is particularly attractive in the 2009 context of low yields on short-term investment-grade bonds.

Desroches decides to buy Total shares on the last possible trading day he can to receive an announced dividend. He explains to a colleague, “It would be like buying a bond on the last day of a six-month period without having to pay the seller accrued interest yet receiving the interest for the entire six months.”

On 15 May 2009, Total reported that shareholders had adopted the board of directors’ resolution to pay a dividend of €1.14 per share in May 2009. The relevant dates are

Ex-date	Tuesday, 19 May
Payment date	Monday, 22 June

Using only the above information and ignoring taxes and any tax effects, address the following:

1. Assuming all of Desroches’s assumptions are correct, what is the last date he could buy the stock and still receive the dividend?
2. If Total closed at €38.39 a share on the last day Desroches was entitled to the dividend, what is the likely opening price on the next day assuming all other factors are unchanged?
3. Critique Desroches’s statement.

Solution to 1. The day before the ex-date, or 18 May.

Solution to 2. The likely opening price on 19 May is €38.39 minus the dividend of €1.14, or €37.25.¹³

Solution to 3. Assuming other factors do not change overnight and ignoring taxes, Desroches’s wealth position would be the same whether he bought the stock the day before the ex-date or on the ex-date. If he bought on 18 May, he would pay €38.39 but have a €1.14 dividend receivable on 22 May, so his effective cost would be €38.39 minus €1.14 or €37.25—the same as the estimated opening price the next trading day. Desroches’s statement did not take account of the expected ex-dividend date drop in stock price.

4. SHARE REPURCHASES

A **share repurchase** (or **buyback**) is a transaction in which a company buys back its own shares. Unlike stock dividends and stock splits, share repurchases use corporate cash. Hence, share repurchases can be viewed as an alternative to cash dividends. Shares that have been

¹³An advanced point outside the scope of this chapter is that tax effects may cause share price to drop by an amount that is different from the amount of the dividend on the ex-date.

issued and subsequently repurchased are classified as **treasury shares (treasury stock)** or in some jurisdictions canceled; in either case they are not then considered for dividends, voting, or computing earnings per share.¹⁴

In contrast to the case of cash dividends, usage or growth in usage of share repurchases has historically required enabling regulation. In the United Kingdom, share repurchases became legal in 1981. They were never explicitly illegal in the United States¹⁵ but usage became substantial only subsequent to U.S. Securities and Exchange Commission rule 10b-18 in 1982. (That rule protected repurchasing companies from charges of share manipulation if repurchases were conducted consistent with the terms of the rule.) Other markets in continental Europe and Asia have undertaken enabling regulation relatively recently (e.g., 1995 for Japan, 1998 for Germany and Singapore, 1999 for India and Norway, 2000 for Denmark and Sweden).¹⁶ Share repurchases in many markets remain subject to more restrictions than in the United States. Restrictions include requiring shareholder approval of share repurchase programs, limiting the percent of share repurchases to a certain fraction (often 10 percent) of outstanding shares, allowable repurchase mechanisms, and other restrictions serving to protect creditors.¹⁷

Share repurchases growth can be measured in relation to cash dividends. For the United States, in the early 1980s, cash dividends were approximately five times greater than the market value of share repurchases. In the late 1990s and again in the first decade of the twenty-first century, the value of share repurchases often exceeded the value of cash dividends in the United States.¹⁸ In many other markets, such as Canada, the United Kingdom, Germany, France, Hong Kong, and Korea, use of share repurchases is becoming increasingly common.

In general, when an amount of share repurchases is authorized, the company is not strictly committed to carrying through with repurchasing shares. This situation contrasts with the declaration of dividends, where that action does commit the company to pay the dividends. Another contrast with cash dividends is that whereas cash dividends are distributed to shareholders proportionally to their ownership percentage, share repurchases in general do not distribute cash in such a proportionate manner. For example, if repurchases are executed by a company via buy orders in the open market, cash is effectively being received by only those shareholders with concurrent sell orders.

Among the reasons that corporations have given for engaging in share repurchases are the following:

- To communicate that management perceives shares in the company to be undervalued in the marketplace or more generally to support share prices—this motivation was the most frequently mentioned by U.S. chief financial officers in one survey.¹⁹
- Flexibility in distributing cash to shareholders—share repurchases permit the company's management flexibility as to amount and timing and are not perceived as establishing an expectation that a level of repurchase activity will continue in the future.

¹⁴Across different markets, regulations differ on the permissible treatment of shares that have been repurchased.

¹⁵See Grullon and Michaely (2002).

¹⁶Sabri (2003).

¹⁷See Vermaelen (2005), 31.

¹⁸Brealey, Myers, and Marcus (2007), 432.

¹⁹See Brav, Graham, Harvey, and Michaely (2005).

- Tax efficiency in distributing cash, in markets in which the tax rate on cash dividends exceeds the tax rate on capital gains.
- To absorb increases in shares outstanding resulting from the exercise of employee stock options.

Other motivations for a share repurchase are also possible. For example, share repurchase might merely reflect that the corporation has accumulated more cash than it has profitable uses for and does not want to pay an extra cash dividend.

The next section presents the means by which a company may execute a share repurchase program.

4.1. Share Repurchase Methods

Following are the four main ways that companies repurchase shares, listed in order of importance.

1. **Buy in the open market.** This method of share repurchase is the most common, with the company buying its own shares as conditions warrant in the open market. The open market share repurchase method gives the company maximum flexibility. Open market repurchases are the most flexible option for a company because there is no legal obligation to undertake or complete the repurchase program—a company may not follow through with an announced program for various reasons, such as unexpected cash needs for liquidity, acquisitions, or capital expenditures. In the United States, open market transactions do not require shareholder approval. Because shareholder approval is required in Europe, Vermaelen (2005) suggested that all companies have such authorization in place in case the opportunity to buy back undervalued shares occurs in the future.²⁰ Authorizations to repurchase stock can last for years. In many shareholders' minds, the announcement of a repurchase policy provides support for the share price. If the share repurchases are competently timed to minimize price impact and to exploit perceived undervaluation in the marketplace, this method is also relatively cost effective.
2. **Buy back a fixed number of shares at a fixed price.** Sometimes a company will make a **fixed price tender offer** to repurchase a specific number of shares at a fixed price that is typically at a premium to the current market price. For example, in Australia, if a stock is selling at A\$37 a share, a company might offer to buy back 5 million shares from current shareholders at A\$40. If shareholders are willing to sell more than 5 million shares, the company will typically buy back a pro rata amount from each shareholder. By setting a fixed date, such as 30 days in the future, a fixed price tender offer can be accomplished quickly.
3. **Dutch auction.** A Dutch auction is also a tender offer to existing shareholders, but instead of specifying a fixed price for a specific number of shares, the company stipulates a range of acceptable prices. A Dutch auction uncovers the minimum price at which the company can buy back the desired number of shares with the company paying that price to all qualifying bids. For example, if the stock price is A\$37 a share, the company would offer to buy back 5 million shares in a range of A\$38 to A\$40 a share. Each shareholder

²⁰See Vermaelen (2005), 8.

would then indicate the number of shares and the lowest price at which he or she would be willing to sell. The company would then begin to qualify bids beginning with those shareholders who submitted bids at A\$38 and continue to qualify bids at higher prices until 5 million shares had been qualified. In our example, that price might be A\$39.²¹ Shareholders who bid between A\$38 and A\$39, inclusive, would then be paid A\$39 per share for their shares. Like Method 2, Dutch auctions can be accomplished in a short time period.²²

4. **Repurchase by direct negotiation.** In some markets, a company may negotiate with a major shareholder to buy back its shares, often at a premium to the market price. The company may do this to keep a large block of shares from overhanging the market (and thus acting to dampen the share price). A company may try to prevent an “activist” shareholder from gaining representation on the board of directors. In some of the more infamous cases, unsuccessful takeover attempts have ended with the company buying back the would-be suitor’s shares at a premium to the market price in what is referred to as a greenmail transaction, often to the detriment of remaining shareholders.²³ Vermaelen (2005) reported, however, that 45 percent of private repurchases between 1984 and 2001 were actually made at discounts, indicating that many direct negotiation repurchases are generated by the liquidity needs of large investors who are in a weak negotiating position.

Outside the United States and Canada, almost all share repurchases occur in the open market (Method 1), and not all the methods listed may be permissible according to local regulations.²⁴

EXAMPLE 6-5 BCII Considers Alternative Methods of Share Repurchase

The board of directors of British Columbia Industries, Inc. (BCII), is considering a 5 million common share repurchase program. BCII has a sizable cash and marketable securities portfolio. BCII’s current stock price is C\$37. The company’s chief financial officer wants to accomplish the share repurchases in a cost-effective manner. Some board members want repurchases accomplished as quickly as possible, whereas other board members mention the importance of flexibility. Discuss the relative advantages of each of the following methods with respect to cost, flexibility, and speed:

²¹Shareholders who set an A\$39 price would be subject to a pro rata amount.

²²Vermaelen (2005), 7.

²³**Greenmail** is the purchase, usually at a substantial premium over market price, of the accumulated shares of a hostile investor by a company that is targeted for takeover by that investor.

²⁴See Vermaelen (2005), 31.

1. Open market share repurchases
2. A fixed price tender offer
3. Dutch auction tender offer

Solution to 1. Open market share repurchases give the company the most flexibility. BCII can time repurchases, making repurchases when the market prices its stock below its perceived intrinsic value. BCII can also change amounts repurchased or even not execute the repurchase program. Open market repurchases are typically made opportunistically, with cost a more important consideration than speed. Because open market repurchases can be conducted to minimize any effects on price and can be timed to exploit prices that are perceived to be below intrinsic value, this method is also relatively cost effective.

Solution to 2. A fixed price tender offer can be accomplished quickly, but the company usually has to offer a premium.

Solution to 3. Dutch auctions have become quite popular in some markets because they generally enable a company to do the buyback at a lower price than with a fixed price tender offer. For example, a fixed price tender offer for 5 million shares at C\$40 would cost BCII C\$200 million. If the Dutch auction were successful at C\$38, the cost would be C\$190 million, a savings of C\$10 million. Similar to fixed price tender offers, Dutch auctions can be accomplished quickly.

4.2. Financial Statement Effects of Repurchases

Share repurchases affect both the balance sheet and income statement. Both assets and shareholders' equity decline if the repurchase is financed with cash. As a result, leverage increases. Debt ratios (leverage) will increase even more if the repurchase is financed with debt.

On the income statement, fewer shares outstanding could increase earnings per share (i.e., by reducing the denominator) depending on how and at what cost the repurchase is financed. We discuss the effects on the income statement and balance sheet in the following sections.

4.2.1. Changes in Earnings per Share

One rationale for share repurchases often cited by corporate financial officers and some investment analysts is that reducing the number of shares outstanding can increase earnings per share (EPS). Assuming a company's net income does not change (or even that any decline is less than proportional to the decrease in outstanding shares after the buyback), a smaller number of shares after the buyback may produce a higher EPS (because EPS is net income divided by the number of shares outstanding).

Examples 6-6 and 6-7 show changes in EPS resulting from alternative methods of financing a share repurchase.

EXAMPLE 6-6 Share Repurchase Using Idle Cash

Takemiya Industries, a Japanese company, has been accumulating cash in recent years with a plan of expanding in emerging Asian markets. The global recession has persuaded Takemiya's management and directors that such expansion is no longer practical, and they are considering a share repurchase using surplus cash. Takemiya has 10 million shares outstanding and its net income is ¥100 million. Takemiya's share price is ¥120. Cash not needed for operations totals ¥240 million and is invested in Japanese government short-term securities that earn virtually zero interest. For a share repurchase program of the contemplated size, Takemiya's investment bankers think the stock could be bought in the open market at a ¥20 premium to the current market price, or ¥140 a share. Calculate the impact on EPS if Takemiya uses the surplus cash to repurchase shares at ¥140 per share.²⁵

Solution: First, note that current $EPS = (\text{¥100 million net income}) / (10 \text{ million shares}) = \text{¥10.00}$. If Takemiya repurchases shares, net income is unchanged at ¥100 million. A share repurchase at ¥140 a share reduces share count by approximately 1.7 million shares ($\text{¥240,000,000} / \text{¥140}$) so that 8.3 million shares remain outstanding. Thus, after the share repurchase, EPS should be $(\text{¥100 million}) / (8.3 \text{ million shares}) = \text{¥12.00}$, approximately. EPS would increase by 20 percent as a result of the share repurchase. Note that EPS would increase even more if the open market purchases were accomplished at the prevailing market price without the premium.

In the absence of idle cash and equivalents, companies may fund share repurchases by using long-term debt. Example 6-7 shows that any increase in EPS is dependent on the company's after-tax borrowing rate on the funds used to repurchase stock.

EXAMPLE 6-7 Share Repurchases Using Borrowed Funds

Jensen Farms, Inc., plans to borrow \$12 million, which it will use to repurchase shares. The following information is given:

- Share price at time of share repurchase = \$60
- Earnings after-tax = \$6.6 million
- EPS before share repurchase = \$3
- Price/Earnings ratio (P/E) = $\$60 / \$3 = 20$

²⁵Accounting principles in some countries require that the calculation of EPS in a given year be on the basis of the weighted average number of shares outstanding during the year. For purposes of illustration, we ignore that convention in our examples.

- Earnings yield (E/P) = $\$3/\$60 = 5\%$ ²⁶
 - Shares outstanding = 2.2 million
 - Planned share repurchase = 200,000 shares
1. Calculate the EPS after the share repurchase, assuming the after-tax cost of borrowing is the company's customary after-tax borrowing rate of 5 percent.
 2. Calculate the EPS after the share repurchase, assuming the company's borrowing rate increases to 6 percent because of the increased financial risk of borrowing the \$12 million.

Solution to 1.

$$\begin{aligned}
 \text{EPS after buyback} &= (\text{Earnings} - \text{After-tax cost of funds}) / \text{Shares outstanding after buyback} \\
 &= [\$6.6 \text{ million} - (\$12 \text{ million} \times 0.05)] / 2 \text{ million shares} \\
 &= [\$6.6 \text{ million} - (\$0.6 \text{ million})] / 2 \text{ million shares} \\
 &= \$6.0 \text{ million} / 2 \text{ million shares} \\
 &= \$3.00
 \end{aligned}$$

With the after-tax cost of borrowing at 5 percent, the share repurchase has no effect on the company's EPS. Note that the stock's earnings yield, the ratio of earnings per share to share price or E/P, was $\$3/\$60 = 0.05$ or 5 percent, equal to the after-tax cost of debt.

Solution to 2.

$$\begin{aligned}
 \text{EPS after buyback} &= (\text{Earnings} - \text{After-tax cost of funds}) / \text{Shares outstanding after buyback} \\
 &= [\$6.6 \text{ million} - (\$12 \text{ million} \times 0.06)] / 2 \text{ million shares} \\
 &= [\$6.6 \text{ million} - (\$0.72 \text{ million})] / 2 \text{ million shares} \\
 &= \$5.88 \text{ million} / 2 \text{ million shares} \\
 &= \$2.94
 \end{aligned}$$

Note that in this case, the after-tax cost of debt, 6 percent, is greater than the 5 percent earnings yield, and a reduction in EPS resulted.

In summary, a share repurchase may increase, decrease, or have no effect on EPS. The effect depends on whether the repurchase is financed internally or externally. In the case of internal financing, a repurchase increases EPS only if the funds used for the repurchase would *not* earn their cost of capital if retained by the company.²⁷ In the case of external financing, the effect on EPS is positive if the earnings yield exceeds the after-tax cost of financing the

²⁶The E/P is the reciprocal of the price-to-earnings ratio, P/E.

²⁷See Cornell (2009).

repurchase. In Example 6-7, when the after-tax borrowing rate equaled the earnings yield of 5 percent, EPS was unchanged as a result of the buyback. Any after-tax borrowing rate above the earnings yield would result in a decline in EPS, whereas an after-tax borrowing rate less than the earnings yield would result in an increase in EPS.

These relationships should be viewed with caution so far as any valuation implications are concerned. Notably, to infer that an increase in EPS indicates an increase in shareholders' wealth would be incorrect. For example, the same idle cash could also be distributed as a cash dividend. Informally, if one views the total return on a stock as the sum of the dividend yield and a capital gains return, any capital gains as a result of the boost to EPS from the share repurchase may be at the expense of an offsetting loss in terms of dividend yield.

4.2.2. Changes in Book Value per Share

Price to book value per share is a popular ratio used in equity valuation. The following example shows the impact of a share repurchase on book value per share (BVPS).

EXAMPLE 6-8 The Effect of a Share Repurchase on Book Value per Share

The market price of both Company A's and Company B's common stock is \$20 a share, and each company has 10 million shares outstanding. Both companies have announced a \$5 million buyback. The only difference is that Company A has a market price per share greater than its book value per share, whereas Company B has a market price per share less than its book value per share:

- Company A has a book value of equity of \$100 million and BVPS of \$100 million/10 million shares = \$10. *The market price per share of \$20 is greater than BVPS of \$10.*
- Company B has a book value of equity of \$300 million and BVPS of \$300 million/10 million shares = \$30. *The market price per share of \$20 is less than BVPS of \$30.*

Both companies

- Buy back 250,000 shares at the market price per share (\$5 million buyback/\$20 per share = 250,000 shares).
- Are left with 9.75 million shares outstanding (10 million pre-buyback shares – 0.25 million repurchased shares = 9.75 million shares).

After the share repurchase:

- Company A's shareholders' equity at book value falls to \$95 million (\$100 million – \$5 million), and its *book value per share decreases* from \$10 to \$9.74 (shareholders' equity/shares outstanding = \$95 million/9.75 million shares = \$9.74).
- Company B's shareholders' equity at book value falls to \$295 million (\$300 million – \$5 million), and its *book value per share increases* from \$30 to \$30.26 (shareholders' equity/shares outstanding = \$295 million/9.75 million = \$30.26).

This example shows that when the market price per share is greater than its book value per share, BVPS will decrease after the share repurchase. When the market price per share is less than BVPS, however, BVPS will increase after a share repurchase.

4.3. Valuation Equivalence of Cash Dividends and Share Repurchases: The Baseline

A share repurchase should be viewed as equivalent to the payment of cash dividends of equal amount in terms of the effect on shareholders' wealth, all other things being equal. "All other things being equal" in this context is shorthand for assumptions that the taxation and information content of cash dividends and share repurchases do not differ. Understanding this baseline equivalence result permits more advanced analysis to explore the result's sensitivity to various modifications to the "all other things being equal" assumption. Example 6-9 demonstrates the claim of equivalence in the "all other things being equal" case.

EXAMPLE 6-9 The Equivalence of Share Repurchases and Cash Dividends

Waynesboro Chemical Industries, Inc. (WCII), has 10 million shares outstanding with a current market value of \$20 per share. WCII's board of directors is considering two ways of distributing WCII's current \$50 million free cash flow to equity. The first method involves paying an irregular or special cash dividend of \$50 million/10 million = \$5 per share. The second method involves repurchasing \$50 million worth of shares. For simplicity, we make the assumptions that dividends are received when the shares go ex-dividend and that any quantity of shares can be bought at the market price of \$20 per share. We also assume that the taxation and information content of cash dividends and share repurchases, if any, do not differ. How would the wealth of a shareholder be affected by WCII's choice of method in distributing the \$50 million?

Solution.

Cash Dividend. After the shares go ex-dividend, a shareholder of a single share would have \$5 in cash (the dividend) and a share worth $\$20 - \$5 = \$15$. The ex-dividend value of \$15 can be demonstrated as the market value of equity after the distribution of \$50 million divided by the number of shares outstanding after the dividend payment, or $[(10 \text{ million})(\$20) - \$50 \text{ million}] / 10 \text{ million} = \$150 \text{ million} / 10 \text{ million} = \15 . (Of course, the payment of a cash dividend has no effect on the number of shares outstanding.) Total wealth from ownership of one share is, therefore, $\$5 + \$15 = \$20$.

Share Repurchase. With \$50 million, WCII could repurchase $\$50 \text{ million} / \$20 = 2.5$ million shares. The post-repurchase share price would be unchanged at \$20, which can be calculated as the market value of equity after the \$50 million share repurchase divided by the shares outstanding after the share repurchase, or $[(10 \text{ million})(\$20) - \$50 \text{ million}] / (10 \text{ million} - 2.5 \text{ million}) = \$150 \text{ million} / 7.5 \text{ million} = \20 . Total wealth from ownership of one share is, therefore, \$20—exactly the same as in the case of a cash dividend. Whether the shareholder actually sold the share back to WCII in the share repurchase is irrelevant for a shareholder's wealth: If the share was sold, \$20 in cash would be realized; if the share was not sold, its market value of \$20 would count equally toward the shareholder's wealth.

The theme of Example 6-9 is that a company should not expect to create or destroy shareholder wealth merely by its method of distributing money to shareholders (i.e., by share repurchases as opposed to cash dividends).²⁸ Example 6-10 illustrates that if a company repurchases shares from an individual shareholder at a negotiated price representing a premium over the market price, the remaining shareholders' wealth is reduced.

EXAMPLE 6-10 Direct Negotiation: A Share Repurchase That Transfers Wealth

Florida Citrus (FC) common shares sell at \$20, and there are 10 million shares outstanding. Management becomes aware that Kirk Parent recently purchased a major position in its outstanding shares with the intention of influencing the business operations of FC in ways the current board does not approve. An adviser to the board has suggested approaching Parent privately with an offer to buy back \$50 million worth of shares from him at \$25 per share, which is a \$5 premium over the current market price. The board of FC declines to do so because of the effect of such a repurchase on FC's other shareholders. Determine the effect of the proposed share repurchase on the wealth of shareholders other than Parent.

Solution. With \$50 million, FC could repurchase $\$50 \text{ million} / \$25 = 2$ million shares from Parent. The post-repurchase share price would be \$18.75, which can be calculated as the market value of equity after the \$50 million share repurchase divided by the shares outstanding after the share repurchase, or $[(10 \text{ million})(\$20) - \$50 \text{ million}] / (10 \text{ million} - 2 \text{ million}) = \$150 \text{ million} / 8 \text{ million} = \18.75 . Shareholders other than Parent would lose $\$20 - \$18.75 = \$1.25$ for each share owned. Although this share repurchase would conserve total wealth (including Parent's), it effectively transfers wealth to Parent from the other shareholders.

5. CONCLUDING REMARKS

The question of the valuation implications of share repurchases and dividends is of great interest to investors but outside the scope of the current chapter. Many investors and corporate managers, however, believe that share repurchases have, on average, a net positive effect on shareholder value. Vermaelen (2005) reviewed major studies and found that share repurchase announcements are accompanied by significant positive excess returns both around the announcement date and for the next two years—and in some studies, five years.

²⁸Oded and Michel (2008) lend support to the argument of value neutrality. Using a simulation, as well as the example of ExxonMobil, they find that no difference exists in shareholder wealth over a period of years regardless of whether a company used its cash to repurchase shares or pay dividends, or hoarded the cash.

An explanation consistent with that finding is that managements tend to buy back their stock when it is undervalued in the marketplace and issue stock when it is overvalued.

Likewise, dividend initiations and unexpected increases in dividends are frequently associated with positive excess returns. The most common explanation relates to the information that dividends may be perceived to carry because management and the board of directors are presumed to know more than outsiders about a company's finances and opportunities. Investors may share the view of one money manager that "dividends are a wonderful gauge for management's confidence in forward-looking profitability."²⁹ Empirical support exists for the notion that managements justifiably feel more confident about their company's future when they pay a cash dividend for the first time. In a study of U.S. equities, Healy and Palepu (1988) found that company earnings increased by an average of 43 percent in the year of dividend initiation and 164 percent in the subsequent four years. Furthermore, the announcement of the initiation of a regular cash dividend was accompanied by an excess return of 4 percent on average. One possible reason might be that cash dividends broaden the potential market for a company's shares. Some institutional investors are governed by bylaws that require them to invest only in dividend-paying shares. The observations in Example 6-11 support these ideas.

EXAMPLE 6-11 Information in Dividend Initiations

- A. Oracle Corporation, a leading business software maker, initiated a \$0.05 quarterly dividend in May 2009. Oracle's annual \$0.20 dividend amounts to about \$1 billion, a relatively small amount compared with operating cash flow of \$8 billion and another \$9 billion in cash and cash-equivalent assets on its balance sheet at the end of fiscal year 2009. An analyst who follows Oracle for institutional investors saw the Oracle announcement as a signal that the company is well positioned to ride out the downturn and also gain market share.³⁰
- B. In mid-2009, Paris-based Groupe Eurotunnel announced its first ever dividend after it completed a debt restructuring and received insurance proceeds resulting from a fire that had closed the Channel Tunnel. In a 2 June 2009 press release, Eurotunnel's CEO said that this "marked a turning point for the company as its business has returned to the realm of normality," as the company anticipated a return to profitability.

6. SUMMARY

A company's cash dividend payments and share repurchase policies, taken together, constitute its payout policy. Both entail the distribution of the company's cash to its shareholders. After management's decision on capital expenditures and how to fund those expenditures, payout

²⁹Robert Arnott, quoted in the *New York Times* (3 May 2009):BU7.

³⁰*Wall Street Journal* (19 March 2009):B1.

policy is perhaps the most important decision sent to the board of directors for approval. In Europe and Asia, shareholders often vote on the board's recommendation. This chapter has made the following points:

- Dividends can take the form of regular or irregular cash payments, stock dividends, or stock splits. Only cash dividends are payments to shareholders. Stock dividends and splits merely carve equity into smaller pieces and do not create wealth for shareholders. Reverse stock splits usually occur after a stock has dropped to a very low price and do not affect shareholder wealth—they represent cosmetic repackaging of shareholder equity.
- Regular cash dividends—unlike irregular cash dividends, stock splits, and stock dividends—represent a commitment to pay cash to stockholders on a quarterly, semiannual, or annual basis.
- The key dates for cash dividends, stock dividends, and stock splits are the declaration date, the ex-date, the shareholder-of-record date, and the payment date. Share price will reflect the amount of the cash payment (or shares in the case of a stock dividend or split) on the ex-date.
- Share repurchases, or buybacks, most often occur in the open market. Alternatively, tender offers occur at a fixed price or at a price range through a Dutch auction. Shareholders who do not tender increase their relative position in the company. Direct negotiations with major shareholders to get them out of the company are less common because they could destroy value for remaining stockholders.
- Share repurchases made with excess cash have the potential to increase earnings per share, whereas share repurchases made with borrowed funds can increase, decrease, or not affect earnings per share, depending on the after-tax borrowing rate.
- A share repurchase is equivalent to the payment of a cash dividend of equal amount in its effect on shareholders' wealth, all other things being equal.
- If the buyback market price is greater (less) than the book value, the book value will decline (increase).
- Announcement of a share repurchase is sometimes accompanied by positive excess returns in the market when the market price is viewed as reflecting management's view that the stock is undervalued, and earnings per share can increase as a result of fewer shares outstanding.
- Initiation of regular cash dividends can also have a positive impact on share value. Management is seen as having enough confidence in the future to make a commitment to pay out cash to shareholders. In addition, some institutional, as well as individual, shareholders see regular cash dividend payments as a measure of investment quality.

PROBLEMS

1. The payment of a 10% stock dividend by a company will result in an increase in that company's:
 - A. current ratio.
 - B. financial leverage.
 - C. contributed capital.

2. If a company’s common shares trade at relatively very low prices, that company would be *most likely* to consider the use of a:
A. stock split.
B. stock dividend.
C. reverse stock split.
3. In a recent presentation, Doug Pearce made two statements about dividends:
Statement 1: “A stock dividend will increase share price, all other things being equal.”
Statement 2: “One practical concern with a stock split is that it will reduce the company’s price-to-earnings ratio.”
Are Pearce’s two statements about the effects of the stock dividend and stock split correct?
A. No for both statements.
B. Yes for Statement 1 and No for Statement 2.
C. No for Statement 1 and Yes for Statement 2.
4. All other things being equal, the payment of an internally financed cash dividend is *most likely* to result in:
A. a lower current ratio.
B. a higher current ratio.
C. the same current ratio.
5. The calendar dates in Column 1 are potentially significant dates in a typical dividend chronology. Column 2 lists descriptions of these potentially significant dates (in random order).

Column 1	Column 2
Friday, 10 June	A. Holder-of-record date
Thursday, 23 June	B. Declaration date
Friday, 24 June	C. Payment date
Tuesday, 28 June	D. Ex-dividend date
Sunday, 10 July	E. Last day shares trade with the right to receive the dividend

Match the significance of these typical dividend chronology dates by placing the correct letter of the description by the appropriate date. Use the template for your answer.

Dividend Chronology
Friday, 10 June
Thursday, 23 June
Friday, 24 June
Tuesday, 28 June
Sunday, 10 July

6. Mary Young intends to take a position in Megasoft Industries once Megasoft begins paying dividends. A dividend of C\$4 is payable by Megasoft on 2 December. The

ex-dividend date for the dividend is 10 November, and the holder-of-record date is 12 November. What is the last possible date for Young to purchase her shares if she wants to receive the dividend?

- A. 9 November.
- B. 10 November.
- C. 12 November.

7. Aiken Instruments (AIK) has recently declared a regular quarterly dividend of \$0.50, payable on 12 November, with an ex-dividend date of 28 October. Which date below would be the holder-of-record date assuming all the days listed are business days and that trades settle three business days after the trade date?

- A. 27 October.
- B. 30 October.
- C. 11 November.

8. A company has 1 million shares outstanding and earnings are £2 million. The company decides to use £10 million in idle cash to repurchase shares in the open market. The company's shares are trading at £50 per share. If the company uses the entire £10 million of idle cash to repurchase shares at the market price, the company's earnings per share will be *closest* to:

- A. £2.00.
- B. £2.30.
- C. £2.50.

9. Devon Ltd. common shares sell at \$40 a share and their estimated price-to-earnings ratio (P/E) is 32. If Devon borrows funds to repurchase shares at its after-tax cost of debt of 5%, its EPS is *most likely* to:

- A. increase.
- B. decrease.
- C. remain the same.

10. A company can borrow funds at an after-tax cost of 4.5%. The company's stock price is \$40 per share, earnings per share is \$2.00, and the company has 15 million shares outstanding. If the company borrows just enough to repurchase 2 million shares of stock at the prevailing market price, that company's earnings per share is *most likely* to:

- A. increase.
- B. decrease.
- C. remain the same.

11. Crozet Corporation plans to borrow just enough money to repurchase 100,000 shares. The following information relates to the share repurchase:

Shares outstanding before buyback	3.1 million
Earnings per share before buyback	\$4.00
Share price at time of buyback	\$50
After-tax cost of borrowing	6%

Crozet's earnings per share after the buyback will be *closest* to:

- A. \$4.03.
 - B. \$4.10.
 - C. \$4.23.
12. A company with 20 million shares outstanding decides to repurchase 2 million shares at the prevailing market price of €30 per share. At the time of the buyback, the company reports total assets of €850 million and total liabilities of €250 million. As a result of the buyback, that company's book value per share will *most likely*:
- A. increase.
 - B. decrease.
 - C. remain the same.
13. An analyst gathered the following information about a company:

Number of shares outstanding	10 million
Earnings per share	\$2.00
P/E	20
Book value per share	\$30

If the company repurchases 1 million shares at the prevailing market price, the resulting book value per share will be *closest* to:

- A. \$26.
 - B. \$27.
 - C. \$29.
14. If a company's objective is to support its stock price in the event of a market downturn, it would be advised to authorize:
- A. a Dutch auction tender offer effective in 30 days.
 - B. a tender offer share repurchase at a fixed price effective in 30 days.
 - C. an open market share repurchase plan to be executed over the next five years.
15. A company has positive free cash flow and is considering whether to use the entire amount of that free cash flow to pay a special cash dividend or to repurchase shares at the prevailing market price. Shareholders' wealth under the two options will be equivalent unless the:
- A. company's book value per share is less than the prevailing market price.
 - B. company's book value per share is greater than the prevailing market price.
 - C. tax consequences and/or information content for each alternative is different.
16. Assume that a company is based in a country that has no taxes on dividends or capital gains. The company is considering either paying a special dividend or repurchasing its own shares. Shareholders of the company would have:
- A. greater wealth if the company repurchased its shares.
 - B. greater wealth if the company paid a special cash dividend.
 - C. the same wealth under either a cash dividend or share repurchase program.

CHAPTER 7

DIVIDENDS AND SHARE REPURCHASES: ANALYSIS¹

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LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- Compare theories of dividend policy and explain implications of each for share value, given a description of a corporate dividend action.
- Describe types of information (signals) that dividend initiations, increases, decreases, and omissions may convey.
- Explain how clientele effects and agency issues may affect a company's payout policy.
- Explain factors that affect dividend policy.
- Calculate and interpret the effective tax rate on a given currency unit of corporate earnings under double-taxation, split-rate, and tax imputation dividend tax regimes.
- Compare stable dividend, target payout, and residual dividend policies and calculate the dividend under each policy.
- Explain the choice between paying cash dividends and repurchasing shares.
- Describe global trends in corporate dividend policies.
- Calculate and interpret dividend coverage ratios based on (1) net income and (2) free cash flow.
- Identify characteristics of companies that may not be able to sustain their cash dividend.

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1. INTRODUCTION

One of the longest running debates in corporate finance concerns the impact, if any, on common shareholders' wealth of a company's **payout policy** (i.e., the principles by which a company distributes cash to common shareholders by means of cash dividends and/or share repurchases).² Payout decisions, along with financing (capital structure) decisions, generally involve the board of directors and most senior levels of management and are closely watched by investors and analysts. This chapter introduces the theory and practice of dividend policy with reference to world markets.

This chapter is organized as follows: In Section 2, we present theories of the effects of dividend policy on company value. In Section 3, we discuss factors that affect dividend policy. In Section 4, we cover the types of dividend policies, the dividend-share repurchase decision, and global trends in payout policy. Section 5 covers analysis of dividend safety, and conclusions and summary are in Section 6.

2. DIVIDEND POLICY AND COMPANY VALUE: THEORY

Over the past 40 years, financial theorists have debated the extent to which dividend policy should and does matter to a company's shareholders. One group of theorists believes that dividend policy is irrelevant to shareholders. This group typically holds that only the decisions of the company that are directly related to investment in working and fixed capital affect shareholders' wealth. A second group holds that dividend policy does matter to investors, for one or more reasons, and that a company can affect shareholders' wealth through its dividend policy. Typically, dividend relevance is attributed to either a presumption that investors value a unit of dividends more highly than an equal amount of uncertain capital gains, or to one or more market imperfections. Such imperfections include taxes (in which a given amount of dividends is taxed differently than an equal amount of capital gains), asymmetric information (specifically, that corporate insiders are better informed about their company's prospects than outside investors), and agency costs (in particular, that management has a tendency to squander extra cash). We examine these positions and the assumptions that underlie them in the following subsections.

2.1. Dividend Policy Does Not Matter

In a 1961 paper, Miller and Modigliani ("MM") argued that in a world without taxes, transaction costs, and equal ("symmetric") information among all investors—that is, under **perfect capital market** assumptions—a company's dividend policy should have no impact on its cost of capital or on shareholder wealth.³ Their argument begins by assuming a company has a given capital budget (e.g., it accepts all projects with a positive net present value [NPV]), and that its current capital structure and debt ratio are optimal. Another way of stating this

²The term *payout policy*, or sometimes *distribution policy*, is more general than *dividend policy* because it reflects the fact that companies can return cash to shareholders by means of share repurchases and cash dividends.

³See Miller and Modigliani (1961).

argument is that the dividend decision is independent of a company's investment and financing decisions. For example, suppose that a company decided to pay out all of its earnings as dividends. To finance capital projects, it could issue additional common shares in the amount of its capital budget (such financing would keep its capital structure unchanged). The value of the newly issued shares would exactly offset the value of the dividend. Thus, if a company paid out a dividend that represented 5 percent of equity, its share price would be expected to drop by 5 percent. If a common stock in Australia is priced at A\$20 before an A\$1 a share dividend, the implied new price would be A\$19. The shareholder has assets worth A\$20 if the dividend is not paid or assets worth A\$20 if the stock drops to A\$19 and an A\$1 dividend is paid.

Note that under the MM assumptions, there is no meaningful distinction between dividends and share repurchases (repurchases of outstanding common shares by the issuing company)—they are both ways for a company to return cash to shareholders. If a company had few investment opportunities such that its current cash flow was more than that needed for positive NPV projects, it could distribute the excess cash flow via a dividend or a share repurchase. Shareholders selling shares would receive A\$20 a share, and shareholders not selling would hold shares whose value continued to be A\$20. To see this, suppose the company being discussed has 10,000 shares outstanding, a current free cash flow of A\$10,000, and the present value of its future cash flows is A\$190,000. Thus, the share price is $(A\$10,000 + A\$190,000)/10,000 = A\$20$. Now if the company uses the free cash flow to repurchase shares, in lieu of paying a dividend of A\$1, it will repurchase 500 shares $(A\$10,000/A\$20 = 500)$. The 9,500 shares left outstanding have a claim on the A\$190,000 future cash flow, which results in a share price of A\$20.

An intuitive understanding of MM dividend irrelevance also follows from the concept of a “homemade dividend.”⁴ In a world with no taxes or transactions costs, if shareholders wanted or needed income, they could construct their own dividend policy by selling sufficient shares to create their desired cash flow stream. Using the example above, assume the company did not pay the A\$1 dividend and the stock remained at A\$20. A holder of 1,000 shares who desired A\$1,000 in cash could sell 50 shares at A\$20, thereby reducing his or her holdings to 950 shares. Note that by reducing share holdings, second period dividend income is reduced: higher dividend income in one period is at the expense of exactly offsetting lower dividend income in subsequent periods. The irrelevance argument does not state that dividends per share are irrelevant to share value but that dividend *policy* is irrelevant because by taking the earning power of assets as a given and assuming perfect capital markets, policy alternatives merely involve trade-offs of different dividend streams of equal present value.

In the real world, there are market imperfections that create some problems for MM's dividend policy irrelevance propositions. First, both companies and individuals incur transactions costs. A company issuing new shares incurs **flotation costs** (i.e., costs in selling shares to the public that include underwriters' fees, legal costs, registration expenses, and possible negative price effects) often estimated to be as much as 4 percent to 10 percent of the capital

⁴MM use a similar idea in their irrelevance proposition for capital structure—that of “homemade leverage.” If a shareholder can undo anything a company does at no cost, then it follows that whatever the company does in terms of capital structure or dividend decisions should not have an impact on shareholder value because the shareholder can always alter the outcome to suit his or her own needs. Thus, under the MM assumptions, only investment decisions, which determine the amount of future cash flows from operations, have an effect on company value.

raised, depending on the size of the company and the size of the issue.⁵ Shareholders selling shares to create a “homemade” dividend would incur transaction costs and, in some countries, capital gains taxes (of course, cash dividends incur taxes in most countries). Furthermore, selling shares on a periodic basis to create an income stream of dividends can be problematic over time if share prices are volatile. If share prices decline, shareholders have to sell more shares to create the same dividend stream.

2.2. Dividend Policy Matters: The Bird-in-the-Hand Argument

Financial theorists, such as Myron Gordon (1963), John Lintner (1962), and Benjamin Graham (1934), have argued that, even under perfect capital markets assumptions, investors prefer a dollar of dividends to a dollar of potential capital gains from reinvesting earnings because they view dividends as less risky. Graham’s viewpoint is that “. . . the typical dollar of reinvestment has less economic value to the shareholder than a dollar paid in dividends.”⁶ The Gordon, Lintner, and Graham arguments are similar and have sometimes been called the “bird in the hand” argument, a reference to the proverb, “A bird in the hand is worth two in the bush.” By assuming that a given amount of dividends is less risky than the same amount of capital gains, the argument is that a company that pays dividends will have a lower cost of equity capital than an otherwise similar company that does not pay dividends; the lower cost of equity should result in a higher share price. MM contend that this argument is incorrect because, under their assumptions, paying or increasing the dividend today does not affect the risk of future cash flows. Such actions only lower the ex-dividend price of the share (the **ex-dividend price** is the share price when the share first trades without the right to receive an upcoming dividend).

2.3. Dividend Policy Matters: The Tax Argument

In some countries, dividend income has traditionally been taxed at higher rates than capital gains. For instance in the 1970s, tax rates on dividend income in the United States were as high as 70 percent whereas the long-term capital gains rate was 35 percent. Even as recently as 2002, U.S. tax rates were as high as 39.1 percent on dividends and 20 percent on long-term capital gains. (From 2003 to 2010, dividends and long-term capital gains were taxed at 15 percent in the United States.)

An argument could be made that in a country that taxes dividends at higher rates than capital gains, taxable investors should prefer companies that pay low dividends and reinvest earnings in profitable growth opportunities. Presumably, any growth in earnings in excess of the opportunity cost of funds would translate into a higher share price. If, for any reason, a company lacked growth opportunities sufficient to consume its annual retained earnings, it could distribute such funds through share repurchases (again, the assumption is that capital gains are taxed more lightly than dividends). Taken to its extreme, this argument would advocate a *zero* payout ratio. Real world market considerations may complicate the picture; for example, in some jurisdictions, governmental regulation may preclude companies from

⁵Because net income is calculated after payment of interest, net income is considered a flow to equity or internally generated equity. New share issuance—externally generated equity—is thus the closest financing substitute to internally generated equity. Dividends also may be financed with debt (if bond covenants permit), which is subject to flotation costs.

⁶Graham, Dodd, Cottle, and Tatham (1962), 486.

never distributing excess earnings as dividends or deeming share repurchases to be dividends if the repurchases appear to be ongoing in lieu of dividend payments.

2.4. Other Theoretical Issues

In the following section, we present other important issues that arise in theory of dividend policy.

2.4.1. Clientele Effect

Another factor that may affect a company's dividend policy is a clientele effect. In this context, a **clientele effect** is the existence of groups of investors (clienteles) attracted by (and drawn to invest in) companies with specific dividend policies.

For example, some retired investors may have a preference for higher current income and prefer to hold stocks with relatively high dividend payouts and yields. Alternatively, other investor groups, such as younger workers with a long time horizon, might favor owning shares of companies that reinvest a high proportion of their earnings for long-term capital growth and thus prefer stocks that pay little or no dividends.

When the investor's marginal tax rate on capital gains (i.e., the tax on the next euro of capital gains) is lower than the marginal tax rate on dividends (i.e., the tax on the next euro of dividends), the investor may be influenced by tax considerations to have a preference for returns in the form of capital gains. All else being equal, however, tax-exempt investors would be expected to be indifferent about returns in the forms of capital gains or dividends from a tax perspective. Taxable investors might be similarly indifferent regarding investments held in tax-exempt accounts.

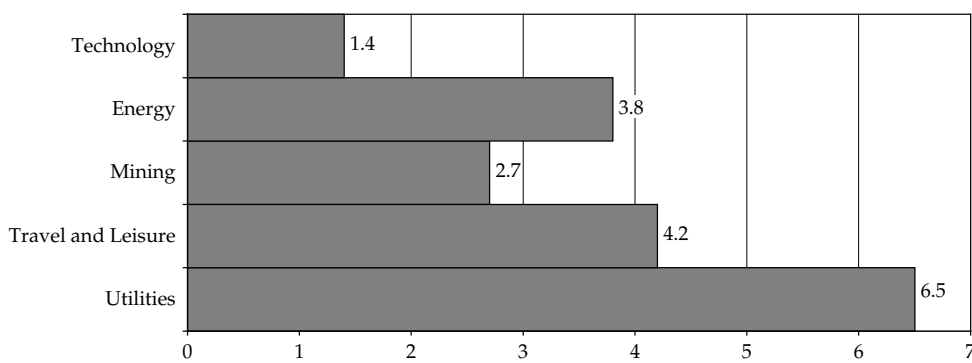
Many investors indicate a preference for dividends. Some institutional investors, including certain mutual funds, banks, and insurance companies, will only invest in companies that pay a dividend. Some investors require a specific minimum dividend yield or require that the dividend yield be in the top quartile (or half) of the relevant stock universe. Some mutual funds and exchange-traded funds specifically seek high dividend yield. Various high-yield equity indices exist in response to this demand (e.g., the Dow Jones Select Dividend Index family or the MSCI High Dividend Yield Indices). Trusts and foundations may be under a restriction that only income (i.e., interest and dividends) may be distributed to beneficiaries. Some individual investors use a discipline of "only spend the dividends, not the principal" to preserve their capital.⁷ Furthermore, in some jurisdictions, there are *legal* or *approved lists of equity investments* for institutions, such as insurance companies, or trusts for individuals. Such lists typically mandate that permissible investments consist only of companies that pay dividends. Often, such restrictive lists are intended to discourage investment in high-risk stocks. All of these considerations suggest that a clientele effect does exist and that equity market participants can be sorted by those who prefer to receive returns in the form of dividends and those who prefer capital gains returns.

Even if a clientele effect exists, however, it would not follow that dividend policy affects equity values; only that investors care about dividends and gravitate toward owning companies with the dividend policies they prefer. In particular, if the dividend market is in equilibrium in the sense that the demands of all clienteles for various dividend policies are satisfied by sufficient numbers of companies, a company cannot affect its own share value by changing its dividend policy. The change would only result in a switch in clientele. Thus, dividend clienteles may tend to promote stability of dividend policy and do not contradict dividend policy irrelevance.

⁷See Shefrin and Statman (1984).

Investors seeking yield will often be found to consistently overweight in some industry sectors relative to the benchmark weights of those sectors. Exhibit 7-1 shows the dividend yield for five of the FTSE 100 industry sectors: Utilities, Travel and Leisure, Energy (Oil and Gas), Mining, and Information Technology.

EXHIBIT 7-1 Dividend Yield of Major FTSE 100 Industry Sectors, June 2009 (percent)



Source: www.itpaysdividends.co.uk.

As is evident, there is a dramatic difference in dividend yields for these five industries, with Utilities having the highest yield and Technology having a relatively low one. This pattern in industry dividend yields appears to be global, as is shown in Exhibit 7-2.

EXHIBIT 7-2 Gross Dividend Yield on Selected FTSE All-World Sector Indices

Industries	(percent)
Oil and gas	3.1
Basic materials	3.1
Consumer goods	3.1
Health care	2.8
Consumer services	2.5
Financials	3.4
Utilities	5.0
Technology	1.6

Source: *Financial Times*, 5 June 2009, p. 19.

If the tax rates applied to dividends and capital gains are the same, then (all else being equal) the expected price drop when a share goes **ex-dividend** (i.e., first trades without the right to receive an upcoming dividend) is the amount of the dividend. When the ex-dividend day price change is consistently different from that amount, the discrepancy may carry information about the marginal tax rates of investors trading in the share on the **ex-dividend**

date (the first date that the share trades without the right to receive an upcoming dividend). The point is worth developing in greater detail.

Suppose that a taxable investor purchases a share at price P_b (where *bis* for *buy*) and has marginal tax rates on dividends and capital gains of T_D and T_{CG} , respectively. Consider two trading strategies distinguished by whether a share is sold just before or just after the share goes ex-dividend:

1. *Sell just before the share goes ex-dividend.* The share is sold at the end of the last trading day before the ex-dividend day at price P_w (where *w* stands for *with right to receive the dividend*). By selling the share at that time the investor will *not* appear as a holder of record of the share as of the record date and will *not* be entitled to the dividend. (The purchaser of the share will be the owner of record.)

The resulting cash flow is the sale price P_w minus the capital gains tax owed on the sale: $P_w - (P_w - P_b)(T_{CG})$.

2. *Sell just after the share goes ex-dividend.* The share is sold when it opens for trading on the ex-dividend day at price P_x (where *x* is for *ex-dividend*). The investor will receive the dividend.

The resulting cash flow is the sale price P_x minus the capital gains tax owed on the sale plus the after-tax amount of the dividend: $P_x - (P_x - P_b)(T_{CG}) + D(1 - T_D)$.

A **marginal investor** in a given share is defined as an investor who is very likely to be part of the next trade in the share and who is therefore important in setting price. Suppose that the investor whose marginal tax rates we are describing is such an investor. The prices P_w and P_x represent an equilibrium if this marginal investor is indifferent about selling the share just before and just after it goes ex-dividend. For that to be the case, the two cash flows given must be equal:

$$P_w - (P_w - P_b)(T_{CG}) = P_x - (P_x - P_b)(T_{CG}) + D(1 - T_D)$$

This equation can be solved for the amount of the price decrease when the share goes ex-dividend, $P_w - P_x$.⁸

$$P_w - P_x = D \frac{1 - T_D}{1 - T_{CG}} \quad (7-1)$$

Equation 7-1 implies three relationships. If the investor's marginal tax rate on dividends is equal to the marginal tax rate on capital gains, the share's price should drop by the amount of the dividend when the share goes ex-dividend. If the investor's marginal tax rate on dividends is higher than the marginal tax rate on capital gains, the share's price should drop by less than the amount of the dividend when the share goes ex-dividend. Finally, if the investor's marginal tax rate on dividends is less than the marginal tax rate on capital gains, the share's price should drop by more than the amount of the dividend when the share goes ex-dividend. For example, if the dividend is €12 and the marginal tax rate on dividends at 0.40 is higher than the marginal tax rate on capital gains at 0.20, we expect the price to drop by less than the amount of the dividend on the ex-dividend day. The expected price drop is calculated as $(€12)(1 - 0.40)/(1 - 0.20) = (€12)(0.75) = €9$.

The ratio $(1 - T_D)/(1 - T_{CG})$ can be viewed as establishing an indifferent relationship between dividends and capital gains. For example, assuming an investor pays taxes of

⁸See Elton and Gruber (1970), 68–74. Technically, the expression does not take into account the time value of money and assumes investors are risk neutral (indifferent to risk).

40 percent on the next unit of dividend income and taxes of 15 percent on the next unit of capital gains, €1 of dividend is worth as much as $(1 - 0.40)/(1 - 0.15) = €0.71$ in capital gains.

The amount of the ex-dividend price drop may provide information on the tax rates applying to those trading in the stock. Example 7-1 shows details about this type of analysis.

EXAMPLE 7-1 Clienteles and Preferences for Dividends versus Capital Gains

1. An individual investor pays taxes of 28 percent on the next dollar of dividend income and taxes of 15 percent on the next dollar of capital gains. Which would she prefer: \$1 in dividends or \$0.87 in capital gains?
2. Suppose the tax rate on capital gains is 20 percent for all investors but the tax rate on dividend income differs among investors. A share drops by 70 percent of the amount of the dividend, on average, when the share goes ex-dividend. Assume that any appropriate corrections for equity market price movements on ex-dividend days have been made. Calculate the marginal tax rate on dividend income applying to those who trade the issue around the ex-dividend day.
3. Consider a U.S. corporation with a corporate income tax rate of 40 percent. The corporation needs to report as taxable income only 30 percent of dividends received from other corporations—that is, it takes a 70 percent deduction on that type of dividend income in calculating taxes owed. Assume that both capital gains and reported dividends (dividends net of any deductible amount) are taxed at 40 percent. What is \$1 of dividends worth in terms of capital gains for such a corporate investor?
4. Explain why the ex-dividend share price would be expected to drop by more than the amount of the dividend if such investors as the corporation described in question 3 are the marginal trader in the issue.
5. For a given share issue, the share price consistently drops by an amount very close to the amount of the dividend when the share goes ex-dividend. Describe the marginal investor in the shares.

Solution to 1. For this investor, after taxes, \$1 in dividends is worth $\$1(1 - 0.28)/(1 - 0.15) = \0.85 in capital gains. Because \$0.87 exceeds \$0.85, this investor would prefer \$0.87 in capital gains to \$1 in dividends. Viewed another way, the \$0.87 in capital gains gives the investor $\$0.74 = (\$0.87)(1 - 0.15)$ after tax, compared with $\$0.72 = (\$1)(1 - 0.28)$ after tax for a \$1 of dividends.

Solution to 2. The statement of the problem implies that $(P_w - P_\infty)/D = 0.70$. Thus, $0.70 = (1 - T_D)/(1 - T_{CG}) = (1 - T_D)/(1 - 0.20)$. So, $(0.80)(0.70) = 1 - T_D$ and $T_D = 1 - (0.80)(0.70) = 0.44$. The average ex-dividend day price movement reflects a 44 percent marginal tax rate on dividend income for those who trade around the ex-dividend day.

Solution to 3. Because 70 percent of the dividend is excluded from taxation, the effective tax rate on dividends, T_D , is $0.4(1 - 0.7) = 0.12$. Thus, a \$1 dividend is worth $(1 - 0.12)/(1 - 0.4) = \$1.47$ of capital gains for the corporate investor described.

Solution to 4. Because 70 percent of the dividends received are excluded from taxation, the corporation has a tax-motivated preference for dividends over capital gains. Therefore, the ratio $(1 - T_D)/(1 - T_{CG})$ exceeds 1.0; that is, $(P_w - P_x) > D$. The ex-dividend day price decline is expected to exceed the amount of the dividend.

Solution to 5. The marginal investor may be a tax-exempt investor. A taxable investor with the same marginal tax rate on dividends and capital gains is another possibility consistent with the data.

The existence of dividend clienteles does not contradict the hypothesis of dividend policy irrelevance. Example 7-2 addresses the point. In the example, **dividend payout ratio** refers to the percentage of total earnings paid out in dividends in a given year; in per-share terms, it is DPS/EPS.

EXAMPLE 7-2 Clienteles and Preferences for Dividends versus Capital Gains

Suppose it is established that about 70 percent of investors prefer a relatively high income stream from a given size position in shares. You are on the board of directors of a company with a dividend policy that specifies a particularly low dividend payout ratio. Give two reasons why having your company adopt a higher dividend payout ratio may not lead to an increase in shareholder wealth.

Solution. First, even if the dividend payout ratio is not increased, individual shareholders may be able to manufacture their desired income stream by selling shares as needed (creating “homemade dividends”). Second, if there are tax clienteles, by adopting a higher dividend payout ratio, the company may be merely exchanging one clientele (which it satisfies currently) for a different clientele.

2.4.2. The Information Content of Dividend Actions: Signaling

MM assumed that all investors—including outside investors—have the same information about the company: a situation of symmetric information. In reality, corporate managers typically have access to more detailed and extensive information about the company than do outside investors.

A situation of asymmetric information raises the possibility that dividend increases or decreases may affect share price because they may convey new information about the company. A company’s board of directors and management, having more information than outside investors, may use dividends to signal to investors (i.e., convey information) how the company is *really* doing. A company’s decision to initiate, maintain, increase, or cut a dividend may convey more credible information than positive words from management because cash is involved. For a

signal to be effective it must be difficult or costly to mimic by another entity without the same attributes. Dividend increases are costly to mimic because a company that does not expect its cash flows to increase will not be able to maintain the dividend at increasingly high levels in the long run.⁹ (In the short run, a company can borrow to fund dividends.)

Empirical studies broadly support the thesis that dividend initiations or increases convey positive information and are associated with future earnings growth, whereas dividend omissions or reductions convey negative information and are associated with future earnings problems.¹⁰ A dividend declaration can help resolve some of the information asymmetry between insiders and outsiders and help close any gap between the market price of shares and their intrinsic value.

Some researchers¹¹ have argued that a company's dividend initiation or increase tends to be associated with share price increases because it attracts more attention to the company. Managers have an incentive to increase the company's dividend if they believe the company to be undervalued because the increased scrutiny will lead to a positive price adjustment. In contrast, according to this line of reasoning, managers of overvalued companies have little reason to mimic such a signal because increased scrutiny would presumably result in a downward price adjustment to their shares.

EXAMPLE 7-3 Signaling with Dividends and the Costs of Mimicking

Suppose that the management of a company with poor future prospects recommends to the board of directors an increase in its dividend. Management explains to the board that investors may then believe that the company has positive future prospects, leading to an increase in share value and shareholder wealth.

1. State whether such imitation is likely to achieve the stated objective over the long term.
2. Justify your answer to Question 1.

Solution to 1. No, such dividend increases are not likely to achieve the stated objective over the long term for the company described.

Solution to 2. Dividend increases are costly to mimic because a company that does not expect its cash flows to increase will not be able to maintain the increased dividend. The company will have to either cut the dividend in the future, or go to the market to obtain new equity funding to pay the dividend. Both these alternatives are costly for the company because they result in downward revisions to the stock price.

⁹See, for example, Ross (1977), 23–40, and Myers and Majluf (1984), 187–221.

¹⁰See Filbeck (2009) for a short summary of the evidence, including the evidence that does not support the thesis stated.

¹¹See Grinblatt, Masulis, and Titman (1984), 461–490.

Many companies take pride in their record of consistently increasing dividends over a long period of time. Standard & Poor's, for example, identifies companies in its U.S.-based S&P 500 Index, Europe 350 Index, Pan Asia Index, and S&P/TSX Canadian Index that are "Dividend Aristocrats" in the sense that they have increased their dividend for a number of consecutive years (at least 25 years in the case of the S&P 500, at least 10 years in the case of the Europe 350, at least 7 years in the case of Pan Asia Index, and at least 5 years in the case of the S&P/TSX). These companies are in various industries and include Procter & Gamble, Nestle, Novartis, Sanofi-Aventis, Wal-Mart, 3M, ExxonMobil, and Automatic Data Processing. When a company's earnings and cash flow outlook has been and continues to be positive, it often views a policy of increasing dividends as an important tool to convey that information to existing and potential shareholders. Companies that consistently increase their dividends seem to share certain characteristics:

- Dominant or niche positions in their industry.
- Global operations.
- Relatively high returns on assets.
- Relatively low debt ratios (dividend payouts unlikely to be affected by restrictions in debt covenants).

Dividend cuts or omissions, in contrast, present powerful and often negative signals. For companies under financial or operating stress, the dividend declaration date may be viewed with more than usual interest. Will they cut the dividend? Will they omit the dividend altogether? In these instances, merely maintaining the dividend or not cutting it as much as expected is usually viewed as good news (i.e., that current difficulties are transitory and manageable), unless investors view managers as trying to convey erroneous information to the market.

In principle, management can attempt to send a positive signal by cutting the dividend, although that is difficult in practice. For example, IBM, long the giant of mainframe computers and a company with an enviable record of dividend increases over the years, announced in 1993 a more than 50 percent cut in its dividend. IBM explained that their intention was to use the funds conserved to shift its business into nonmainframe technology and consulting services for the purpose of improving future returns. Although the message was met with varying reactions, it was, in retrospect, a positive signal because IBM successfully used its cash flow to reorganize its business. IBM resumed its dividend increases again in 1996 and, as of the time of writing, it has increased every year since.

EXAMPLE 7-4 Dividend Reductions and Price Increases

On 6 March 2003, the BBC reported that Royal & Sun Alliance Group, Britain's second largest insurer, had announced it would cut its dividend from 16 pence a share to 6 pence a share. The company also revealed that it had a shortfall of £406 million in its pension fund and was planning to increase contributions to the fund by about £30 million a year for the next 10 years.

All this was despite the fact that the company reported operating profits of £226 million at the end of 2002, up from just £16 million at the end of 2001. The insurer was in the process of reorganizing its business to focus on general insurance policies, and expanding into Australia and New Zealand, while replacing its chief executive. The interim chief executive told reporters that future dividends would depend on decisions made by the new leadership. As the market digested all this information, the insurance company's shares rose 2 percent.

Source: BBC News, <http://news.bbc.co.uk/2/hi/business/2824527.stm>.

Another even more complicated example of the signaling content of dividends can be found in Microsoft's initial dividend declaration. As Exhibit 7-1 showed, technology companies have among the lowest dividend yields and, it can be shown, below average dividend payout ratios. These facts make sense. Most technology companies have high R&D requirements and some (e.g., integrated circuit manufacturers) are capital intensive; those that are profitable often achieve returns on assets and owners' equity that are well above average. In addition, business risk is considerable as discoveries and unforeseen advances change the product landscape. All of these considerations would suggest a policy of low (or no) dividend payments, so that internally generated funds are directed for new product development and/or capital investment that will maintain high returns. Some companies in the technology sector, however, do mature. For example, in the mid 1990s, because of Microsoft's past phenomenal growth and its dominance of its industry, net cash grew to tens of billions of dollars and many wondered if the company could effectively use its cash "hoard," and if it were time for Microsoft to pay a dividend.

In late 2003, Microsoft declared its first annual dividend of \$0.06 a share, equaling about 7 percent of its yearly cash flow, less than two percent of its net cash position, and representing a yield of 0.3 percent. Then, in the summer of 2004, the company increased its annual dividend to \$0.32 a share and announced a special year-end dividend of \$3.00 a share. Clearly, the signaling effect was more important than the actual cash impact on either the company or its investors. Some investors viewed these declarations positively, whereas others viewed them negatively. On the one hand, some believed that Microsoft was signaling an interest in broadening its investor focus while refraining from undertaking unprofitable expansion. The clientele effect, discussed earlier, would suggest that Microsoft's dividend possibly attracted a new group of potential shareholders. On the other hand, others viewed the dividend declaration as an admission that it was becoming a mature company—that it could no longer reap high returns from reinvesting its earnings. The future growth prospects for the stock, they would argue, had been diminished, although a question was the extent to which the market already understood that. In any event, few could argue that the 2003–2004 dividend declarations by Microsoft were not corporate events of some importance.

2.4.3. Agency Costs and Dividends as a Mechanism to Control Them

In large, publicly traded corporations, there is typically a substantial separation between the professional managers who control the corporation's operations and the outside investors who largely own it. When agents (the managers) and owners (the shareholders) are different, managers may have an incentive to maximize their own welfare at the company's expense because they own none or relatively small percentages of the company for which they work and they do not bear all the costs of such actions. This incentive is ultimately also a problem of unequal (asymmetric) information between managers and outside investors because, if outside investors could perfectly observe managers, managers would be dissuaded from such actions. One managerial incentive of particular concern is investment in negative net present value (NPV) projects. Such projects may

grow the size of the company (measured in sales or assets) and thus enlarge the manager's span of control, while they generate negative economic returns. This potential overinvestment agency problem might be alleviated by the payment of dividends. In particular, by paying out all free cash flow to equity in dividends, managers would be constrained in their ability to overinvest by undertaking negative NPV projects.¹² This concern or hypothesis that management may create an overinvestment agency cost is known as Jensen's free cash flow hypothesis.¹³

That management will squander free cash flow by undertaking unprofitable projects can be viewed as a possible concern to be evaluated case by case. For example, as discussed previously, Microsoft accumulated increasingly large cash positions but was not observed to squander monies on unprofitable projects. In some cases, such cash positions may provide financial flexibility to respond quickly to changes in the environment, to grasp unforeseen opportunities, or to survive periods of restricted credit, as in the case of Ford Motor Company's accumulation of cash during profitable years in the 1990s. Clearly, there are industry-specific and life-cycle conditions to consider. In general, it makes sense for growing companies in industries characterized by rapid change to hold cash and pay low or no dividends, but it does not make sense for large, mature companies in relatively noncyclical industries. In general, there is empirical support for the market reaction to dividend change announcements to be stronger for companies with greater potential for over investment than for companies with lesser potential for over investment.¹⁴

There is another concern when a company is financed by debt as well as equity. Paying dividends can exacerbate the agency conflict between shareholders and bondholders. When a company has risky debt, the payment of dividends reduces the cash cushion available to the company for the disbursement of fixed payments to bondholders. The payment of large dividends, with the intention of transferring wealth from bondholders to shareholders, could lead to underinvestment in profitable projects. All else equal, both dividends and share repurchases increase the risk that the company will default on its debt. Reflecting bondholders' concern, the bond indenture (contract) often includes a covenant restricting distributions to shareholders that might impair the position of bondholders.¹⁵ A typical form of this restriction is to define an amount that distributions to shareholders during the life of the bond may not exceed. This amount of funds is usually a positive function of the company's current and past earnings and issues of new equity, and a negative function of dividends paid since the bonds were issued. Dividends are not permitted if their payment would make the amount zero or if the amount is negative (e.g., because of negative earnings). Such covenants often do not really restrict the level of dividends as long as those dividends come from new earnings or from new issues of stock. What the covenant attempts to do is prevent the payment of dividends financed by the sale of the company's existing assets or by the issuance of new debt. Covenants that specify minimum levels of EBITDA and/or EBIT coverage of interest charges are frequently used as well. These covenants provide some assurance that operating earnings include a cushion for the payment of fixed charges.¹⁶ Other covenants focus on balance sheet strength—for example, by specifying a maximum value for the ratio of debt to tangible net worth.

¹²Informally, free cash flow to equity is the cash flow available to be distributed as dividends after the company has accepted all positive NPV projects.

¹³See Jensen (1986).

¹⁴For more information, see Mukherjee (2009).

¹⁵This discussion draws on Smith and Warner (1979), 117–161.

¹⁶EBITDA and EBIT are earnings before interest, taxes, depreciation, and amortization and earnings before interest and taxes, respectively. Bond covenants typically indicate that EBITDA and EBIT are adjusted for nonrecurring items.

EXAMPLE 7-5 Agency Issues and Dividends

Two dividend-paying companies, A and B, directly compete with each other. Both companies are all-equity financed and have recent dividend payout ratios averaging 35 percent. The corporate governance practices at Company B are weaker than at Company A. For example, at B but not A, the chief executive officer is also chairperson of the board of directors. Recently, profitable investment opportunities for B have become fewer although operating cash flow for A and B is strong.

Based only on the information given, investors who own shares in both A and B are *most likely* to press for a dividend increase at:

- A. Company A, because it has better growth prospects than Company B.
- B. Company B, because a dividend increase may mitigate potential over investment agency problems.
- C. Company B, because a dividend increase may mitigate potential underinvestment agency problems.

Solution. B is correct. Company B's strong operating cash flow in an environment of fewer profitable growth opportunities may tempt Company B management to over invest. The concern is increased because of Company B's relatively weak corporate governance.

The final example in this section illustrates the complex agency considerations that may affect dividend policy.

EXAMPLE 7-6 Electric Utilities, Agency Costs, and Dividends

Electric utilities often have above average dividend yields. A distinctive characteristic of many utility companies is that they pay a high percentage of earnings as dividends, while periodically issuing new equity to invest in the many projects necessitated by the capital-intensive nature of their business. This practice of financing dividends with new equity appears unwise because new equity is expensive. Researchers¹⁷ examining a set of U.S.-based electric utilities, however, have demonstrated that there may be a good reason for paying dividends and then issuing equity: the mitigation of the agency problems between managers and shareholders and between utility regulators and utility shareholders.

¹⁷See Hansen, Kumar, and Shome (1994), 16–22.

Because electric utilities are typically monopolies in the sense that they are usually the only providers of electricity in a given area, they are regulated so they are not able to set electricity rates at monopolistically high levels. The regulators are expected to set rates such that the company's operating expenses are met and investors are provided with a fair return. The regulators, however, are usually elected, or are political appointees, and view ratepayers as potential voters. Thus, utility shareholders, in addition to facing potential manager–shareholder agency issues because managers have incentives to consume perquisites or to over invest, also face a regulator–shareholder conflict, in which regulators set rates low to attract the votes of individuals being served by the utility.

In the utility industry, therefore, dividends and the subsequent equity issue are used as mechanisms to monitor managers and regulators. The company pays high dividends and then goes to the capital markets to issue new equity. If the market does not think that shareholders are getting a fair return because regulators are setting rates too low, or because managers are consuming too many perks, the price at which new equity can be sold will fall until the shareholder expectations for returns are met. As a result, the company may not be able to raise sufficient funds to expand its plant to meet increasing electricity demand—the electric utility industry is very capital intensive—and, in the extreme, the lights may go out. Faced with this possibility, and potentially angry voters, regulators have incentives to set rates at a fair level. Thus, the equity market serves to monitor and arbitrate conflicts between shareholders and both managers and regulators.

2.5. Dividend Theory: Summary

What can we conclude about the link between dividends and valuation? In theory, in the absence of market imperfections, Miller and Modigliani (1961) find that dividend policy is irrelevant to the wealth of a company's investors. But in reality, the existence of market imperfections makes matters more complicated. In addition, some investors are led, by logic or custom, to prefer dividends.

Unfortunately, in the search for the link between dividend policy and value, the evidence is inconclusive. It is difficult to show an exact relationship between dividends and value because there are so many variables affecting value. We have presented factors that would seem to explain why some companies put emphasis on dividends and others do not. Financial theory predicts that reinvestment opportunities should be the dominant factor. Indeed, no matter where they are located in the world, smaller, fast-growing companies pay out little or none of their earnings. Regardless of jurisdiction, more mature companies with fewer reinvestment opportunities tend to pay dividends. For these mature companies, taxes, laws, tradition, signaling, ownership structure, and attempts to reconcile agency conflicts all seem to play a role in determining the dividend payout ratio. At a minimum, in looking at a company, an analyst should evaluate whether a given company's dividend policy matches its reinvestment opportunities, clientele preferences, and legal/financial environment.

3. FACTORS AFFECTING DIVIDEND POLICY

In Section 2, we discussed theories of dividend policy and value and concluded that the issue is, at best, unresolved. In this section we explore six factors that affect a company's dividend policy (decisions about whether and in what amount to pay dividends):

- Investment opportunities
- The expected volatility of future earnings
- Financial flexibility
- Tax considerations
- Flotation costs
- Contractual and legal restrictions

Boards of directors and managers spend considerable time setting dividend policy despite the lack of clear guidance from theory to guide their deliberations. The factors listed are, however, often mentioned by managers themselves as relevant to dividend policy selection in practice. Some of the factors we explore, such as taxation, are not company-specific, whereas other factors, such as possible contractual restrictions on dividend payments and the expected volatility of future earnings, are more company-specific. The factors may be interrelated and the presence of one may enhance or diminish the effect of another. Importantly, the independence between the investment, financing, and dividend decisions assumed by MM may no longer hold when such market imperfections as information effects, agency problems, and taxes are recognized.

3.1. Investment Opportunities

All else equal, a company with many profitable investment opportunities will tend to pay out less in dividends than a company with fewer opportunities because the former company will have more uses for internally generated cash flows. Internally generated cash flow is generally a cheaper source of equity funding than new equity issuance. Opportunities for new investments, and the speed with which a company needs to respond to them, are influenced by the industry in which the company operates. A company with the ability to delay the initiation of projects without penalty may be willing to pay out more in dividends than a company that needs to act immediately to exploit profitable investment opportunities. From Exhibit 7-1, we see that technology companies have the lowest dividend yields whereas utilities have the highest. The chief explanation may be the size and time horizon of profitable investment opportunities in relation to annual operating cash flow generated. For technology companies the pace of change is rapid, so having internally generated funds available to react to profitable opportunities affords such companies valuable flexibility. For utility companies, for which there are typically fewer such opportunities and for which change is much slower, higher dividend payouts are indicated.

3.2. The Expected Volatility of Future Earnings

In 1956, Lintner¹⁸ published a survey of managers at 28 companies that identified several important factors in the dividend payout decision. Most managers:

- Had a target payout ratio based on long-run sustainable earnings.
- Focused more on dividend changes (increases or decreases) than on dividend levels.
- Were reluctant to increase the dividend if the increase might soon need to be reversed.

More recently, Brav et al. (2005), in a survey of treasurers and chief financial officers, reported that managers are very reluctant to cut dividends and tend to smooth dividends.¹⁹

¹⁸Lintner (1956), 97–113.

¹⁹Brav, Graham, Harvey, and Michaely (2005), 483–527.

All else equal, the more volatile earnings are, the greater the risk that a given dividend increase may not be covered by earnings in a future time period. Thus, when earnings are volatile we expect companies to be more cautious in the size and frequency of dividend increases.

3.3. Financial Flexibility

Companies may not initiate, or may reduce or omit, dividends to obtain the financial flexibility associated with having substantial cash on hand. A company with substantial cash holdings is in a relatively strong position to meet unforeseen operating needs and to exploit investment opportunities with minimum delay. Having a strong cash position can be particularly valuable during economic contractions when the availability of credit may be reduced. Financial flexibility may be viewed as a tactical consideration that is of greater importance when access to liquidity is critical and when the company's dividend payout is relatively large.

A classic example of explaining a dividend decision in terms of the need to preserve financial flexibility occurred on 28 February 2009 when General Electric Company, which had not reduced its dividend at any time in the previous 71 years, announced that going forward it was cutting its quarterly dividend rate from US\$0.31 to US\$0.10. GE Chairman Jeffrey Immelt stated:

“We made the decision to cut the dividend because it is a prudent measure to further enhance our balance sheet and provide us with flexibility for potential future opportunities. It is the right, precautionary action to keep the company safe and secure in the difficult operating environment we see today. We believe it further strengthens our Company for the long-term, while still providing an attractive dividend.”

Source: www.gereports.com/jeff-immelt-talks-about-ges-dividend/

The cut was expected to conserve \$9 billion on annual basis. With approximately \$50 billion of cash on hand at the time of the statement and with operating cash flow at least covering the previous dividend, the dividend reduction appeared to be accurately characterized as “precautionary.” Nevertheless, the dividend cut was widely anticipated²⁰ despite the assurance in GE's February 2009 Investor Update (2 February 2009) that “We are committed to our plan for \$1.24 per share dividend for 2009” (page 1). Furthermore, most analysts greeted GE's decision to cut the dividend favorably given the uncertainty about the magnitude of credit losses at its financing division, GE Capital, the duration of the economic contraction, and partially frozen credit markets.

When increasing financial flexibility is an important concern, a company may decide to distribute money to shareholders primarily by means of share repurchases rather than regular dividends. A program to repurchase shares in the open market does not involve a formal requirement that any repurchases be executed and share repurchases in general do not establish the same expectations for continuation in the future as regular dividends.

3.4. Tax Considerations

Taxation is an important factor that affects investment decisions for taxable investors in particular, because it is the after-tax return that is most relevant to investors. Different countries tax

²⁰The precipitous decline in GE's share repurchases in the preceding quarter indicated to many investors an urgent concern for conserving cash.

corporate dividends in a wide variety of ways. Some tax both capital gains and dividend income. Others tax dividends but not capital gains. Hong Kong is an exception in that it levies no tax on either dividends or capital gains. Within a given country, tax policy can be quite complex. In addition, as a major fiscal policy tool that is subject to politics, governments have a tendency to “re-address” tax issues, sometimes with great frequency, thereby complicating the issue even more. As with other aspects of taxation, governments use the taxation of dividends to address a variety of goals: to encourage or discourage the retention or distribution of corporate earnings; to redistribute income; or to address other political, social, and/or investment goals.

For the global investor, foreign taxes can be just as important as domestic taxes. Foreign tax credits in the investor’s home country also may figure importantly into the overall taxation issue. For example, France requires French companies to withhold 15 percent of dividends paid to foreign investors, but investors in the United States can claim a tax credit on their U.S. tax return for the amount of the French tax.

3.4.1. Taxation Methods

We look at three main systems of taxation that impact dividends: double taxation, split-rate, and imputation. Other tax systems can be a combination of these.

In a **double taxation** system, corporate earnings are taxed at the corporate level and then taxed again at the shareholder level if they are distributed to taxable shareholders as dividends. Exhibit 7-3 illustrates double taxation. The United States is used as an example. In 2003, the individual tax rate on dividends was lowered from a maximum of 39.6 percent (the highest marginal income tax rate) to a maximum of 15 percent.²¹ At the same time, the tax rate on long-term capital gains was also reduced from a 20 percent maximum rate to the same 15 percent. Exhibit 7-3 depicts the double taxation system using the highest marginal rate on dividends in the United States both before and after the 2003 tax law change.²²

EXHIBIT 7-3 Double Taxation of Dividends at Different Personal Tax Rates (per \$100)

	39.6%	15%
Net income before taxes	\$100	\$100
Corporate tax rate	35%	35%
Net income after tax	\$65	\$65
Dividend assuming 100 percent payout	\$65	\$65
Shareholder tax on dividend	\$25.74	\$9.75
Net dividend to shareholder	\$39.26	\$55.25
Double tax rate per \$ of dividend	60.7%	44.8%

²¹For this 15 percent tax rate to apply, the dividends must meet certain criteria such that they are considered to be “qualified dividends.” For dividends to be qualified for this tax rate, they must be out of accumulated taxable earnings of the corporation and recipients of dividends must meet certain minimum holding periods during which they have not hedged away the economic risk of the security held.

²²Under U.S. tax law as of mid-2009, both dividend and capital gains tax rates are scheduled to return to pre-2003 levels in 2011.

Although there is still double taxation of dividends before and after the 2003 tax change, the net tax rate on a dollar of income distributed in dividends declined from 61 percent to 45 percent: a decline of about 26 percent. U.S. investors clearly prefer the lower tax rate on dividends, but it is not clear whether they would prefer a higher or lower payout because the current tax rate is the same on both dividends and long-term capital gains for most shareholders. Later we will discuss a company's decision with respect to the dividend payout ratio.

A second major taxation system is the dividend **imputation** tax system, which effectively assures that corporate profits distributed as dividends are taxed just once, at the shareholder's tax rate. Australia, New Zealand, and France use a dividend imputation tax system, whereas the United Kingdom uses a modified dividend imputation system. Under this system, a corporation's earnings are first taxed at the corporate level. When those earnings are distributed to shareholders in the form of dividends, however, shareholders receive a tax credit, known as a franking credit, for the taxes that the corporation paid on those distributed earnings (i.e., corporate taxes paid are imputed to the individual shareholder). If the shareholder's marginal tax rate is higher than the company's, the shareholder pays the difference between the two rates. Exhibit 7-4 shows one variation of a tax imputation system in which a shareholder with a lower marginal tax bracket than that of the company actually receives a tax credit for the difference between the corporate rate and his own rate.

EXHIBIT 7-4 Taxation of Dividends Based on Tax Imputation System (\$Australian)

	Marginal Shareholder Tax Rate	
	15%	47%
Pretax income	\$100	\$100
Taxes at 30 percent corporate tax rate	30	30
Net income after tax	70	70
Dividend assuming 100 percent payout	70	70
Shareholder tax on pretax income	15	47
Less tax credit for corporate payment	30	30
Tax due from shareholder	(15)	17
Effective tax rate on dividend	15/100	47/100
	= 15%	= 47%

A **split-rate** tax system is a third taxation system of greater historical than current importance. Under this system, corporate earnings that are distributed as dividends are taxed at a lower rate at the corporate level than earnings that are retained. At the level of the individual investor, dividends are taxed as ordinary income. Earnings distributed as dividends are still taxed twice, but the relatively low corporate tax rate on earnings mitigates that penalty. Exhibit 7-5 depicts this split-rate tax system for dividends.

EXHIBIT 7-5 Taxation of Dividends Based on Split-Rate System (per €100)

Pretax earnings	€200
Pretax earnings retained	100
35 percent tax on retained earnings	35
Pretax earnings allocated to dividends	100
20 percent tax on earnings allocated to dividends	20
Dividends distributed	80
Shareholder tax rate	35%
After tax dividend to shareholder	$[(1 - 0.35) \times 80] = 52$
Effective tax rate on dividend	$[20\% + (80 \times 35)\%] = 48\%$ ²³

3.4.2. Shareholder Preference for Current Income versus Capital Gains

All other things being equal, one could expect that the lower an investor's tax rate on dividends relative to his or her tax rate on capital gains, the stronger the investor's preference for dividends. But other issues also impinge on this preference. The investor may buy high-payout shares for a tax-exempt retirement account. Even if dividends are taxed at a lower rate than capital gains, it is not clear that shareholders will necessarily prefer higher dividends. After all, capital gains taxes do not have to be paid until the shares are sold, whereas taxes on dividends must be paid in the year received, even if reinvested. In addition, in some countries, such as the United States, shares held at the time of death benefit from a step-up valuation as of the death date.²⁴ Finally, tax-exempt institutions, such as pension funds and endowment funds, are major shareholders in most industrial countries. Such institutions are typically exempt from both taxes on dividends and taxes on capital gains. Hence, all other things being equal, they are indifferent as to whether their return comes in the form of current dividends or capital gains.

3.5. Flotation Costs

Another factor that affects a company's dividend policy is flotation costs. Flotation costs include: (1) the fees that the company pays (to investment bankers, attorneys, securities regulators, auditors, and others) to issue shares and (2) the possible adverse market price impact from a rise in the supply of shares outstanding. Aggregate flotation costs are proportionally higher (in terms of percentage of gross proceeds) for smaller companies (who issue fewer shares) than for larger companies. Flotation costs make it more expensive for companies to raise new equity capital than to use their own internally generated funds. As a result, many companies try to avoid establishing a level of dividends that would create the need to raise new equity to finance positive NPV projects.²⁵

²³Note that of every €100 allocated to dividends, shareholder receives €52, which implies that the effective tax rate on dividend is $100 - 52 = 48\%$.

²⁴The tax basis of the shares received by the beneficiary from the decedent is stepped up to fair market value at the date of death of the decedent.

²⁵We mentioned this earlier. There are companies, however, that pay dividends and issue equity, mainly in the utility industry. For a further discussion, see Parrino and Kidwell (2009).

EXAMPLE 7-7 A Company that Needs to Reinvest All Internally Generated Funds

Boar's Head Spirits Ltd., based in the United Kingdom, currently does not pay a dividend on its common shares. Boar's Head has an estimated operating cash flow of £500 million. The company's financial analyst has calculated its cost of capital as 12 percent. The same analyst has evaluated modernization and expansion projects with a positive NPV that would require £800 million. The cost of positive NPV projects exceeds estimated operating cash flow by £300 million (£800 million – £500 million). Having an above average debt ratio for its industry, Boar's Head is reluctant to increase its long-term debt in the next year. Discuss whether you would expect Boar's Head to initiate a dividend based on the above facts.

Solution. One would expect Boar's Head not to initiate a dividend. As things stand, internally generated funds, as represented by operating cash flow, are not sufficient to fund positive NPV projects. So payment of a dividend would be at the expense of passing by positive NPV projects unless the balance of such projects and the dividend were both financed by debt. Given its concern about debt levels, the company would not be expected to pay a dividend that needs to be financed by debt. Because the company has unfunded positive NPV projects, it could consider issuing new shares to fund those projects. The company, however, would not be expected to issue shares only for the purpose of paying dividends.

The solution to Example 7-7 can also be stated in terms of free cash flow to equity (FCFE). FCFE equals operating cash flow (OCF) minus fixed capital investment (FCInv) for the period (capital expenditures) plus net borrowing for the period. Conceptually, FCFE is the cash flow available for the payment of dividends and in this case it is negative: $FCFE = £500 \text{ million} - £800 \text{ million} + \text{net borrowing} = -£300 \text{ million} + \text{net borrowing}$, which is negative for values of net borrowing below £300 million.

3.6. Contractual and Legal Restrictions

The payment of dividends is often affected by legal or contractual restrictions or rules. In some countries, such as Brazil, the distribution of dividends is legally mandated (with certain exceptions).²⁶ In some countries (e.g., Canada and the United States) the payment of a dividend not specifically indicated to be a liquidating dividend may be restricted by an **impairment of capital rule**. Such a rule requires that the net value of the remaining assets as shown on the balance sheet be at least equal to some specified amount (related to the company's capital).

Contractual restrictions on the amount of dividends that can be paid are often imposed by bondholders in bond indentures.²⁷ These restrictions require that the company maintain

²⁶See www.mzweb.com.br/positivo/web/conteudo_en.asp?idioma=1&tipo=3667&conta=44#1.

²⁷An **indenture** is a written contract between a lender and borrower that specifies the terms of the loan, such as interest rate, interest payment schedule, maturity, and so on.

certain ratios (interest coverage ratios, current ratio, etc.) or fulfill certain conditions before dividend payments can be made. Debt covenants in a bond indenture are a response to the agency problems that exist between shareholders and bondholders and are put in place to limit the ability of the shareholders to expropriate wealth from bondholders. As an extreme example, in the absence of covenants or legal restrictions,²⁸ management could liquidate the company's assets and pay the proceeds to the shareholders as a liquidating dividend, leaving the bondholders with nothing to settle their claims.

If a company has issued preference shares, dividends on common shares may not be paid until preference share dividends are paid. In addition, if the preference dividends are cumulative, then preference dividends that are in arrears must be paid before any common dividend can be paid.

3.7. Factors Affecting Dividend Policy: Summary

There are several factors of varying degrees of importance that can affect a company's dividend policy. In the following example, we explore how these factors affected Toyota Motor Company's dividend policy.

EXAMPLE 7-8 Toyota Motor Company Cuts Its Dividend²⁹

On 8 May 2009, Toyota Motor Company, the world's largest automobile manufacturer, announced that it was going to cut its dividend for the first time. Toyota, which pays dividends twice a year, said the dividend would be reduced to ¥35 a share from the ¥75 paid a year earlier. The 2008 total dividend was ¥140 a share. The dividend cut ends a 600 percent cumulative increase in the dividend over 10 years. Faced with plunging global demand for cars (Toyota's vehicle sales were forecasted to fall 14 percent) and ongoing turmoil in the auto industry, Toyota was expecting a loss as high as ¥550 billion (operating loss of ¥850 billion) for fiscal year ending March 2010, compared with the analyst forecast loss of ¥284 billion for the same period. The company already had a loss of ¥437 billion in fiscal year 2009 (the operating loss was ¥461 billion). Toyota is focused on aggressively cutting costs—it plans to cut production-related costs by ¥340 billion and fixed costs by ¥460 billion—and has said that the lower dividend is because of the difficulty of sustaining the dividend at its previous level. Board member bonuses have been eliminated and manager summer bonuses were reduced by 60 percent. Capital spending will be cut by 36 percent to ¥830 billion, and R&D spending will be cut by 9.3 percent to ¥820 billion.

The company announced plans to raise capital via a bond issue of as much as ¥700 billion. Standard & Poor's cut Toyota's bond rating from AA+ to AA. Another problem facing Toyota and other Japanese automakers is the strong yen, which has

²⁸An example of a legal restriction is a law against fraudulent transfer of assets.

²⁹Source: www.bloomberg.com/apps/news?pid=20601101&sid=aYuKh9k5NZGQ.

gained 13 percent against the U.S. dollar in the preceding quarter. Toyota said that a one yen gain against the dollar trims profits by about ¥30 billion and that a similar gain against the euro trims profits by ¥4 billion.

Discuss Toyota's decision to cut its dividend in light of the factors affecting dividend policy covered in this section.

Solution: Of the six factors discussed in this section, the *volatility of future earnings* and preservation of *financial flexibility* are the major factors influencing Toyota's decision to cut its dividend. Paying the full dividend would have lowered Toyota's liquidity ratios and forced it to raise even more external capital. In addition, paying the full dividend probably would have resulted in a more severe downgrade in its bond rating, which would have increased its interest rate on its borrowed funds. Paying the full dividend when faced with huge, and larger than expected, operating losses might have also sent a signal to investors that Toyota was not serious about cutting costs and curtailing losses. *Flotation costs* could also play a role in Toyota's case. Flotation costs on new equity are typically higher than those on new debt, and it is possible that if it paid more than ¥35 a share it would have to issue new equity in addition to the ¥700 billion in debt.

4. PAYOUT POLICIES

In this section, we categorize and discuss three types of dividend policy. **Dividend policy** is the strategy that a company follows to determine the amount and timing of dividend payments.

4.1. Types of Dividend Policies

In the following sections we discuss stable dividend, constant dividend payout ratio, and residual dividend policies. A stable dividend policy is one in which regular dividends are paid that generally do not reflect short-term volatility in earnings. This type of dividend policy is the most common because managers are very reluctant to cut dividends, as discussed earlier. A constant dividend payout ratio policy is the policy of paying out a constant percentage of net income in dividends. A residual dividend policy is based on paying out as dividends any internally generated funds remaining after such funds are used to finance positive NPV projects. This type of policy has often been mentioned in theoretical discussions of dividend policy but is rarely used in practice. In Section 4.2, we discuss share repurchases, which are an alternative to the payment of cash dividends.

4.1.1. Stable Dividend Policy

This dividend policy is the most common. Companies that use a stable dividend policy base dividends on a long-term forecast of sustainable earnings, and increase dividends when earnings have increased to a sustainably higher level. Thus, if the long-term forecast for sustainable earnings is slow growth, the dividends would be expected to grow slowly over time, more or less independent of cyclical upward or downward spikes in earnings. If sustainable earnings were not expected to grow over time, however, the corresponding dividends would be level (i.e., not growing). Compared with the two other types of dividend policies

that will be presented, a stable dividend policy typically involves less uncertainty for shareholders about the level of future dividends. This is so because the other types of policies reflect to a higher degree short-term volatility in earnings and/or in investment opportunities.

Many companies pride themselves on a long record of gradually and consistently increasing dividends. Exhibit 7-6 shows the recent record of E.ON AG, Europe's largest utility. **Dividends per share (DPS)** show an upward trajectory. The decline in earnings in 2008 was actually associated with an increase in dividends, underscoring the long-term perspective of a stable dividend policy. To explain further, the exhibit shows adjusted earnings per share (EPS) reported by E.ON that attempt to remove "special effects" (to use the language of the Annual Report), such as restructuring expenses, marking to market of derivatives, and so on. In 2008, earnings were severely affected by book losses on disposals. For the long term, E.ON management was obviously optimistic about earnings prospects.

EXHIBIT 7-6 E.ON AG Earnings and Dividends

Year	EPS	EPS (adjusted)	DPS	Dividend Payout Ratio	Dividend Payout Ratio Using Adjusted EPS
2008	€0.68	€3.01	€1.50	221%	50%
2007	€3.69	€2.62	€1.37	37	52%
2006	€2.82	€2.22	€1.12	40	50%
2005	€3.75	€1.84	€0.92	25	50%
2004	€2.20	n/c	€0.78	35	n/c

Source for data: www.eon.com/en/investoren/19886.jsp.

As the example shows, dividends over the period were fairly stable, even while earnings, affected by restructuring costs, experienced considerable variability.

A stable dividend policy can be modeled as a process of gradual adjustment towards a target payout ratio based on long-term sustainable earnings. A **target payout ratio** is a goal that represents the proportion of earnings that the company intends to distribute (pay out) to shareholders as dividends over the long term.

A model of gradual adjustment (which may be called a "target payout adjustment model") was developed by John Lintner.³⁰ The model reflects three basic conclusions from his study of dividend policy: (1) Companies have a target payout ratio, based on long-term, sustainable earnings; (2) managers are more concerned with dividend changes than with the level of the dividend; and (3) companies will cut or eliminate a dividend only in extreme circumstances or as a last resort.

A simplified version of Lintner's model can be used to show how a company can adjust its dividend.³¹ For example, suppose that the payout ratio is below the target payout ratio and earnings are expected to increase. The expected increase in the dividend can be estimated as the product of three quantities: the expected increase in earnings next year, the target payout ratio, and the adjustment factor (one divided by the number of years over which the adjustment in dividends should take place). Suppose that the current dividend is \$0.40,

³⁰Lintner (1956).

³¹Lease et al. (2000), 124.

the target payout ratio is 50 percent, the adjustment factor is 0.2 (i.e., the adjustment is to occur over five years), and that the expected earnings increase is \$0.50 (from earnings of \$1.00 over the past year to earnings of \$1.50 for the year ahead). The expected increase in dividends is

$$\begin{aligned}
 &= \text{Increase in earnings} \times \text{Target payout ratio} \times \text{Adjustment factor} \\
 &= \$0.50 \times 0.5 \times 0.2 \\
 &= \$0.05 \text{ Increase in dividends}
 \end{aligned}$$

Therefore, even though earnings increased 50 percent from \$1.00 to \$1.50, the dividend would only incrementally increase by about 13 percent from \$0.40 to \$0.45.

By using this model, note that if in the following year earnings temporarily fell from \$1.50 to \$1.00, the dividend might well be increased by up to \$0.05 a share, as the implied new dividend of \$0.50 would still be moving the company toward its target payout ratio of 50 percent. Even if earnings were to fall further or even experience a loss, the company would be reluctant to cut or eliminate the dividend (unless its estimate of sustainable earnings or target payout ratio were lowered), but would rather opt to maintain the current dividend until future earnings increases justified an increase in the dividend.

EXAMPLE 7-9 Determining Dividends by Using a Target Payout Adjustment Model

Last year Luna Inc. had earnings of \$2.00 a share and paid a regular dividend of \$0.40. For the current year, the company anticipates earnings of \$2.80. It has a 30 percent target payout ratio and uses a 5-year period to adjust the dividend. Compute the expected dividend for the current year.

Solution.

$$\begin{aligned}
 \text{Expected dividend} &= \text{Last dividend} + (\text{Expected increase in earnings} \\
 &\quad \times \text{Target payout ratio} \times \text{Adjustment factor}) \\
 &= \$0.40 + [(\$2.80 - \$2.00) \times 0.3 \times (1/5)] \\
 &= \$0.40 + (\$0.80 \times 0.3 \times 0.2) \\
 &= \$0.45
 \end{aligned}$$

Thus, although earnings are expected to increase by 40 percent, the increase in the dividend would be 12.5 percent.

4.1.2. Constant Dividend Payout Ratio Policy

In this type of policy, a dividend payout ratio decided on by the company is applied to current earnings to calculate the dividend. With this type of dividend policy, dividends fluctuate with earnings in the short term. Constant dividend payout ratio policies are infrequently adopted in practice. Example 7-10 illustrates this type of policy.

EXAMPLE 7-10 Cal-Maine Foods Changes from a Stable to a Constant Dividend Payout Ratio Policy

Cal-Maine Foods, Inc. (NASDAQ: CALM) is the leading egg producer in the United States. Cal-Maine's earnings tend to be highly volatile. Demand for eggs is seasonal, typically being higher in winter than in summer. On the supply side, costs are driven, to a great extent, by corn prices that are subject to business cycle influences and are thus very volatile. In consideration of earnings volatility, Cal-Maine might have difficulty sustaining a steadily rising dividend level. Probably in view of such considerations, Cal-Maine changed its dividend policy from a stable dividend policy to a constant dividend payout ratio policy (denoted a "variable dividend policy" by management) in its fiscal year 2008. The following is the explanation by the company:

"We have paid cash dividends on our Common Stock since 1998. The annual dividend rate of \$0.05 per share of Common Stock, or \$0.0125 per quarter, was paid in each of the fiscal quarters shown in the table above, through the second quarter of fiscal 2008. We have also paid cash dividends on our Class A Common Stock at a rate equal to 95 percent of the annual rate on our Common Stock.

Effective 30 November 2007, the Company's Board of Directors approved the adoption of a variable dividend policy to replace the Company's fixed dividend policy. Commencing with the third quarter of fiscal 2008 Cal-Maine began to pay a dividend to shareholders of its Common Stock and Class A Common Stock on a quarterly basis for each quarter for which the Company reports net income computed in accordance with generally accepted accounting principles in an amount equal to one-third ($\frac{1}{3}$) of such quarterly income. The amount of the dividend payable on each share of Class A Common Stock is in an amount equal to 95 percent of the amount paid on each share of Common Stock. Dividends are paid to shareholders of record as of the sixtieth day following the last day of such quarter, and are payable on the fifteenth day following the record date. Following a quarter for which the Company does not report net income, the Company shall not pay a dividend for a subsequent profitable quarter until the Company is profitable on a cumulative basis computed from the date of the last quarter for which a dividend was paid.

Management and Board of Directors of Cal-Maine believe the variable dividend policy will more accurately reflect the results of our operations while recognizing and allowing for the cyclical nature of the egg industry."

Source: www.calmainefoods.com/.

Exhibit 7-7 shows quarterly data for fiscal years 2009 and 2008.

EXHIBIT 7-7 Earnings per Share (EPS) and Dividends per Share (DPS) for Cal-Maine Foods (Fiscal Years End 31 or 30 May)

Fiscal Period	EPS (\$)	DPS (\$)
2009:Q4	0.43	0.1438
2009:Q3	1.30	0.4322
2009:Q2	1.15	0.3817
2009:Q1	0.47	0.1570
2008:Q4	1.54	0.5138
2008:Q3	2.41	0.8038
2008:Q2	1.70	0.0125
2008:Q1	0.76	0.0125

Source: www.calmainefoods.com.

1. From the table above, identify the fiscal quarter when Cal-Maine first applied a constant dividend payout ratio policy.
2. Demonstrate that the dividend for 2009:Q4 reflects the stated current dividend policy.

Solution to 1. Cal-Maine first used that policy in the third quarter of fiscal year 2008. Until then a quarterly dividend of \$0.0125 was paid no matter what the quarterly earnings per share were. The payout ratios in all subsequent quarters round to approximately 33.3 percent.

Solution to 2. $(\text{EPS } \$0.43)/3 = \0.1433 , which differs only slightly from reported dividend of \$0.1438 (EPS are rounded to two decimal places so rounding error is expected).

4.1.3. Residual Dividend Policy

The **residual dividend policy** is an intuitively appealing dividend policy that is rarely used in practice because it typically results in highly volatile dividend payments. The residual dividend policy is based on paying out as dividends the full amount of any internally generated funds remaining after financing the current period's capital expenditures (investment in positive net present value projects) consistent with the target capital structure. A residual dividend policy presumes that equity financing comes from reinvested earnings rather than new share issuance, which is more expensive. Directing internally generated funds first to positive NPV projects is consistent with shareholder wealth maximization as is, typically, distributing to shareholders the balance that cannot be so invested. The residual dividend policy puts investment in positive NPV projects ahead of considerations of not reducing the

dividend. Under a residual dividend policy, however, dividends may swing from low or zero when capital expenditure needs are high (relative to internally generated funds) to high when the reverse situation holds. The increased uncertainty about future dividends may lead investors to require a higher rate of return on equity investment as compensation, possibly offsetting any advantages to the policy.

Exhibit 7-8 provides an illustration of the residual dividend policy. The company has earnings of €100 million, a target capital structure of 30 percent debt and 70 percent equity, and three prospective capital expenditure levels of €50 million, €100 million, and €150 million. As Exhibit 7-8 shows, $\text{Dividend} = \text{Earnings} - (\text{Capital budget} \times \text{Equity percent in capital structure})$ or zero, whichever is greater.

EXHIBIT 7-8 Residual Dividend Policy for a Target Capital Structure of 30 Percent Debt and 70 Percent Equity (€ millions)

	€50 Capital Budget	€100 Capital Budget	€150 Capital Budget
Earnings	€100	€100	€100
Capital spending	€50	€100	€150
Financed from new debt	$0.3 \times 50 = €15$	$0.3 \times 100 = €30$	$0.3 \times 150 = €45$
Financed from retained earnings	$0.7 \times 50 = €35$	$0.7 \times 100 = €70$	$(0.7 \times 150 > 100) = €100$
Financed from new equity or debt	€0	€0	€5
Residual cash flow = Residual dividend	$€100 - €35 = €65$	$€100 - €70 = €30$	$€100 - €100 = €0$
Implied payout ratio	$65/100 = 65\%$	$30/100 = 30\%$	$0/100 = 0\%$

In the final column of Exhibit 7-8, the €150 million in capital spending requires €105 million in equity ($€150 \text{ million} \times 0.70$), which is greater than the company's total earnings of €100 million. The company would probably finance the shortfall with debt, temporarily deviating from its target capital structure, rather than use more costly external equity financing.

As can be seen from Exhibit 7-8, various capital spending plans result in dramatically different implied dividend payments. Payout ratios, too, range from a zero payment of dividends under the highest capital spending plan, to a 65 percent payout ratio under the lowest capital spending plan.

To overcome the problem of volatile dividends, companies may use a long-term residual dividend approach to smooth their dividend payments. The approach would involve forecasting earnings and capital expenditures over the next 5 or 10 years, determining the resulting total amount of residual dividends for the period, which would then be paid out evenly over the forecast period. The company could also set a relatively low stable cash dividend based on the calculation and distribute a more flexible amount to shareholders in the form of share repurchases or even a special dividend, as in the Microsoft case described earlier.

EXAMPLE 7-11 Determining Dividends

1. Suppose a company has €900 million in planned capital spending (representing positive NPV projects). The company's target capital structure is 60 percent debt and 40 percent equity. Given that the company follows a residual dividend policy, the company's indicated dividend with earnings of €500 million is *closest* to:
 - A. €140 million.
 - B. €360 million.
 - C. €500 million.
2. Suppose a company has paid semiannual dividends of €3 a share over the prior two years and €2.75 for four years prior. During that six-year period, earnings and capital expenditure needs have shown considerable interim variability and dividend payout ratios have ranged from 55 to 86 percent, with an average of 65 percent. In the current six-month period, suppose that 8 million shares are issued and outstanding and that earnings are anticipated to be €28 million. The company has €5 million in planned capital spending for the six-month period (representing positive NPV projects). The company's long-term target capital structure is 50 percent debt and 50 percent equity. Based on the facts given, the *most likely* dividend per share for the current six-month period is:
 - A. €2.28.
 - B. €3.00.
 - C. €3.19.

Solution to 1. A is correct. To fund its €900 million in projects while maintaining its target debt ratio of 60 percent, the company will obtain $€900 \text{ million} \times 0.60 = €540 \text{ million}$ in new debt financing. The amount that needs to be financed by internally generated funds is $€900 \text{ million} - €540 \text{ million} = €360 \text{ million}$. Netting that amount from earnings gives $€500 \text{ million} - €360 \text{ million} = €140 \text{ million}$ that can be paid out in dividends. The solution can also be obtained as $€500 - €900 \times 0.4 = €500 - €360 = €140 \text{ million}$.

Solution to 2. B is correct. The historical description of the company's dividend payments is consistent with a stable dividend policy. The total cost of the dividend at $8 \text{ million shares} \times €3 \text{ a share} = €24 \text{ million}$ is covered by current earnings of €28 million. Just maintaining the current dividend implies a dividend payout ratio of $(€24 \text{ million}) / (€28 \text{ million}) = 85.7 \text{ percent}$, which is at the high end of the historical range. No information is provided that points to increasing the dividend.

Answer A at $€2.28 \approx €2.275 = (€28 \text{ million})(0.65) / (8 \text{ million shares})$ would be a possible value of the dividend under a target payout ratio policy, and answer C $€3.19 \approx €3.1875 = [€28 \text{ million} - 0.5(€5 \text{ million})] / (8 \text{ million shares})$ would be a possible answer under a residual dividend policy.

4.2. The Dividend versus Share Repurchase Decision

Theory concerning the dividend–share repurchase decision generally concludes that share repurchases are equivalent to cash dividends of equal amount in their effect on shareholders'

wealth, all other things being equal. Further discussion about the choice revolves around what might not “be equal” and what might cause one distribution mechanism to be preferred over the other. The use of share repurchases also may be legally restricted.³²

In general, share repurchases can be considered part of a company’s broad policy on distributing earnings to shareholders and a company may engage in share repurchases for reasons similar to those mentioned in connection with cash dividends—for example, to distribute free cash flow to equity to common shareholders. A number of additional reasons have been brought forward that apply to share repurchases, including:

- Potential tax advantages.
- Share price support/signaling that the company considers its shares a good investment.
- Added managerial flexibility.
- Offsetting dilution from employee stock options.
- Increasing financial leverage.

Potential tax advantages. In jurisdictions that tax shareholder dividends at higher rates than capital gains, share repurchases have a tax advantage over cash dividends.

Share price support/signaling that the company considers its shares a good investment. Management of a company may view its own shares as undervalued in the marketplace and hence a good investment. Although management’s stock market judgment can be just as good or bad as that of any other market participant, corporate management typically does have more information about the company’s operation and future prospects than does any outside investor or analyst. Furthermore, share repurchases via open market purchase, the dominant repurchase mechanism, allow management to time share repurchases with respect to market price. The announcement of a share repurchase program is often understood as a positive signal about the company’s prospects and attractiveness as an investment. An unexpected announcement of a meaningful share repurchase program can often have the same positive impact on share price as would a better-than-expected earnings report or similar positive event. In the days following the global stock market crash of October 1987, a number of prominent companies announced huge buybacks in an effort to halt the slide in the price of their shares and show confidence in the future. It may have been an important aspect in the stock market recovery that followed. Some investment analysts, however, take issue with the notion that initiation of share repurchases is a positive signal, because a repurchase program could mean that the company has no new profitable investment opportunities and is thus returning cash to shareholders.

Added managerial flexibility. Unlike regular cash dividends, share repurchase programs appear not to create the expectation among investors of continuance in the future. Furthermore, in contrast to an announced dividend, the announcement of a share repurchase by open market purchase does not typically create an obligation to follow through with repurchases. Additionally, the timing of share repurchases via open market activity is at managers’ discretion. Share repurchases also afford shareholders flexibility because participation is optional, which is not the case with the receipt of cash dividends.

Offsetting dilution from employee stock options. For some companies, share repurchases are used to offset the possible dilution of earnings per share that may result from the exercise of employee stock options. Whether stated or not, many companies try to repurchase at least as many shares as were issued in the exercise of stock options—even though the options are typically exercised at lower prices than the repurchase price.

³²See Vermaelen (2005) for details.

Increasing financial leverage. Another reason for repurchasing shares is to modify the company's capital structure, if greater leverage in the company's capital structure is viewed as efficient. Share repurchases increase leverage.

Among other reasons mentioned for share repurchases by corporate managers is the objective of increasing EPS. This objective is problematic for two reasons. First, even when share repurchases result in an EPS increase, the required rate of return will likely increase reflecting higher leverage. Second, according to finance theory, changing EPS by changing the number of shares outstanding does not affect shareholder wealth given that total free cash flow is unchanged.

EXAMPLE 7-12 Share Repurchase to Increase Financial Leverage

Canadian Holdings, Inc. (CHI), with debt and a debt ratio of C\$30 million and 30 percent, respectively, plans a share repurchase program involving C\$7 million or 10 percent of the market value of its common shares. What debt ratios would result from financing the repurchases using (1) cash on hand and (2) new debt?

Solution: (1) If CHI uses cash on hand to make the share repurchase the debt ratio would rise to 32 percent. (2) If CHI uses debt to finance the share repurchases, the debt ratio would increase to 37 percent. Exhibit 7-9 shows the calculations. By either means of financing the share repurchase, it increases financial leverage.³³

EXHIBIT 7-9 Estimated Impact on Capital Structure (C\$ millions)

	After Buyback					
	Before Buyback		All Cash		All Debt	
	C\$	%	C\$	%	C\$	%
Debt	\$30	30%	\$30	32%	\$37	37%
Equity (at market)	\$70	70%	\$63	68%	\$63	63%
Total Cap	\$100	100%	\$93	100%	\$100	100%

Canadian Holdings' beginning debt ratio was 30 percent. If Canadian Holdings uses borrowed funds to repurchase equity, the debt ratio at market will increase to 37 percent, which is significantly more than if it used excess cash (32 percent).

³³Note that using a ratio of net debt to capital based on net debt (defined as debt net of cash) and capital (defined as net debt plus equity), the effect of using cash or using debt in the share repurchase would be the same. The initial ratio of net debt to capital is $(30 - 7)/(23 + 70) = 25$ percent. Using cash for the share repurchase, this ratio would become $(30)/(30 + 63) = 32$ percent, and using debt in the transaction, it would also be $(37 - 7)/(30 + 63) = 32$ percent.

EXAMPLE 7-13 Siemens AG Announces Share Buyback to Achieve Target Capital Structure

On 7 November 2007, Siemens AG, a world leader in electrical and electronic equipment, reported that in order to optimize its capital structure it would repurchase shares by fiscal year end 2010 to achieve a target ratio of net industrial debt to EBITDA in the range $0.8\times - 1.0\times$. Accordingly, Siemens said it could repurchase shares in the amount up to €10 billion in several tranches. Siemens' repurchases in the first two tranches were as follows:

EXHIBIT 7-10 Share Buyback Activities, First Tranche (2008)

Month	Shares Repurchased	Average Price (€)	Total Value (€)
January	1,829,000	84.6186	154,767,464.62
February	9,579,498	88.2335	845,232,489.97
March	9,943,030	75.4019	749,723,178.63
April	3,503,013	71.4466	250,278,201.67
Sum	24,854,541	80.4682	2,000,001,334.89

Share Buyback Activities, Second Tranche (2008)

Month	Shares Repurchased	Average Price (€)	Total Value (€)
June	13,709,495	72.8857	999,225,910.57
July	14,207,169	70.3870	999,999,975.00
Sum	27,916,664	71.6141	1,999,225,885.57

Source: a1.siemens.com/investor/en/siemens_share/share_buyback_program.htm.

The company bought back about 52.77 million shares for approximately €4 billion. No further repurchases have been announced, and it is possible that Siemens has shelved the program to conserve cash in the economic downturn.

A company can use both special cash dividends and share repurchases as a supplement to regular cash dividends. These means of distributing cash are often used in years when there are large and extraordinary increases in cash flow that are not expected to continue in future years. In making these types of payments, the company essentially communicates that the distribution, like the increase in cash flow, should not be expected to continue in the future. In this context, a share repurchase is effectively an alternative to paying a special cash dividend.

Some companies initiate payouts to shareholders using share repurchases rather than cash dividends.³⁴ As with the case of a share repurchase substituting for a special cash dividend, the use of share repurchases is paid with the expectation that it will not be viewed as creating a fixed commitment.

Although all of the preceding can be the stated or unstated reasons for share repurchases, in general, share repurchases increase in volume when the economy is strong and companies have more cash. During recessions, when cash is often short, share repurchases typically fall. From the fourth quarter of 2004 to the fourth quarter of 2008, the 500 companies in the S&P 500 spent \$1.8 trillion on share repurchases as compared with \$2 trillion on capital expenditures and \$1 trillion on cash dividends. In the market crash of 2008–2009, share repurchases plummeted.³⁵ Major companies (particularly in the global financial sector) that had made large share repurchases encountered challenges to their financial viability in 2008 and 2009.

Example 7-14, in which a company's board of directors initiates a cash dividend, integrates a number of themes related to cash dividends, stock dividends (in which additional shares are distributed to shareholders instead of cash), and share repurchases.

EXAMPLE 7-14 Scottsville Instruments' Dividend Policy Decision

Scottsville Instruments, Inc., (SCII) is a U.S.-based company emerging as a leader in providing medical testing equipment to the pharmaceutical and biotechnology industries. SCII's primary markets are growing and the company is spending \$100 million a year on research and development to enhance its competitive position. SCII is highly profitable and has substantial positive free cash flow after funding positive NPV projects. During the past three years, SCII has made significant share repurchases. Subsequent to the reduction in the tax rate on cash dividends to 15 percent in the United States, the same tax rate as that on long-term capital gains, SCII management is proposing the initiation of a cash dividend. The first dividend is proposed to be an annual dividend of \$0.40 a share to be paid during the next fiscal year. Based on estimated earnings per share of \$3.20, this dividend would represent a payout ratio (DPS/EPS) of 0.125 or 12.5 percent. The proposal that will be brought before the board of directors is the following:

Proposed: Scottsville Instruments, Inc., will institute a program of cash dividends. The first dividend will be an annual dividend of \$0.40 a share, to be paid at a time to be determined during the next fiscal year. Thereafter, an annual dividend will be paid consistent with retaining funds sufficient to finance profitable capital projects.

The company's board of directors will formally consider the dividend proposal at its next meeting in one month's time. Although some directors favor the dividend

³⁴Grullon and Michaely (2002).

³⁵Grace and Curran (2009), C9.

initiation proposal, other directors, led by William Marshall, are skeptical of it. Marshall has stated:

“The initiation of a cash dividend will suggest to investors that SCII is no longer a growth company.”

As a counterproposal, Marshall has offered his support for the initiation of an annual 2 percent stock dividend. Elise Tashman, a director who is neutral to both the cash dividends and stock dividend ideas, has told Marshall the following:

“A 2 percent stock dividend will not affect the wealth of our shareholders.”

Exhibit 7-11 presents selected *pro forma* financials of SCII, if the directors approve the initiation of a cash dividend.

EXHIBIT 7-11 Scottsville Instruments, Inc., Pro Forma Financial Data Assuming Cash Dividend (\$ millions)

Income Statement		Statement of Cash Flows	
Sales	\$1,200	Cash flow from operations	\$135
Earnings before taxes	155	Cash flow from investing activities	(84)
Taxes	35	Cash flow from financing activities:	
Net income	120	Debt repayment	(4)
		Share repurchase	(32)
		Proposed dividend	(15)
		Estimated change in cash	0
Ratios		Five-Year Forecasts	
Current ratio	2.1	Sales growth	8% annually
Debt/equity (at market)	0.27	Earnings growth	11% annually
Interest coverage	10.8×	Projected cost of capital	10%
ROA	10.0%		
ROE	19.3%		
P/E	20×		
E/P	5.0%		

Using the information provided, address the following:

1. Critique Marshall's statement.
2. Justify Tashman's statement.
3. Identify and explain the dividend policy that the proposed \$0.40 a share cash dividend reflects.

Solution to 1. The following points argue against the thesis of Marshall's statement:

- As discussed in the text, dividend initiations and increases are on average associated with higher future earnings growth.
- Forecasted sales and earnings growth rates are relatively high.
- SCII still has considerable positive NPV projects available to it, as shown by the cash flow from investing activities of negative \$84 million. This fact is consistent with SCII being a company with substantial current growth opportunities.
- For the past three years SCII has been making share repurchases, so investors are already cognizant that management is distributing cash to shareholders. The initiation of a dividend as a continuation of that policy is less likely to be interpreted as an information signaling event.

Solution to 2. A stock dividend has no effect on shareholder wealth. A shareholder owns the same percentage of the company and its earnings as it did before the stock dividend. All other things being equal, the price of a stock will decline to reflect the stock dividend, but the decline will be exactly offset by the greater number of shares owned.

Solution to 3. As shown in the Statement of Cash Flows, the \$0.40 a share annual dividend reflects a total amount of \$15 million, fully using SCII's free cash flow after acceptance of positive NPV projects. The proposal brought before the board does not suggest a commitment to maintain the annual dividend at \$0.40 a share (or greater), as a stable dividend policy would typically imply. Rather, the funding of profitable capital projects will first be considered. These facts taken together are most consistent with a residual dividend policy.

4.3. Global Trends in Payout Policy

An interesting question is whether corporations are changing their dividend policies in response to changes in the economic environment and in investor preferences. In 2001, Fama and French³⁶ investigated the case of disappearing dividends in the United States. They found a large decline in the number of U.S.-based industrial companies that paid dividends from 1978 to 1998. But the aggregate payout ratio in the 1990s was about 40 percent, within the 40–60 percent range typical of the 1960–1998 period. Fama and French argued that the decline in dividends was related to the large number of relatively unprofitable companies that were assuming prominence in the stock market. DeAngelo, DeAngelo, and Skinner³⁷ extended Fama and French's argument by showing that even though fewer corporations were paying dividends, the largest 100 companies in the United States increased their inflation-adjusted dividends by 23 percent from 1978 to 2000. What appeared to be happening was the formation of two tiers of companies. The first tier is composed of approximately 100 large, extremely profitable companies that have a fairly stable payout ratio of around 42 percent. The second tier is composed of two types of nondividend payers: financially troubled, marginally profitable or money-losing companies, and/or companies related to technology in which companies typically use share repurchase as a substitute for dividends.

³⁶Fama and French (2001).

³⁷DeAngelo, DeAngelo, and Skinner (2004).

Dividend policy practices have international differences and change through time, even in one market, consistent with the catering theory of Baker and Wurgler (2004), which predicts that companies adapt their dividend policy over time to changing investor tastes.³⁸ Typically, a lower percentage of companies in a given U.S. stock market index have paid dividends than have companies in a comparable European stock market index. In addition, the following broad trends in dividend policy have been observed:

- The fraction of companies paying cash dividends has been in long-term decline in most developed markets (e.g., the United States, Canada, the European Union, the United Kingdom, and Japan).³⁹
- Since the early 1980s in the United States⁴⁰ and the early 1990s in the United Kingdom and continental Europe,⁴¹ the fraction of companies engaging in share repurchases has trended upward.

Ferris, Sen, and Unlu (2009) study dividend behavior across 25 countries and conclude that both aggregate dividend amounts as well as payout ratios have generally increased over time, although the fraction of dividend payers has decreased.⁴² (See Exhibit 7-12.)

EXHIBIT 7-12 Dividend Payout Ratios by Country and Over Time⁴³

Country	1994	1998	2001	2004	2007
Australia	0.28	0.37	0.48	0.36	0.38
Austria	0.14	0.27	0.27	0.18	0.24
Canada	0.17	0.19	19.16	0.25	0.27
Denmark	0.07	0.15	0.25	0.13	0.13
Finland	0.06	0.19	0.29	0.41	0.35
France	0.10	0.14	0.31	0.24	0.26
Germany	0.20	0.30	0.48	0.20	0.26
Hong Kong	0.33	0.58	0.32	0.32	0.39
Indonesia	0.25	0.11	0.16	0.27	0.37
Ireland	0.12	0.14	0.28	0.27	0.11
Italy	0.04	0.14	0.45	0.49	0.25

³⁸For the international evidence of catering and of international differences, see Ferris, Jayaraman, and Sabherwal (2009), 1730–1738.

³⁹See Von Eije and Megginson (2008) and references therein.

⁴⁰Important in the United States was the adoption of Securities and Exchange Commission Rule 10b-18 in 1982, which relieved companies from concerns of stock manipulation in repurchasing shares as long as companies follow certain guidelines.

⁴¹See Von Eije and Megginson (2008).

⁴²The reader should be aware that the samples for each market shown generally represent different proportions of the total market and high proportions of large cap stocks.

⁴³The data in Exhibit 7-12 are excerpted from Ferris et al. (2009), and appear as shown in the original document.

EXHIBIT 7-12 (Continued)

Country	1994	1998	2001	2004	2007
Japan	0.13	0.13	0.13	0.10	0.13
South Korea	0.03	0.05	0.10	0.10	0.12
Malaysia	0.20	0.46	0.25	0.25	0.31
Mexico	0.35	0.21	0.10	0.16	0.18
Norway	0.09	0.25	0.12	0.19	0.21
Philippines	0.05	0.08	0.13	0.13	0.25
Portugal	0.11	0.25	0.30	0.22	0.31
Singapore	0.21	0.24	0.39	0.32	0.39
South Africa	0.23	0.19	0.27	0.23	0.25
Spain	0.19	0.20	0.19	0.33	0.26
Sweden	0.09	0.22	0.72	0.37	0.37
Switzerland	0.14	0.18	0.25	0.23	0.24
United Kingdom	0.27	0.38	0.49	0.38	0.29
United States	0.21	0.20	0.30	0.20	0.20

5. ANALYSIS OF DIVIDEND SAFETY

The global recession that began in late 2007 was predicted to give rise to the largest number of dividend cuts and suspensions since the Great Depression of the 1930s.⁴⁴ Global titans, such as GE, Toyota, Barclays, UBS, and Daimler AG, cut their dividend. By mid 2009, S&P 500 dividends for U.S. companies were down by 25 percent from the prior year, British investors were predicting a worst-case decline in dividends for U.K. companies of 35 percent, and market analysts forecast similar declines for the MSCI Global Index.⁴⁵ In this section, we discuss how an analyst can form a judgment on the likelihood a company's cash dividend may be cut.

The traditional way of looking at dividend safety is the dividend payout ratio (dividends/net income) and its inverse, the dividend coverage ratio (net income/dividends). A higher dividend payout ratio or a lower dividend coverage ratio tends to indicate, all else equal, higher risk of a dividend cut. The logic is that with a relatively high dividend payout ratio, a relatively small percentage decline in earnings could cause the dividend not to be payable out of earnings.

In judging these ratios, various generalizations may be stated based on observed practice. In stating these generalizations, we emphasize that they should be confirmed for the particular market and time period being addressed.

Large mature companies typically target dividend payout ratios of 40 percent to 60 percent, so that dividend coverage ratios range from about $1.7\times$ to $2.5\times$, excluding "extra" payments. Mature companies are expected to be in this range over the course of a 5- to 10-year business cycle. Higher dividend payout ratios (or lower dividend coverage ratios) often constitute a risk factor that

⁴⁴*The Economist*, 7 March 2009, 77.

⁴⁵FT.com, "Investors fear new flood of dividend cuts," 13 May 2009.

EXAMPLE 7-15 Traditional Measures of Dividend Safety

Given the following data, calculate the dividend payout and coverage ratios:

Mature European SA	2010 FY
Net Income Available for Common Stock	EUR 100 mil.
Dividends Paid	EUR 40 mil.

Solution:

Dividend Payout Ratio	$40/100 = 40\%$
Dividend Coverage Ratio	$100/40 = 2.5\times$

a dividend may be cut if earnings decline. When a dividend coverage ratio drops to 1.0, the dividend is considered to be in jeopardy unless nonrecurring events, such as an employee strike, or a typhoon, are responsible for a temporary decline in earnings. In judging safety, qualitative pluses are awarded for companies that have had stable or increasing dividends, while minuses accrue to companies that have reduced their dividend in the past. Indeed, concerning this issue, the 1962 edition of Graham et al. stated that “[t]he absence of rate reduction in the past record is perhaps as important as the presence of numerous rate advances.”⁴⁶

The payout and coverage ratios are often compared on an industry basis when evaluating them. Fast growing industries, often with relatively new companies, are associated with no or low dividend payouts, and mature and highly regulated companies have higher payouts. In the early 1990s, technology companies were regarded as quintessential growth companies with little concern for cash dividends. As the technology industry has matured, its dividend payout has become more significant.

Free cash flow to equity (FCFE), defined earlier, represents the cash flow available for distribution as dividends after taking account of working and fixed capital expenditure needs. If those needs are ignored, distribution of dividends may be at cross purposes with shareholder wealth maximization. Cash flow (specifically free cash flow to equity), not reported net income, should be viewed as the source of cash dividend payments from that perspective. Thus, analysis of dividend safety can properly include payout and coverage ratios based on FCFE rather than net income. Other cash flow definitions besides FCFE have also been used in such ratios. Examining the correlation of dividends with cash flow measures may also provide insights.

This chapter has taken the position that payouts should be considered in terms of share repurchases as well as dividends because they both represent cash distributions to shareholders. Arguably, a comprehensive measure of dividend safety would relate FCFE to both cash dividends and share repurchases.⁴⁷

⁴⁶Graham, Dodd, Cottle, and Tatham (1962), 487.

⁴⁷See Damodaran (2001), 689–704. Damodaran actually shows the inverse, the FCFE payout ratio.

$$\text{FCFE Coverage Ratio} = \text{FCFE} / (\text{Dividends} + \text{Share Repurchases})$$

If that ratio is 1, the company is returning all available cash to shareholders. If it is significantly greater than 1, the company is improving liquidity by using funds to increase cash and/or marketable securities. A ratio significantly less than 1 is not sustainable because the company is paying out more than it can afford by drawing down existing cash/marketable securities, thereby decreasing liquidity. At some point the company will have to raise new equity.

Fundamental risk factors with regard to dividend safety include above-average financial leverage. Additional issuance of debt, whether to fund projects or to finance the dividend, may be restricted during business downturns.

Example 7-16 shows an analysis of the sustainability of the dividend of the iconic motorcycle company, Harley Davidson, Inc. The analysis includes the traditional earnings/dividend coverage approach and an alternative FCFE approach that considers total cash payouts to shareholders—dividends and share repurchases.

EXAMPLE 7-16 Harley Davidson's Coverage Ratios

Harley Davidson, Inc. (NYSE symbol HOG), produces and sells luxury motorcycles in the United States and Europe. The company has paid dividends since 1993.

EXHIBIT 7-13 Harley Davidson

Years Ending 31 December (US\$ millions)	2006	2007	2008
Net income (earnings)	\$1,043	\$934	\$655
Cash flow from operations	762	798	(685)
FCInv (capital expenditures)	220	242	332
Net borrowing	493	352	1,845
Dividends paid	213	261	302
Stock repurchases	936	1,132	249

Source: Yahoo! Finance website, 24 July 2009.

- Using the above information, calculate the following for 2006, 2007, and 2008:
 - Dividend/earnings payout ratio
 - Earnings/dividend coverage ratio
 - Free cash flow to equity (FCFE)
 - FCFE/[dividend + stock repurchase] coverage ratio
- Discuss the trend in earnings/dividend coverage as compared with the trend in FCFE/[dividend + stock repurchase] coverage.
- Comment on the sustainability of HOG's dividend and stocks repurchase policy after 2008.

Solutions to 1.

- A. Dividend/earnings payout = $213/1043 = 0.20$ or 20 percent in 2006, 0.28 or 28 percent in 2007, and 0.46 or 46 percent in 2008.
- B. Earnings/dividend coverage = $1043/213 = 4.9\times$ in 2006, $3.6\times$ in 2007, and $2.2\times$ in 2008.
- C. FCFE = Cash flow from operations (CFO) – FCInv + Net borrowing = $\$762 - \$220 + \$493 = \1035 in 2006, $\$798 - \$242 + \$352 = \908 in 2007, and $\$828$ in 2008.
- D. FCFE coverage of dividends + share repurchases = FCFE/dividends + stock repurchases = $\$1035/(\$213 + \$936) = 0.90\times$ in 2006. Similar calculations result in $0.65\times$ in 2007 and $1.50\times$ in 2008.

2. Earnings/dividend coverage declined over the three years. Still, even in 2008, accounting earnings were more than twice the amount necessary to pay the dividend. An analyst who looked at only this metric might not have suspected problems.

The FCFE coverage of both the dividend and stock repurchases was less than 1 in 2006 and 2007, indicating the company was reducing liquidity (and/or consciously electing to move to a more leveraged capital structure) by returning money to shareholders. The increase in this ratio to $1.5\times$ in 2008 was the result of net borrowings. Harley was funding almost everything (negative CFO, capital expenditures, dividends, and share buyouts) with new borrowings. Analysis of FCFE generation in 2008, showing its reliance on net borrowing, was a better indicator of problems latent in Harley's payout policies than earnings/dividend coverage.

4. Funding dividends and stock repurchases with net borrowings is a short-term proposition and not a sustainable policy. Something has to give: cut the dividend and/or curtail share repurchases.

Update: On 12 February 2009, Harley Davidson announced a cut in its quarterly dividend to \$0.10 a share, a decline of 70 percent from its old rate of \$0.33, and further announced that no stock repurchases would be made in the first quarter.

Whether based on a company's net income or free cash flow, past financial data do not always predict dividend safety. Surprise factors and other unexpected events can confound the most rigorous analysis of past data. Equity and debt markets were shaken in 2008–2009 by the losses taken by almost all U.S. and European banks. These losses led to the cutting and, in some cases, virtual elimination of cash dividends. Not all twenty-first century investors would agree with Graham and Dodd's 1962 assertion that "For the vast majority of common stocks, the dividend record and prospects have always been the most important factor controlling investment quality and value."⁴⁸ But most investors would agree that when the market even begins to suspect a decrease or suspension of a company's cash dividend, that expectation is likely to weigh unfavorably on that company's common stock valuation. Therefore, many analysts look for external stock market indicators of market expectations of dividend cuts.

⁴⁸Graham, Dodd, Cottle, and Tatham (1962), 480.

Extremely high dividend yields compared with a company's past record and current bond yields is often another warning signal that investors are predicting a dividend cut. For example, the dividend yield on General Electric shares just prior to its 68 percent dividend cut in 2008 was nearly 14 percent.⁴⁹ After the dividend cut, GE shares still yielded about 4.7 percent, relatively high compared with its yields in recent years (generally under 3 percent) and the then current 10 year T-bond yield of about 3 percent. In such cases, investors bid down the price of shares such that, after the expected cut, the expected total return on the shares was still adequate.

The observations of Madden (2008) support an attitude of caution with respect to very high dividend yields. Madden examined yields for the 1,963 stocks in the MSCI World Index.⁵⁰ His company classified 865 companies out of the 1,963 companies as a "High Dividend Universe" (HDU). In the early months of the economic decline, Madden found that 78.6 percent of the companies in the HDU had questionable ability to maintain their dividend payments as compared with 30.7 percent of all the companies in the MSCI World Index.

6. SUMMARY

The dividend policy of a company affects the form in which shareholders receive the return on their investment and is a prominent decision of a company's board of directors. This chapter has made the following points:

- There are three general theories on investor preference for dividends. The first, MM, argues that given perfect markets dividend policy is irrelevant. The "bird in hand" theory contends that investors value a dollar of dividends today more than uncertain capital gains in the future. The third theory argues that in countries in which dividends are taxed at higher rates than capital gains, taxable investors should prefer that companies reinvest earnings in growth opportunities or repurchase shares so they receive more of the return in the form of capital gains.
- An argument for dividend irrelevance given perfect markets is that the corporate dividend policy is irrelevant because shareholders can create their preferred cash flow stream by selling any company's shares ("homemade dividends").
- The clientele effect suggests that different classes of investors have differing preferences for dividend income. Those who prefer dividends will tend to invest in higher yielding shares.
- Dividend declarations may provide information to current and prospective shareholders regarding the prospects of the company. Initiating a dividend or increasing a dividend sends a positive signal, whereas cutting a dividend or omitting a dividend typically sends a negative signal.
- Payment of dividends can help reduce the agency conflicts between managers and shareholders, but can worsen conflicts of interest between shareholders and debt holders.
- Empirically, several factors appear to influence dividend policy, including investment opportunities for the company, the volatility expected in its future earnings, financial flexibility, tax considerations, flotation costs, and contractual and legal restrictions.
- Under double taxation systems, dividends are taxed at both the corporate and shareholder level. Under tax imputation systems, a shareholder receives a credit on dividends for the tax

⁴⁹Glader, Laise, and Browning (2009), A1.

⁵⁰Madden (2008), 42–44.

paid on corporate profits. Under split-rate taxation systems, corporate profits are taxed at different rates depending on whether the profits are retained or paid out in dividends.

- Companies with outstanding debt often are restricted in the amount of dividends they can pay because of debt covenants and legal restrictions. Some institutions require that a company pay a dividend to be on their “approved” list. If a company funds capital expenditures by borrowing while paying earnings out in dividends, it will incur flotation costs on new issues.
- Using a stable dividend policy, a company tries to align its dividend growth rate to the company’s long-term earnings growth rate. Dividends may increase even in years when earnings decline, and dividends will increase at a lower rate than earnings in boom years.
- According to Lintner (1956), the stable dividend policy can be represented by a gradual adjustment process in which the expected dividend is equal to last year’s dividend per share, plus [(this year’s expected increase in earnings per share) \times (the target payout ratio) \times (an annual adjustment factor)].
- Using a constant dividend payout ratio policy, a company applies a target dividend payout ratio to current earnings; therefore, dividends are more volatile than with a stable dividend policy.
- In a residual dividend policy, the amount of the annual dividend is equal to annual earnings minus the capital budget times the percent of the capital budget to be financed through retained earnings or zero, whichever is greater. An advantage of this policy is that positive NPV opportunities have the first priority in the use of earnings.
- Companies can repurchase shares in lieu of increasing cash dividends. Share repurchases usually offer more flexibility than cash dividends by not establishing the expectation that a particular level of cash distribution will be maintained.
- Companies can pay regular cash dividends supplemented by share repurchases. In years of extraordinary increases in earnings, share repurchases can substitute for special cash dividends.
- Share repurchases can signal that company officials think their shares are undervalued. On the other hand, share repurchases could send a negative signal that the company has few positive NPV opportunities.
- The issue of dividend safety deals with how safe a company’s dividend actually is, specifically whether the company’s earnings and, more importantly, its cash flow are sufficient to sustain the payment of the dividend.
- Early warning signs of whether a company can sustain its dividend include the level of dividend yield, whether the company borrows to pay the dividend, and the company’s past dividend record.

PROBLEMS

1. Match the phrases in Column A with the corresponding dividend theory in Column B. Note that you may use the answers in Column B more than once.

Column A	Column B
1. Bird in the hand	a) dividend policy matters
2. Homemade dividends	b) dividend policy is irrelevant
3. High tax rates on dividends	

2. Which of the following assumptions is *not* required for Miller and Modigliani's (MM) dividend theory?
 - A. There are no taxes.
 - B. Investors sort themselves into dividend clienteles.
 - C. Shareholders have no transaction costs when buying and selling shares.
3. The clientele effect implies that:
 - A. investors prefer high dividend paying shares.
 - B. investors have varying preferences regarding dividends.
 - C. low tax bracket investors are indifferent to dividends.
4. Sophie Chan owns 100,000 shares of PAT Company. PAT is selling for €40 per share, so her investment is worth €4,000,000. Chan reinvests the gross amount of all dividends received to purchase additional shares. Assume that the clientele for PAT shares consists of tax-exempt investors. If PAT pays a €1.50 dividend, Chan's new share ownership after reinvesting dividends at the ex-dividend price would be *closest* to:
 - A. 103,600.
 - B. 103,750.
 - C. 103,900.
5. Which of the following is *most likely* to signal negative information concerning a company?
 - A. Share repurchase.
 - B. Decrease in the quarterly dividend rate.
 - C. A two-for-one stock split.
6. WL Corporation is located in a jurisdiction that has a 40% corporate tax rate on pretax income and a 30% personal tax rate on dividends. WL distributes all its after-tax income to shareholders. What is the effective tax rate on WL pretax income distributed in dividends?
 - A. 42%.
 - B. 58%.
 - C. 70%.
7. Which of the following factors would *not* tend to be associated with a company having a low dividend payout ratio?
 - A. Low growth prospects.
 - B. High tax rates on dividends.
 - C. High flotation costs on new equity issues.
8. The dividend policy of Berkshire Gardens Inc. can be represented by a gradual adjustment to a target dividend payout ratio. Last year Berkshire had earnings per share of \$3.00 and paid a dividend of \$0.60 a share. This year it estimates earnings per share will be \$4.00. Find its dividend per share for this year if it has a 25% target payout ratio and uses a five-year period to adjust its dividend.
 - A. \$0.65.
 - B. \$0.80.
 - C. \$0.85.

9. The Apex Corp. has a target debt/equity ratio of 40/60. Its capital budget for next year is estimated to be \$40 million. Estimated net income is \$30 million. If Apex follows a residual dividend policy, its dividend is expected to be:
- \$6 million.
 - \$12 million.
 - \$18 million.
10. Beta Corporation is a manufacturer of inflatable furniture. Which of the following scenarios *best* reflects a stable dividend policy for Beta?
- Maintaining a constant dividend payout ratio of 40–50%.
 - Maintaining the dividend at \$1.00 a share for several years given no change in Beta's long-term prospects.
 - Increasing the dividend 5% a year over several years to reflect the two years in which Beta recognized mark-to-market gains on derivative positions.
11. Investors may prefer companies that repurchase their shares instead of paying a cash dividend when:
- capital gains are taxed at lower rates than dividends.
 - capital gains are taxed at the same rate as dividends.
 - the company needs more equity to finance capital expenditures.

The following information relates to Questions 12–14.

Janet Wu is treasurer of Wilson Paper Company, a manufacturer of paper products for the office and school markets. Wilson Paper is selling one of its divisions for \$70 million cash. Wu is considering whether to recommend a special dividend of \$70 million or a repurchase of 2 million shares of Wilson common stock in the open market. She is reviewing some possible effects of the buyback with the company's financial analyst. Wilson has a long-term record of gradually increasing earnings and dividends. Wilson's board has also approved capital spending of \$15 million to be entirely funded out of this year's earnings.

Book value of equity	\$750 million (\$30 a share)
Shares outstanding	25 million
12-month trading range	\$25–\$35
Current share price	\$35
After-tax cost of borrowing	7%
Estimated full year earnings	\$25 million
Last year's dividends	\$9 million
Target debt/equity (market value)	35/65

12. In investors' minds, Wilson's share buyback could be a signal that the company:
- is decreasing its financial leverage.
 - views its shares as undervalued in the marketplace.
 - has more investment opportunities than it could fund internally.

-
13. Assume that Wilson Paper funds its capital spending out of its estimated full year earnings. If Wilson uses a residual dividend policy, determine Wilson's implied dividend payout ratio:
- A. 36%.
 - B. 40%.
 - C. 60%.
14. The *most likely* tax environment in which Wilson Paper's shareholders would prefer that Wilson repurchase its shares (share buybacks) instead of paying dividends is one in which:
- A. the tax rate on capital gains and dividends is the same.
 - B. capital gains tax rates are higher than dividend income tax rates.
 - C. capital gains tax rates are lower than dividend income tax rates.

CHAPTER 8

WORKING CAPITAL MANAGEMENT

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LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- Describe primary sources of liquidity and factors that influence a company's liquidity position.
- Compare a company's liquidity measures with those of peer companies.
- Evaluate working capital effectiveness of a company based on its operating and cash conversion cycles, and compare the company's effectiveness with that of peer companies.
- Explain the effect of different types of cash flows on a company's net daily cash position.
- Identify and evaluate the necessary tools to use in managing a company's net daily cash position.
- Calculate and interpret comparable yields on various securities, compare portfolio returns against a standard benchmark, and evaluate a company's short-term investment policy guidelines.
- Evaluate a company's management of accounts receivable, inventory, and accounts payable over time and compared to peer companies.
- Evaluate the choices of short-term funding available to a company and recommend a financing method.

1. INTRODUCTION

The focus of this chapter is on the short-term aspects of corporate finance activities collectively referred to as **working capital management**. The goal of effective working capital management is to ensure that a company has adequate ready access to the funds necessary for day-to-day operating expenses, while at the same time making sure that the company's assets are invested in the most productive way. Achieving this goal requires a balancing of concerns. Insufficient access to cash could ultimately lead to severe restructuring of a company by selling off assets, reorganization via bankruptcy proceedings, or final liquidation of the company. On the other hand, excessive investment in cash and liquid assets may not be the best use of company resources.

Effective working capital management encompasses several aspects of short-term finance: maintaining adequate levels of cash, converting short-term assets (i.e., accounts receivable and inventory) into cash, and controlling outgoing payments to vendors, employees, and others. To do this successfully, companies invest short-term funds in working capital portfolios of short-dated, highly liquid securities, or they maintain credit reserves in the form of bank lines of credit or access to financing by issuing commercial paper or other money market instruments.

Working capital management is a broad-based function. Effective execution requires managing and coordinating several tasks within the company, including managing short-term investments, granting credit to customers and collecting on this credit, managing inventory, and managing payables. Effective working capital management also requires reliable cash forecasts, as well as current and accurate information on transactions and bank balances.

Both internal and external factors influence working capital needs; we summarize them in Exhibit 8-1.

EXHIBIT 8-1 Internal and External Factors that Affect Working Capital Needs

Internal Factors	External Factors
<ul style="list-style-type: none"> • Company size and growth rates • Organizational structure • Sophistication of working capital management • Borrowing and investing positions/activities/capacities 	<ul style="list-style-type: none"> • Banking services • Interest rates • New technologies and new products • The economy • Competitors

The scope of working capital management includes transactions, relations, analyses, and focus:

- Transactions include payments for trade, financing, and investment.
- Relations with financial institutions and trading partners must be maintained to assure that the transactions work effectively.
- Analyses of working capital management activities are required so that appropriate strategies can be formulated and implemented.
- Focus requires that organizations of all sizes today must have a global viewpoint with strong emphasis on liquidity.

In this chapter, we examine the different types of working capital and the management issues associated with each. We also look at methods of evaluating the effectiveness of working capital management.

2. MANAGING AND MEASURING LIQUIDITY

Liquidity is the extent to which a company is able to meet its short-term obligations using assets that can be readily transformed into cash. When we evaluate the liquidity of an asset, we focus on two dimensions: the type of asset and the speed at which the asset can be converted to cash, either by sale or financing. Unlike many aspects of corporate finance, corporate liquidity management does not involve a great deal of theory or generally accepted principles. For companies that have the luxury of large excesses of cash, liquidity is typically taken for granted, and the focus is on putting the excess liquidity to its most productive use. On the other hand, when a company faces tighter financial situations, it is important to have effective liquidity management to ensure solvency. Unfortunately, this recognition comes too late for some companies, with bankruptcy and possible liquidation representing the company's final choice.

2.1. Defining Liquidity Management

Liquidity management refers to the ability of an organization to generate cash when and where it is needed. Liquidity refers to the resources available for an entity to tap into cash balances and to convert other assets or extend other liabilities into cash for use in keeping the entity solvent (i.e., being able to pay bills and continue in operation). For the most part, we associate liquidity with short-term assets and liabilities, yet longer-term assets can be converted into cash to provide liquidity. In addition, longer-term liabilities can also be renegotiated to reduce the drain on cash, thereby providing liquidity by preserving the limited supply of cash. Of course, the last two methods may come at a price as they tend to reduce the company's overall financial strength.

The challenges of managing liquidity include developing, implementing, and maintaining a liquidity policy. To do this effectively, a company must manage all of its key sources of liquidity efficiently. These key sources may vary from company to company, but they generally include the primary sources of liquidity, such as cash balances, and secondary sources of liquidity, such as selling assets.

2.1.1. Primary Sources of Liquidity

Primary sources of liquidity represent the most readily accessible resources available. They may be held as cash or as near-cash securities. Primary sources include:

- Ready cash balances, which is cash available in bank accounts, resulting from payment collections, investment income, liquidation of near-cash securities (i.e., those with maturities of less than 90 days), and other cash flows.
- Short-term funds, which may include items such as trade credit, bank lines of credit, and short-term investment portfolios.
- Cash flow management, which is the company's effectiveness in its cash management system and practices, and the degree of decentralization of the collections or payments processes. The more decentralized the system of collections, for example, the more likely the company will be to have cash tied up in the system and not available for use.

These sources represent liquidity that is typical for most companies. They represent funds that are readily accessible at relatively low cost.

2.1.2. Secondary Sources of Liquidity

The main difference between the primary and secondary sources of liquidity is that using a primary source is not likely to affect the normal operations of the company, whereas using a secondary source may result in a change in the company's financial and operating positions. Secondary sources include:

- Negotiating debt contracts, relieving pressures from high interest payments or principal repayments.
- Liquidating assets, which depends on the degree to which short-term and/or long-term assets can be liquidated and converted into cash without substantial loss in value.
- Filing for bankruptcy protection and reorganization.

Use of secondary sources may signal a company's deteriorating financial health and provide liquidity at a high price—the cost of giving up a company asset to produce emergency cash. The last source, reorganization through bankruptcy, may also be considered a liquidity tool because a company under bankruptcy protection that generates operating cash will be liquid and generally able to continue business operations until a restructuring has been devised and approved.

2.1.3. Drags and Pulls on Liquidity

Cash flow transactions—that is, cash receipts and disbursements—have significant effects on a company's liquidity position. We refer to these effects as drags and pulls on liquidity. A **drag on liquidity** is when receipts lag, creating pressure from the decreased available funds; a **pull on liquidity** is when disbursements are paid too quickly or trade credit availability is limited, requiring companies to expend funds before they receive funds from sales that could cover the liability.

Major drags on receipts involve pressures from credit management and deterioration in other assets and include:

- *Uncollected receivables.* The longer these are outstanding, the greater the risk that they will not be collected at all. They are indicated by the large number of days of receivables and high levels of bad debt expenses. Just as the drags on receipts may cause increased pressures on working capital, pulls on outgoing payments may have similar effects.
- *Obsolete inventory.* If inventory stands unused for long periods, it may be an indication that it is no longer usable. Slow inventory turnover ratios can also indicate obsolete inventory. Once identified, obsolete inventory should be attended to as soon as possible in order to minimize storage and other costs.
- *Tight credit.* When economic conditions make capital scarcer, short-term debt becomes more expensive to arrange and use. Attempting to smooth out peak borrowings can help blunt the impact of tight credit as can improving the company's collections.

In many cases, drags may be alleviated by stricter enforcement of credit and collection practices.¹

¹In a recent survey of CFOs, companies have become more efficient in working capital management, with U.S. companies in 2005 reducing their investment in working capital by 2.5 percent from 2004 levels and European companies reducing their investment by 3.3 percent (REL 2005 CFO Survey, www.relconsult.com).

However, managing the cash outflows may be as important as managing the inflows. If suppliers and other vendors who offer credit terms perceive a weakened financial position or are unfamiliar with a company, they may restrict payment terms so much that the company's liquidity reserves are stretched thin. Major pulls on payments include:

- *Making payments early.* By paying vendors, employees, or others before the due dates, companies forgo the use of funds. Effective payment management means not making early payments. Payables managers typically hold payments until they can be made by the due date.
- *Reduced credit limits.* If a company has a history of making late payments, suppliers may cut the amount of credit they will allow to be outstanding at any time, which can squeeze the company's liquidity. Some companies try to extend payment periods as long as possible, disregarding the possible impact of reduced credit limits.
- *Limits on short-term lines of credit.* If a company's bank reduces the line of credit it offers the company, a liquidity squeeze may result. Credit line restrictions may be government-mandated, market-related, or simply company-specific. Many companies try to avert this situation by establishing credit lines far in excess of what they are likely to need. This "over-banking" approach is often commonplace in emerging economies or even in more-developed countries where the banking system is not sound and the economy is shaky.
- *Low liquidity positions.* Many companies face chronic liquidity shortages, often because of their particular industry or from their weaker financial position. The major remedy for this situation is, of course, to improve the company's financial position, or else the company will be heavily affected by interest rates and credit availability. Most companies facing this situation have to deal with secured borrowing to obtain any working capital funds. Therefore, it is important for these companies to identify assets that can be used to help support the company's short-term borrowing activities.

It is critical that these drags and pulls be identified as soon as possible, often when they have not yet happened or have just arisen.

2.2. Measuring Liquidity

Liquidity contributes to a company's creditworthiness. **Creditworthiness** is the perceived ability of the borrower to pay what is owed on the borrowing in a timely manner and represents the ability of a company to withstand adverse impacts on its cash flows. Creditworthiness allows the company to obtain lower borrowing costs and better terms for trade credit and contributes to the company's investment flexibility, enabling it to exploit profitable opportunities.

The less liquid the company, the greater the risk it will suffer financial distress or, in the extreme case, insolvency or bankruptcy. Because debt obligations are paid with cash, the company's cash flows ultimately determine solvency. The immediate source of funds for paying bills is cash on hand, proceeds from the sale of marketable securities, or the collection of accounts receivable. Additional liquidity also comes from inventory that can be sold and thus converted into cash either directly through cash sales or indirectly through credit sales (i.e., accounts receivable).

There is, however, some point at which a company may have too much invested in low-and nonearning assets. Cash, marketable securities, accounts receivable, and inventory represent a company's liquidity. However, these investments are low earning relative to the long-term, capital investment opportunities that companies may have available.

Various financial ratios can be used to assess a company's liquidity as well as its management of assets over time. Here we will look at some of these ratios in a little more detail.

We calculate **liquidity ratios** to measure a company's ability to meet short-term obligations to creditors as they mature or come due. This form of liquidity analysis focuses on the relationship between current assets and current liabilities and the rapidity with which receivables and inventory can be converted into cash during normal business operations.

In short-term financial management, a great deal of emphasis is placed on the levels of and changes in current assets and liabilities. The two most common measurements are the current ratio and the quick ratio. The **current ratio** is the ratio of current assets to current liabilities:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

The **quick ratio** (also known as the **acid test ratio**) is the ratio of the quick assets to current liabilities. **Quick assets** are those assets that can be most readily converted to cash. In most situations, the least liquid of the current assets is inventory. Hence, we typically exclude inventory when calculating the quick ratio:

$$\text{Quick ratio} = \frac{\text{Cash} + \text{Short-term marketable investments} + \text{Receivables}}{\text{Current liabilities}}$$

The greater the current ratio or the quick ratio (that is, the greater the potential ability to cover current liabilities), the higher a company's liquidity. Whether a given current or quick ratio is good or bad, however, depends on a number of factors, including the trend in these ratios, the comparability of these ratios with competitors, and the available opportunities in more-profitable, long-lived, capital investments.

In addition to looking at the relations among these balance sheet accounts, we can also form ratios that measure how well key current assets are managed over time. The key ratios for asset management are turnover ratios. For example, the **accounts receivable turnover** is the ratio of sales on credit to the average balance in accounts receivable:²

$$\text{Accounts receivable turnover} = \frac{\text{Credit sales}}{\text{Average receivables}}$$

This ratio is a measure of how many times, on average, accounts receivable are created by credit sales and collected on during the fiscal period. As another example, the **inventory turnover** is the ratio of the cost of goods sold to the balance in inventory:

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

This ratio is a measure of how many times, on average, inventory is created or acquired and sold during the fiscal period.

Another perspective on the activity within the current accounts is to estimate the number of days of the current asset or liability that are on hand. For example, the **number of days of**

²You will notice that we use credit sales instead of total revenue; the difference lies in the context. Within the context of working capital management, the corporate financial analyst would have access to details regarding the company's credit versus cash sales. For some companies, sales may be for cash or be some combination of cash sales and credit sales. For the analyst who is looking at the company without benefit of internal information regarding how much of sales is in the form of credit sales, an approximation is generally used based on industry norms for credit practices.

receivables, also referred to as the **day's sales outstanding** and **days in receivables**, gives us an idea of the management of the extension and collection of credit to customers:

$$\text{Number of days of receivables} = \frac{\text{Accounts receivable}}{\text{Average day's sales on credit}} = \frac{\text{Accounts receivable}}{\text{Sales on credit}/365}$$

For example, if this number of days is 35.5, this tells us that it takes, on average, 35.5 days to collect on the credit accounts. Whether this is good or bad depends on credit terms that are offered to customers and the relation between sales and the extension of credit, which is often dictated by industry customs and competitive pressures.

The **number of days of inventory** gives us an indication of how well the inventory acquisition, process, and distribution is managed:

$$\text{Number of days of inventory} = \frac{\text{Inventory}}{\text{Average day's cost of goods sold}} = \frac{\text{Inventory}}{\text{Cost of goods sold}/365}$$

The number of days of inventory, also known as the **average inventory period**, **day's sales in ending inventory**, and the **inventory holding period**, is the length of time, on average, that the inventory remains within the company during the fiscal period. We expect variation in the number of days of inventory among industries because of differences in the production cycle of different types of inventory. For example, we expect a grocery store to have a lower number of days inventory than, say, an aircraft manufacturer.

We can also look at the disbursement side of cash flows with the **number of days of payables**, which provides a measure of how long it takes the company to pay its own suppliers:

$$\text{Number of days of payables} = \frac{\text{Accounts payable}}{\text{Average day's purchases}} = \frac{\text{Accounts payable}}{\text{Purchases}/365}$$

The number of days of payables is also referred to as the **day's payables outstanding** and the **average day's payable**. Purchases are not an item on published financial statements, so if you are evaluating a company's payables, you can estimate the purchases by using what you know about the company's cost of goods sold and beginning and ending balances in inventory.³

Each of these turnover ratios and numbers of days helps tell a story of how the company is managing its liquid assets. Like all ratios, the numbers themselves do not indicate much, but when we put these together with trends, information on the company's profitability, and information about competitors, we develop a good understanding of a company's performance.⁴

Some of the major applications of this type of analysis include performance evaluation, monitoring, creditworthiness, and financial projections. But ratios are useful only when they

³We know that Beginning inventory + Purchases – Cost of good sold = Ending inventory. Therefore, if we know the inventory balances (from the balance sheet) and the cost of goods sold (from the income statement), we can determine the purchases: Purchases = Cost of goods sold + Ending inventory – Beginning inventory.

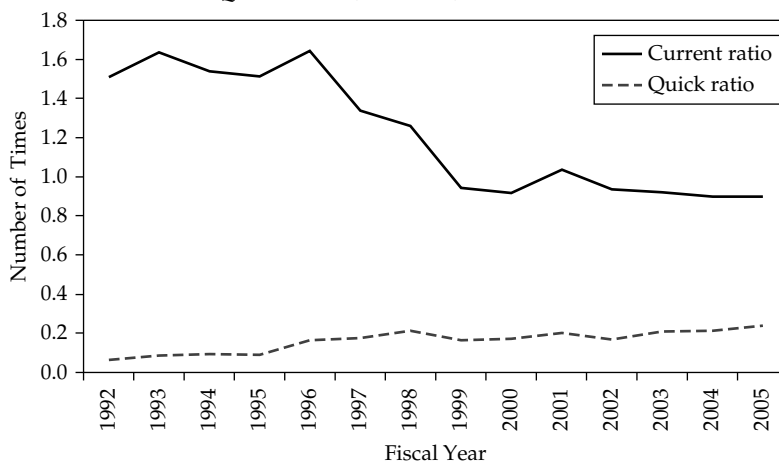
⁴For example, if we see a small number of days of inventory, it could mean that the company is managing its production very efficiently or it could mean that the company is at significant risk of a shortage of inventory. We don't know more until we look at what is needed or usual for companies in the industry, trends in turnover for the company, and the company's profitability in relation to the number of days of inventory.

can be compared. The comparison should be done in two ways—comparisons over time for the same company and over time for the company compared with its peer group. Peer groups can include competitors from the same industries as the company as well as other companies with comparable size and financial situations.

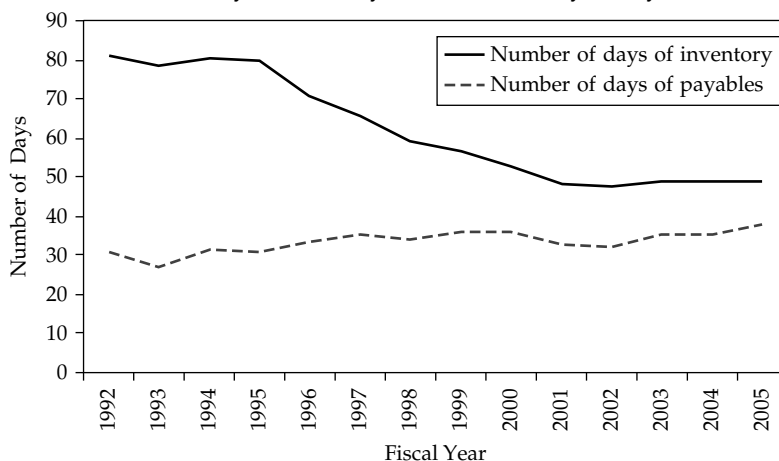
Consider Wal-Mart Stores, Inc. We can see the change in the current ratio and quick ratio over the fiscal years 1992 through 2005 in Exhibit 8-2, Panel A. Here, we see that the current ratio has declined, yet the quick ratio has increased slightly. We can see what is driving these trends in Panel B of this exhibit. One driver is the efficiency in the management of inventory, which results in holding on to inventory fewer days, as indicated by the downward trend in the number of days of inventory. Putting it in perspective, this trend may be because of, in part, the product shift when Wal-Mart Stores increased its presence in the grocery line of business. Another driver is the increasing number of days of payables, which means that company is taking longer to pay what it owes suppliers.

EXHIBIT 8-2 Liquidity Analysis of Wal-Mart Stores

Panel A: Current and Quick Ratios (1992–2005)



Panel B: Number of Days of Inventory and Number of Days of Payables



Source: Wal-Mart Stores, Inc., 10-K filings, various years.

Comparing Wal-Mart with Target, Inc., and Kohl's in the 2005 fiscal year, as shown in Exhibit 8-3, we see differences among these three competitors. These differences may be explained, in part, by the different product mixes (e.g., Wal-Mart has more sales from grocery lines than the others), as well as different inventory management systems and different inventory suppliers. The different need for liquidity may also be explained, in part, by the different operating cycles of the companies.

EXHIBIT 8-3 Liquidity Ratios among Discount Retailers

Ratio for 2005 fiscal year	Company		
	Wal-Mart	Target	Kohl's
Current ratio	0.9	1.5	2.4
Quick ratio	0.2	0.9	1.2
Number of days of inventory	48.9	61.0	94.5
Number of days of payables	38.1	64.7	33.9

Source: Company 10-K filings with Securities and Exchange Commission for fiscal year 2005.

EXAMPLE 8-1 Measuring Liquidity

Given the following ratios, how well has the company been managing its liquidity for the past two years?

Ratio	Current Year		Past Year	
	Company	Industry	Company	Industry
Current ratio	1.9	2.5	1.1	2.3
Quick ratio	0.7	1.0	0.4	0.9
Number of days of receivables	39.0	34.0	44.0	32.5
Number of days of inventory	41.0	30.3	45.0	27.4
Number of days of payables	34.3	36.0	29.4	35.5

Solution. The ratios should be compared in two ways—over time (there would typically be more than two years' worth of data) and against the industry averages. In all ratios shown here, the current year shows improvement over the previous year in terms of increased liquidity. In each case, however, the company remains behind the industry average in terms of liquidity. A brief snapshot such as this example could be the starting point to initiate or encourage more improvements with the goal of reaching or beating the industry standards.

We can combine the number of days of inventory, number of days of receivables, and number of days of payables to get a sense of the company's operating cycle and net operating cycle. The **operating cycle** is a measure of the time needed to convert raw materials into cash from a sale. It consists of the number of days of inventory and the number of days of receivables:

$$\text{Operating cycle} = \frac{\text{Number of days}}{\text{of inventory}} + \frac{\text{Number of days}}{\text{of receivables}}$$

The operating cycle does not take everything into account, however, because the available cash flow is increased by deferring payment to suppliers. This deferral is considered in the **net operating cycle**, also called the **cash conversion cycle**. The net operating cycle is a measure of the time from paying suppliers for materials to collecting cash from the subsequent sale of goods produced from these supplies. It consists of the operating cycle minus the number of days of payables:

$$\text{Net operating cycle} = \frac{\text{Number of days}}{\text{of inventory}} + \frac{\text{Number of days}}{\text{of receivables}} - \frac{\text{Number of days}}{\text{of payables}}$$

In general, the shorter these cycles the greater a company's cash-generating ability and the less its need for liquid assets or outside finance. For many companies, the cash conversion cycle represents a period of time that requires financing; that is, the company offsets some of the financing need by deferring payments through payables terms, but the remainder must be financed.

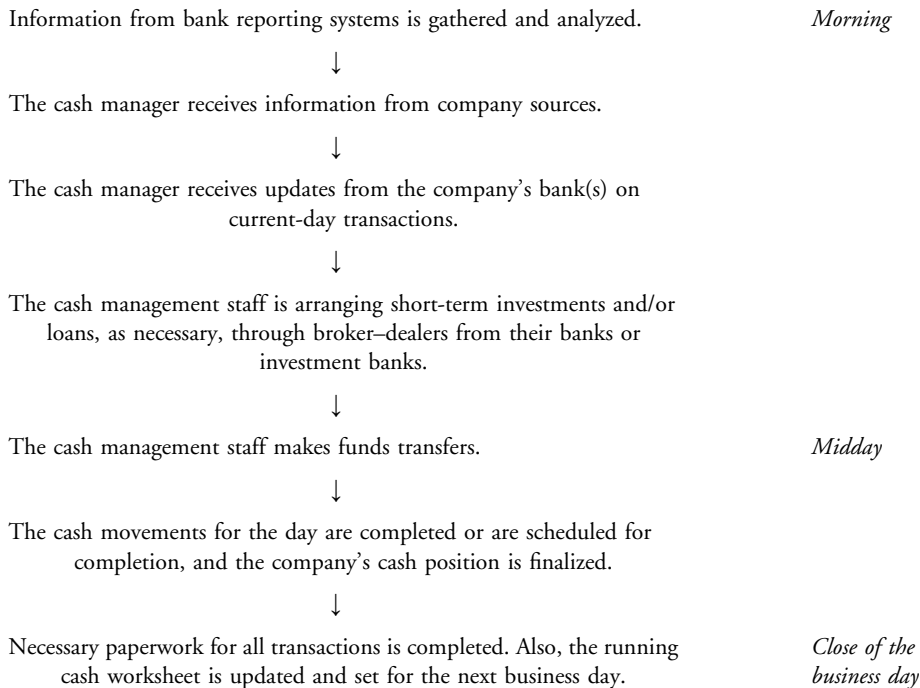
3. MANAGING THE CASH POSITION

Although the mix or magnitude of data items may change from day to day, the goal is the same: assuring that the net cash position is not negative. Ideally, the company's daily cash inflows and outflows would be equal, but this is rarely the case. Without the reliability of matching these flows, companies must take other steps to ensure that the flows net out each day. Most companies try to avoid negative balances because the cost of garnering daily funds by issuing debt or by drawing on bank overdraft facilities is very costly, although the cost of maintaining a small short-term investment portfolio, in terms of an opportunity cost, is regarded as an acceptable cost of doing business.

In addition, it is difficult to borrow the exact amount needed, so many companies borrow a little extra to be safe and invest any small excesses overnight at lower rates than if they could invest them earlier or in securities with higher rates. To manage the cash position effectively, the treasury function, which is usually responsible for this activity, must gather information from various sources at all times during the day, making decisions based on the latest information.

Several critical factors help determine how a company can establish an efficient cash flow system. In most cases, the central treasury function may not be able to dictate how the company collects from customers or pays its vendors. What it can do, however, is use the best services and techniques associated with the company's payment configuration.

As an example of a typical cycle of cash management information that occurs daily, consider the process outlined in Exhibit 8-4. This hypothetical schedule shows how important it is to have an efficient, smooth-flowing information system that can meet the time requirements.

EXHIBIT 8-4 An Example of the Daily Cycle of Cash Management**3.1. Forecasting Short-Term Cash Flows**

Forecasting cash flows is necessary to allow effective management of working capital accounts. For cash forecasting to be effective, it has to be relatively precise. However, a forecast that is precise may not be *accurate*. There are many factors that are outside of the company's control, such as the general economy, unexpected raw material shortages, and changing interest rates. The uncertainty in forecasting encourages companies to maintain some minimum level of cash on hand as a buffer.

3.1.1. Minimum Cash Balances

Most companies want a cash buffer as protection from unexpected cash needs or to provide the financial flexibility to take advantage of attractive opportunities, such as procuring raw material inventory at a discount. This buffer is often expressed as a minimum desired cash balance. The size of this buffer depends on several influences, including the variation in the levels of the company's cash inflows and outflows, the company's ability to access other liquidity sources, and the company's ability to access borrowing facilities with little lead time.

3.1.2. Identifying Typical Cash Flows

Having an accurate forecast can help a financial manager make better use of the company's financial history. Many product lines, especially those that are not in high-growth stages but

rather are in steadier, mature stages, will have similar cash flows from year to year or season to season. If an extensive database has been established, it will be possible to draw reasonable projections for the current period or longer.

Even in cases of heavy growth through mergers and acquisitions, companies should try to transfer the acquired company's cash flow history to be used as a starting point for consolidating the new operation into the rest of the company. The cash manager must identify cash flow elements to build a reliable forecast. These elements are not difficult to identify in general terms, but it is much harder to define them more specifically to be able to collect data regularly.

The cash elements that comprise a total forecast vary from company to company. However, it is good practice to identify the elements that pertain to any one individual company. Exhibit 8-5 shows typical elements arranged as inflows and outflows. It may be more useful to try to arrange the elements in this manner—that is, show matching elements by the direction of their flow (in or out). In most cases, a company's data elements can be arranged this way to facilitate data gathering, reviewing variances, and presenting final reports to management and other cash users or providers.

EXHIBIT 8-5 Examples of Cash Inflows and Outflows

Inflows	Outflows
<ul style="list-style-type: none"> • Receipts from operations, broken down by operating unit, departments, etc. • Funds transfers from subsidiaries, joint ventures, third parties. • Maturing investments. • Debt proceeds (short and long term). • Other income items (interest, etc.). • Tax refunds. 	<ul style="list-style-type: none"> • Payables and payroll disbursements, broken down by operating unit, departments, and so forth. • Funds transfers to subsidiaries. • Investments made. • Debt repayments. • Interest and dividend payments. • Tax payments.

These elements should reflect real cash flows, excluding such items as depreciation or accruals that are paid at a later date (these should be included when they are to be paid).

3.1.3. Cash Forecasting Systems

Cash forecasting should be structured as a system in order to be effective, and to do this, several aspects of the forecast must be considered. We provide some examples of these aspects in Exhibit 8-6, which highlights each aspect for three different forecast horizons. In some cases, one aspect may be more important than others. For instance, if daily cash is being handled fairly easily, it may be more critical to spend time and resources to assure that the medium-term forecasting part of the overall system is functioning at the highest levels of reliability. In addition, some factors, such as format or time horizon, should not be changed arbitrarily because change may affect their accuracy and reliability levels.

EXHIBIT 8-6 Examples of Cash Forecasting Aspects over Different Forecast Horizons

	Short Term	Medium Term	Long Term
Data frequency	Daily/weekly for 4–6 weeks	Monthly for one year	Annually for 3–5 years
Format	Receipts and disbursements	Receipts and disbursements	Projected financial statements
Techniques	Simple projections	Projection models and averages	Statistical models
Accuracy	Very high	Moderate	Lowest
Reliability	Very high	Fairly high	Not as high
Uses	Daily cash management	Planning financial transactions	Long-range financial position

3.2. Monitoring Cash Uses and Levels

Another facet of cash forecasting is monitoring and control. Managing the cash position essentially means keeping a “running score” on daily cash flows. Monitoring daily cash flows is a key aspect of a company’s cash forecasting system in that the financial manager in charge of managing the cash position must know the company’s cash balance in the bank on virtually a real-time basis. However, it really is not *forecasting* as such, because most of the transactions are actually known; the challenge lies in the collection of this known information in time to do something with that information. For example, receiving information about a deposit too late to transfer the funds renders the information valueless.

To receive the appropriate information on a timely basis, information should be gathered from principal users and providers of cash, supplemented by short-term cash projections in days or even throughout the current day. The minimum level of cash available is estimated in advance, adjusted for known funds transfers, seasonality, or other factors, and is used as a **target balance** figure for each bank. Note that most companies use one major bank as their lead bank (or concentration bank) and control the balances for the bank through one main concentration account, with the target balance applied to the main account. For larger companies, more than one concentration bank is possible, but managing the cash positions in multiple concentration banks quickly makes the system complex and requires an efficient information processing system.

For most companies, it is necessary to manage a cash position with the assistance of short-term investments and borrowings. These short-term liquidity sources help counter the excesses and deficits that typically occur in a company’s cash flow. The short-term investments are usually kept in a portfolio that is very liquid, with short maturities. In this way, funds are available whenever they are needed, but the company gives up the extra yield that might have been earned if the investments were made for longer periods of time or with securities with less liquidity. Short-term borrowing is for very short periods of time, but a borrower may find more economies in borrowing for regular periods, such as 30 days, to reduce the number of transactions and associated paperwork. Also, by extending the borrowing period, companies can usually obtain better rates and availabilities of funds than if they continually borrow very short maturities.

Many companies face predictable peaks and valleys in their business throughout the year. For instance, manufacturers of consumer electronics products achieve the bulk of their sales during the holiday shopping season (from late November through the end of the year), which means that they have build-up of products that are shipped well before they receive payment. Thus, they have to finance this inventory roll-out before they receive any cash. During this period, they are likely to use up most or all of the temporary excess funds they set aside or to tap into the credit lines they arranged for this purpose. When sales roll in during the busy shopping season, they use the proceeds to pay down the borrowing and then invest any excess.

Other influencing factors on a company's cash needs may be associated with nonoperating activities, such as major capital expenditure programs, mergers and acquisitions, sales or disposition of company assets, and the timing of long-term financial transactions, such as bond issues, private placements of debt or equity, and equity issues.

Predicting the peak need caused by seasonality of other nonoperating activities is important if the company is going to have to borrow funds to cover the need. If a company sets aside too much, it will incur excess costs that are unjustified. If it sets aside too little, it will have to pay a penalty to raise funds quickly. Either case is a costly error. A reliable forecast can help avoid this situation.

4. INVESTING SHORT-TERM FUNDS

Short-term investments represent a temporary store of funds that are not necessarily needed in a company's daily transactions. If a substantial portion of a company's working capital portfolio is not needed for short-term transactions, it should be separated from a working capital portfolio and placed in a longer-term portfolio. Such longer-term portfolios are often handled by another area or are handled by an outside money manager under the company's supervision. In this way, the risks, maturities, and portfolio management of longer-term portfolios can be managed independently of the working capital portfolio.

Short-term working capital portfolios consist of securities that are highly liquid, less risky, and shorter in maturity than other types of investment portfolios. Thus, a company's working capital portfolio may consist of short-term debt securities, such as short-term U.S. government securities and short-term bank and corporate obligations. This type of portfolio changes almost constantly, as cash is needed or more excess cash is available for investments.

4.1. Short-Term Investment Instruments

We describe examples of the major instruments for short-term investments in Exhibit 8-7. The relative amounts of each security can vary from one company to another, depending on the company's risk tolerance and how quickly the invested funds will be needed.

4.1.1. Computing Yields on Short-Term Investments

Some securities, such as T-bills and banker's acceptances, are issued at a discount. Thus, the investor invests less than the face value of the security and receives the face value back at

EXHIBIT 8-7 Examples of Short-Term Investment Instruments

Instruments	Typical Maturities	Features	Risks
U.S. Treasury Bills (T-bills)	13, 26, 52 weeks	<ul style="list-style-type: none"> • Obligations of U.S. government (guaranteed), issued at a discount • Active secondary market • Lowest rates for traded securities 	Virtually no risk
Federal agency securities	5–30 days	<ul style="list-style-type: none"> • Obligations of U.S. federal agencies (e.g., Fannie Mae, Federal Home Loan Board) issued as interest-bearing • Slightly higher yields than T-bills 	Slight liquidity risk; insignificant credit risk
Bank certificates of deposit (CDs)	14–365 days	<ul style="list-style-type: none"> • Bank obligations, issued interest-bearing in \$100,000 increments • “Yankee” CDs offer slightly higher yields 	Credit and liquidity risk (depending on bank’s credit)
Banker’s acceptances (BAs)	30–180 days	<ul style="list-style-type: none"> • Bank obligations for trade transactions (usually foreign), issued at a discount • Investor protected by underlying company and trade flow itself • Small secondary market 	Credit and liquidity risk (depending on bank’s credit)
Eurodollar time deposits	1–180 days	<ul style="list-style-type: none"> • Time deposit with bank off-shore (outside United States, such as Bahamas) • Can be CD or straight time deposit (TD) • Interest-bearing investment • Small secondary market for CDs, but not TDs 	<ul style="list-style-type: none"> • Credit risk (depending on bank) • Very high liquidity risk for TDs
Bank sweep services	1 day	<ul style="list-style-type: none"> • Service offered by banks that essentially provides interest on checking account balance (usually over a minimum level) • Large number of sweeps are for overnight 	Credit and liquidity risk (depending on bank)
Repurchase agreements (Repos)	1 day +	<ul style="list-style-type: none"> • Sale of securities with the agreement of the dealer (seller) to buy them back at a future time • Typically over-collateralized at 102 percent • Often done for very short maturities (<1 week) 	Credit and liquidity risk (depending on dealer)
Commercial paper (CP)	1–270 days	<ul style="list-style-type: none"> • Unsecured obligations of corporations and financial institutions, issued at discount • Secondary market for large issuers • CP issuers obtain short-term credit ratings 	Credit and liquidity risk (depending on credit rating)
Mutual funds and money market mutual funds	Varies	<ul style="list-style-type: none"> • Money market mutual funds commonly used by smaller businesses • Low yields but high liquidity for money market funds; mutual fund liquidity dependent on underlying securities in fund • Can be linked with bank sweep arrangement 	Credit and liquidity risk (depending on fund manager)
Tax-advantaged securities	7, 28, 35, 49, 90 days	<ul style="list-style-type: none"> • Preferred stock in many forms, including adjustable rate preferred stocks (ARPs), auction rate preferred stocks (AURPs), and convertible adjustable preferred stocks (CAPs) • Dutch auction often used to set rate • Offer higher yields 	Credit and liquidity risk (depending on issuer’s credit)

maturity. For instance, a \$1 million security that pays 5 percent in interest with one month remaining to maturity would be purchased at:

$$\text{Purchase price} = \$1,000,000 - [(0.05)(1/12)(\$1,000,000)] = \$995,833.33$$

$$\text{Proceeds (face value)} = \$1,000,000$$

The difference between the purchase price and the face value, \$4,166.67, is the **discount interest**.

Interest-bearing securities differ from discounted securities in that the investor pays the face amount and receives back that same face amount plus the interest on the security. For example, a 5 percent, 30-day, \$1 million security would return \$1 million face value plus interest earned:

$$\text{Purchase price (face value)} = \$1,000,000$$

$$\text{Proceeds} = \$1,000,000 + [(0.05)(1/12)(\$1,000,000)] = \$1,004,166.67$$

Rates on securities may be quoted as nominal rates or as yields. A **nominal rate** is a rate of interest based on the security's face value. In the previous two examples, the nominal rate in each instance was 5 percent. A **yield**, on the other hand, is the actual return on the investment if it is held to maturity. For example, if you buy the discount security for \$995,833.33 and hold it for one month until it matures for \$1 million, your yield on this investment is

$$\text{Yield} = \left(\frac{\$1,000,000 - 995,833.33}{995,833.33} \right) (12) = (0.004184)(12) = 5.0209\%$$

where the second factor, 12, annualizes the monthly yield of 0.4184 percent. The factor that is used to annualize the yield depends on the type of security and the traditions for quoting yields. For example, the **money market yield** is typically annualized using the ratio of 360 to the number of days to maturity:

$$\text{Money market yield} = \left(\frac{\text{Face value} - \text{Purchase price}}{\text{Purchase price}} \right) \left(\frac{360}{\text{Number of days to maturity}} \right)$$

On the other hand, the **bond equivalent yield** is typically annualized using the ratio of 365 to the number of days to maturity:

$$\text{Bond equivalent yield} = \left(\frac{\text{Face value} - \text{Purchase price}}{\text{Purchase price}} \right) \left(\frac{365}{\text{Number of days to maturity}} \right)$$

One source of confusion is that the yield on U.S. T-bills may be quoted on the basis of the discount basis or the bond equivalent basis (also referred to as the investment yield basis). The yield on a T-bill using the discount basis is calculated using the face value as the basis for the yield and then using a 360-day year:

$$\text{Discount-basis yield} = \left(\frac{\text{Face value} - \text{Purchase price}}{\text{Face value}} \right) \left(\frac{360}{\text{Number of days to maturity}} \right)$$

Although the relevant yield for investment decision purposes is the bond equivalent yield, it is important to understand the discount basis because it is often quoted in the context of these securities.

EXAMPLE 8-2 Computing Investment Yields

For a 91-day \$100,000 U.S. T-bill sold at a discounted rate of 7.91 percent, calculate the following:

1. Money market yield.
2. Bond equivalent yield.

$$\text{Purchase price} = \$100,000 - [(0.0791)(91/360)(\$100,000)] = \$98,000.53$$

Solution to 1. Money market yield = $(1,999.47/98,000.53) \times (360/91) = 8.07$ percent

Solution to 2. Bond equivalent yield = $(1,999.47/98,000.53) \times (365/91) = 8.18$ percent

4.1.2. Investment Risks

Investors face several types of risks. We list a number of these in Exhibit 8-8. In this exhibit, we list the types of risk—credit, market, liquidity, and foreign exchange—and the attributes and safety measures associated with each type. The attributes describe the conditions that contribute to the type of risk, and the safety measures describe the steps that investors usually take to prevent losses from the risk. With the exception of foreign exchange risk, the key safety measures taken are to shift to “safety” (i.e., government securities, such as U.S. T-bills) or to shorten maturities so that securities will mature quicker, allowing an investor to shift funds to a safer type of security.

EXHIBIT 8-8 Types of Investment Risks and Safety Measures

Type of Risk	Key Attributes	Safety Measures
Credit (or default)	<ul style="list-style-type: none"> • Issuer may default • Issuer could be adversely affected by economy, market • Little secondary market 	<ul style="list-style-type: none"> • Minimize amount • Keep maturities short • Watch for “questionable” names • Emphasize government securities
Market (or interest rate)	<ul style="list-style-type: none"> • Price or rate changes may adversely affect return • There is no market to sell the maturity to, or there is only a small secondary market 	<ul style="list-style-type: none"> • Keep maturities short • Keep portfolio diverse in terms of maturity, issuers
Liquidity	<ul style="list-style-type: none"> • Security is difficult or impossible to (re)sell • Security must be held to maturity and cannot be liquidated until then 	<ul style="list-style-type: none"> • Stick with government securities • Look for good secondary market • Keep maturities short
Foreign exchange	<ul style="list-style-type: none"> • Adverse general market movement against your currency 	<ul style="list-style-type: none"> • Hedge regularly • Keep most in your currency and domestic market (avoid foreign exchange)

4.2. Strategies

Short-term investment strategies are fairly simple because the securities in a working capital portfolio are limited in type and are much shorter in maturity than a longer-term portfolio. Most short-term investors seek “reasonable” returns and do not want to take on substantial risk. Short-term investment strategies can be grouped into two types: passive and active. A **passive strategy** is characterized by one or two decision rules for making daily investments, whereas an **active strategy** involves constant monitoring and may involve matching, mismatching, or laddering strategies.

Passive strategies are less aggressive than active ones and place top priority on safety and liquidity. Yet, passive strategies do not have to offer poor returns, especially if companies have reliable cash forecasts. Often, companies with good cash forecasts can combine a passive strategy with an active matching strategy to enhance the yield of a working capital portfolio without taking on substantially greater risks.

The major problem associated with passive strategies is complacency, which can cause the company to roll over the portfolio mechanically, with little attention paid to yields and more focus on simply reinvesting funds as they mature. Passive strategies must be monitored, and the yield from investment portfolios should be benchmarked regularly against a suitable standard, such as a T-bill with comparable maturity.

Active strategies require more daily involvement and possibly a wider choice of investments. Although investments are rolled over with an active strategy, just as they are with a passive strategy, this type of strategy calls for more shopping around, better forecasts, and a more flexible investment policy/guideline.

Active strategies can include intentional matching or mismatching the timing of cash outflows with investment maturities. A **matching strategy** is the more conservative of the two and uses many of the same investment types as are used with passive strategies. A **mismatching strategy** is riskier and requires very accurate and reliable cash forecasts. These strategies usually use securities that are more liquid, such as T-bills, so that securities can be liquidated if adverse market conditions arise. Mismatching strategies may also be accomplished using derivatives, which may pose additional risks to a company unaccustomed to buying and selling derivatives.

A **laddering strategy** is another form of active strategy, which entails scheduling maturities on a systematic basis within the investment portfolio such that investments are spread out equally over the term of the ladder. A laddering strategy falls somewhere between a matching and a passive strategy. Laddering strategies have been used effectively in managing longer-term investment portfolios, but laddering also should be an effective short-term strategy.

Managing a working capital portfolio involves handling and safeguarding assets of the company. Accordingly, companies with investment portfolios should have a formal, written policy/guideline that protects the company and the investment managers. Investment policy/guidelines should not be very lengthy, especially because they must be understood by the company’s investment managers and communicated to the company’s investment dealers.

Although the investment policy/guideline should be customized for an individual company, the basic structure of such a policy is provided in Exhibit 8-9.

EXHIBIT 8-9 Sample Format of an Investment Policy

Purpose	List and explain the reasons that the portfolio exists and also describe the general attributes of the portfolio, such as a summary of the strategy that will be used and the general types of securities that are acceptable investments.
Authorities	Identify the executives who oversee the portfolio managers who make the investments that compose the portfolio and the outside managers that could be used and how they would be managed. Also describe procedures that must be performed if the policy is not followed.
Limitations and/or restrictions	Describe, in general terms, the types of investments that should be considered for inclusion in the portfolio. The list should not consist of specific securities; it should describe the general <i>types</i> of securities, such as commercial paper, U.S. T-bills, or bank CDs. In this manner, the policy retains more flexibility than if specific issuers or securities are listed. In the latter case, the policy would require change every time an issuer was no longer issuing any securities. This section should also include any restrictions as to the relative amount of each security that is allowable in the overall portfolio. This section may also include procedures when a maximum has been exceeded or must be exceeded under special circumstances, such as when the portfolio is temporarily inflated prior to using the funds for an acquisition or other long-term use.
Quality	May be in a separate section or may be included with the previous one. Investments with working capital funds must be safe, so many companies include credit standards for potential investments in their policy statements. Reference may be made to long-term ratings or, more frequently, to short-term credit ratings. The ratings cited are usually those from the major rating agencies: Standard & Poor's and Moody's.
Other items	Other items are sometimes included in a policy/guideline, such as statements that require the portfolio to be included in the financial audit or that regular reports will be generated by the investment manager. Some companies also define the types of securities that are "eligible," but this does not seem necessary if the policy is well written.

EXAMPLE 8-3 Evaluating an Investment Policy

A sample investment policy is shown below. Review the client's investment policy, considering the basic investment policy structure shown in Exhibit 8-9. The average portfolio size is \$100 million, with no significant peaks or valleys throughout the year. After reviewing the policy, answer the following questions:

1. Is the policy an effective one?
2. What shortcomings or potential problem areas, if any, does it have?
3. How would you change this policy, if at all?

Working Capital Portfolio Investment Policy/Guidelines

- Purpose: This is a working capital portfolio with emphasis on safety and liquidity. We will sacrifice return for either of these two goals.
- Authorities: The treasurer, with agreement from the CFO, will be in charge of managing short-term investments. Authority and control to execute can be delegated by the treasurer or CFO to another treasury manager if documented.
- Maximum maturity: Securities may not be made for longer than three (3) years.
- Types/amounts of investments permitted: no more than 10 percent of the portfolio or \$50 million with any issuer, subject to the credit limitation that any eligible issuer must be rated A-1, P-1 by Standard & Poor's and Moody's.
- Repurchase agreements must be equal or to or, preferably exceed, the PSA Standard Investment Agreement, which requires 102 percent collateral for repurchases.
- All investments must be held in safekeeping by XYZ Bank.
- The investment manager can execute exception transactions, but must document them in writing.

Solution to 1. The policy is fairly effective in that it tries to provide simple, understandable rules. It calls for credit quality, limits the possible position with any single issuer, accepts market standards (such as the PSA), and calls for safekeeping. It also has an exception procedure that is straightforward.

Solution to 2. The credit ratings may be too restrictive. Many investment securities may not be rated by both S&P and Moody's, which is implied, if not stated, in the policy. Also, the 10 percent limitation apparently is to be applied to all securities. However, most investment managers do not consider securities issued by governmental agencies or the government itself to be so risky that a limitation needs to be applied.

Solution to 3. The words "or equivalent" should be added to the credit quality of the types of investments. Also, there should be no limitation to highly rated governmental securities, such as U.S. Treasury bills and the equivalent from the major developed countries. A credit rating reference could be applied to determine eligible governmental securities.

4.3. Evaluating Short-Term Funds Management

Tracking tools can range from simple spreadsheets to more expensive treasury workstations. If both portfolios are not too large or diversified, a spreadsheet may be sufficient to be able to compare effective yields and borrowing costs on an ongoing basis and to generate periodic performance reports.

Investment returns should be expressed as bond equivalent yields, to allow comparability among investment alternatives. In addition, the overall portfolio return should be weighted according to the currency size of the investment. We provide an abbreviated example of a portfolio report in Exhibit 8-10. The report provides the weighted average returns of the different investments. The yields are all calculated on a bond equivalent yield basis.

EXHIBIT 8-10 Short-Term Investment Portfolio Report

Security/Loan	Dealer/Bank	€Amt (000)	Weight	Yield	Maturity
U.S. T-bills	ABC Bank	23,575	39.8%	3.50%	90 days
Finco CP	XYZ Co.	20,084	33.9%	4.65%	45 days
Megabank CD	Megabank	15,560	26.3%	5.05%	30 days
Weighted average yield from investments				4.30%	
Short-term benchmark rate*				4.25%	

*Benchmark rate = independent source, such as synthetic portfolio maintained independently or rate provided by third party, such as a money manager or other empirical source (e.g., a financial institution, trade association, or central bank).

5. MANAGING ACCOUNTS RECEIVABLE

Credit accounts vary by type of customer and the industry, and granting credit involves a tradeoff between increasing sales and uncollectible accounts. There are three primary activities in accounts receivable management: granting credit and processing transactions, monitoring credit balances, and measuring performance of the credit function.

Processing accounts receivable transactions requires recording credit sales to create a record and posting customer payments—or at least monitoring the posting—to the accounts receivable account by applying the payment against the customer's outstanding credit balance. Monitoring the outstanding accounts receivable requires a regular reporting of outstanding receivable balances and notifying the collection managers of past due situations. Monitoring is an ongoing activity. Measuring the performance of the credit functions entails preparing and distributing key performance measurement reports, including an account receivable aging schedule and day's sales outstanding reports.

Essentially, the accounts receivable management function is a go-between for the credit manager, treasury manager, and accounting manager. This role is an important one because it can slow up the recording of payments, which may, in turn, prevent customers from purchasing more of the company's products or, worse yet, could prevent the treasury manager from depositing the check and converting the check to available funds.

The accounts receivable management function is also considered to be a derivative activity from credit granting because it helps in providing information needed by the credit management function. It depends on the source of the sale for its records, on the credit manager for additional information on the status of the accounts receivable record, and possibly on the treasury manager to establish an efficient system of getting the payment information to the accounts receivable manager for cash application (e.g., from a bank lockbox).

The goals for the accounts receivable management system include the following:

- Efficient processing and maintaining accurate, up-to-date records that are available to credit managers and other interested parties as soon as possible after payments have been received.
- Control of accounts receivable and assuring that accounts receivable records are current and that no unauthorized entry into the accounts receivable file has occurred.

- Collection on accounts and coordination with the treasury management function.
- Coordination and notification with the credit managers frequently.
- Preparation of regular performance measurement reports.

Companies may achieve scale economies by centralizing the accounts receivable function by using a captive finance subsidiary.⁵ A **captive finance subsidiary** is a wholly owned subsidiary of the company that is established to provide financing of the sales of the parent company.

One of the challenges in accounts receivable management is monitoring receivables and collecting on accounts. Many companies resort to outsourcing the accounts receivable function, primarily to increase the collection on accounts, provide credit evaluation services, and to apply the most recent technology.⁶ Also, some companies may invest in **credit insurance**, which reduces the risk of bad debts and shifts some of the evaluation of creditworthiness to the insurer.

5.1. Key Elements of the Trade Credit Granting Process

Credit management is an integral part of the collection process. It sets the framework for sales in that it can restrict sales by rejecting credit or expand it by loosening acceptance criteria. It also links the collection and cash application processes and has a profound effect on the method of collection as well. In addition, credit management techniques incorporate fundamental financial analysis methods in setting credit policy, granting credit, and managing existing credit customers.

A weak, ineffective credit management function may enhance sales, but many of those sales may become bad debts. On the other hand, a strong, active credit management function can work in tandem with sales and marketing on one side and accounting and treasury on the other. To establish an effective credit management function a company must have a well-conceived strategy customized to the company's needs and reflecting the company's goals.

Credit management policies are usually established as a set of basic guidelines to be used by credit managers. A company's credit policy sets the boundaries for the credit management function. It lays out procedures as part of the policy and offers guidance for each typical situation. The policy shows the steps in the granting process and provides decision rules for specific situations. The policy can also influence the sales level by making it easy or difficult for customers to buy on credit.

Customers may start out with one type of credit account that is restrictive, such as cash on delivery, and may eventually demonstrate that they are regular payers and can be given open book credit accounts.

The major types of credit accounts include the following:

- Open book, which is the most common for company to company.
- Documentary, with or without lines of credit, most common for cross-border transactions.
- Installment credit, with regular timed payments.
- Revolving credit.

⁵As pointed out by Mian and Smith (1992, 169–200), companies that have highly variable accounts receivable (for example, from seasonality) may find the use of a captive finance subsidiary attractive because it may allow the subsidiary's debt indentures to differ from those of the parent company.

⁶Hall (2003), 1–2.

The types of credit terms offered vary by type of customer, relative financial strength by the customer, and the type of credit terms the competition is offering. The different forms of terms of credit other than cash, which generally implies 7 to 10 days, include the following:

- **Ordinary terms.** Terms are set forth in a standard format—*net t* or *d/t₁ net t₂*, where *t* in the first example refers to the length of time a customer has to pay the invoice before becoming past due. In the second example, *t₁* is the time period for taking discounts, and *t₂* is the same as *t* in the first example. For example, *net 60* means that the full amount of the invoice is due in 60 days. Most trade credit customers will take the full 60 days. Terms of *1/10 net 30* mean that the customer can take a 1 percent discount if the invoice is paid within 10 days or else pay the full amount of the invoice by 30 days from the invoice date.
- **Cash before delivery (CBD)** terms require that the amount of the invoice must be paid in advance before delivery will be scheduled. Checks must clear before any shipment is made.
- **Cash on delivery (COD)** terms require that payment must be made (usually in the form of a bank check) when the product is delivered; otherwise, no delivery will be made.
- **Bill-to-bill.** These terms require that each prior bill must be paid before new shipments are possible.
- **Monthly billing.** These terms require payment monthly. They have a different format; for example, *2/10th Prox net 30th* means that the customer can take a 2 percent discount if it pays within the first 10 days of the next month or else it must pay the full amount of the invoice by the 30th day of the next month.

Credit managers may evaluate customers' creditworthiness using a credit scoring model. A **credit scoring model** is a statistical model used to classify borrowers according to creditworthiness. These models were first designed for assisting in making consumer credit decisions. Major credit card issuers needed a tool they could use to make mass credit decisions. It was also used for small business loans after many larger banks discovered that their costs of reviewing and deciding whether to grant loans were such that they could not efficiently make loans of the smaller sizes required by smaller businesses. To overcome this problem, they adopted credit scoring models.

Credit scoring models offer an opportunity for a company to make fast decisions on the basis of simple data, not requiring a great deal of paperwork. The scoring models give greater weight to such factors as:

- Ready cash (e.g., high checking account balances).
- Organization type, with corporations rated higher than sole proprietorships or partnership.
- Being current in supplier payments, as indicated by financial services such as Dun & Bradstreet.

The models penalize the potential borrower for:

- Prior late payment behavior or defaults: Payment patterns are habitual.
- Heavy use of personal credit cards: No reserves or reduced reserves available.
- Previous *personal* bankruptcy or tax liens: Carries over from person to company.
- High-risk categories: food services, hospitality industries.

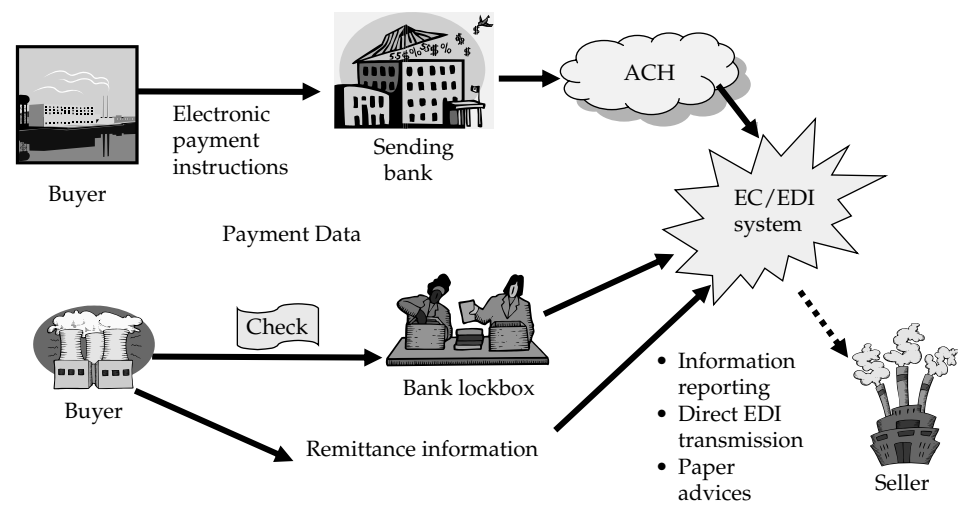
Credit scoring can also be used to predict late payers.

5.2. Managing Customers' Receipts

Cash collections systems are a function of the types of customers a company has and the methods of payment that the customers use. For instance, if a company's sales are made at retail locations, it cannot take advantage of the benefits offered by bank lockbox services. Instead, it must deal with organizing and controlling local deposits and concentrating these deposits efficiently and economically. On the other hand, if a company manufactures and sells products to other businesses, it can use a bank lockbox services to expedite processing and clearing of check payments.

We illustrate a typical network for a company with both electronic and check payments in Exhibit 8-11. Checks from one type of customer are directed to a bank lockbox, while electronic payments from another type of customer are transmitted via **electronic funds transfer (EFT)** through one of the available networks, such as the **Automated Clearing House (ACH)** system or the **Giro system**. The ACH system is an electronic payment network available to businesses, individuals, and financial institutions in the United States, U.S. Territories, and Canada. The Giro systems are postal-based systems in Europe and elsewhere.

EXHIBIT 8-11 Cash Collections and Concentration



In most cases, the best practice for collections involves the establishment of a system that accelerates payments as well as their information content, such as the customer's name and identification number and which invoices are being paid. From the collecting company's point of view, the way to achieve this best practice is to establish an electronic collection network. This can apply to either retail or wholesale companies.

Retail payments can be made by credit/debit cards or electronic checks, which are converted to electronic debits or digitized images, or by direct debit. These payments clear electronically that can be facilitated through **point of sale (POS)** systems, which are systems that capture the transaction data at the physical location in which the sale is made. A **direct debit program** is an arrangement whereby the customer authorizes a debit to a demand account and is used by companies—such as utilities, telecommunications service providers,

cable companies, insurance companies, and credit card companies—to collect routine payments for services.

If payments cannot be converted to electronic payments, the next best practice is to use a bank lockbox service. A **lockbox system** is coordinated with the banking institution in which customer payments are mailed to a post office box and the banking institution retrieves and deposits these payments several times a day, enabling the company to have use of the fund sooner than in a centralized system in which customer payments are sent to the company. An acceptable bank lockbox arrangement is one in which the checks deposited today are available tomorrow or the next business day. This one-day availability lays the groundwork for best practices in cash concentration.

A good performance measure for check deposits is a calculated **float factor**. The **float** in this context is the amount of money that is in transit between payments made by customers and the funds that are usable by the company. We compute the float factor by dividing the average daily deposit in dollars into the average daily float:⁷

$$\begin{aligned}\text{Float factor} &= \frac{\text{Average daily float}}{\text{Average daily deposit}} \\ &= \frac{\text{Average daily float}}{\text{Total amount of checks deposited/Number of days}}\end{aligned}$$

This calculation gives the average number of days it took deposited checks to clear. If the float factor is very small (e.g., less than 1.0), it is probably worthwhile to investigate further to determine whether same-day wire transfers from the depository account are warranted, assuming the depository account is with a bank other than the company's lead bank. The float factor only measures how long it takes for checks to clear, not how long it takes to receive the checks, deposit them, and then have them clear. However, it is still very useful and can be computed easily for any depository accounts.

EXAMPLE 8-4 Calculating Float Factors

Given the following data, compute a float factor for this company bank account.

Total deposits for the month: \$3,360,900
 Number of days in month: 30 days
 Average daily float: \$154,040

Solution.

$$\begin{aligned}\text{Average daily deposit} &= (\$3,360,900)/30 = \$112,030 \\ \text{Float factor} &= \text{Average daily float}/\text{Average daily deposit} \\ &= \$154,040/\$112,010 = 1.375\end{aligned}$$

⁷We determine the average daily float from an analysis of cash accounts.

Cash concentration involves two major activities: consolidating deposits and moving funds between company accounts or to outside points. The best practice for cash concentration may be different for concentration than for moving funds, depending on the timing required and the availability of the funds being transferred.

For bank lockbox concentration, assuming that the checks clear in one business day (on average), the concentration technique of choice is the electronic funds transfer method. In this method, bank lockbox personnel call in the deposit via a reporting service or directly to the concentration bank. The concentration bank creates an electronic funds transfer debit that clears overnight, giving the company available funds in its concentration account. This system can be set up to run with or without intervention by the company's cash manager. In most cases, the best practice does not involve any intervention.

Electronic funds transfers offer distinct advantages to companies that use them for concentration of funds. First, they are substantially cheaper than the alternative, the wire transfer. In addition, they are reliable in that the transfer can be made part of a routine that can be performed daily without exception. Even small payments that would not be economical to transfer out by wire can be transferred economically by electronic funds transfer.

5.3. Evaluating Accounts Receivable Management

There are numerous ways of measuring accounts receivable performance. Most of them deal with how effectively outstanding accounts receivable items can be converted into cash. Measures can be derived from general financial reports as well as more detailed internal financial records.

Many measures, such as number of days of receivables, can be calculated easily from financial statements. The standard number of days of receivables evaluates the total receivables outstanding but does not consider the age distribution within this outstanding balance.

5.3.1. Accounts Receivable Aging Schedule

One key report that accounts receivable managers should use is the **aging schedule**, which is a breakdown of the accounts into categories of days outstanding. We provide an example of an aging schedule in Exhibit 8-12, Panel A. As you can see in this example, the report shows the total sales and receivables for each reporting period (typically 30 days). It is handier to convert the aging schedule to percentages, as we show in this exhibit. Note that in the exhibit, it is easy to spot a change in April's aging: Accounts receivable have not been collected and converted to cash as rapidly as in previous months. In this case, the April change should be scrutinized. For example, the extension of credit terms may have been increased as part of a special program. This change could also signal a change in payments by the company's customers.

5.3.2. The Number of Days of Receivables

The number of days of receivables gives us the overall picture of accounts receivable collection. We can compare the number of days with the credit policy to give us an idea of how well the company is collecting on its accounts, relative to the terms that it grants credit. But we can take this a step further by calculating a weighted average of the collection period, or weighted average day's sales outstanding. By focusing on the time it takes to collect receivables, the weighted average collection period is a good measure of how long it is taking to collect from the company's customers regardless of the sales level or the changes in sales.

The calculation of the weighted average collection period requires data on the number of days it takes to collect accounts of each age grouping. For example, we could group receivables

EXHIBIT 8-12 An Accounts Receivable Aging Schedule

Panel A: The Aging Schedule						
(\$ millions)	January	February	March	April		
Sales	530	450	560	680		
Total accounts receivable	600	560	650	720		
Current (1–30 days old)	330	290	360	280		
1–30 days past due	90	120	160	250		
31–60 days past due	80	60	60	110		
61–90 days past due	70	50	40	50		
> 90 days past due	30	40	30	30		
Aging Expressed as Percent	January	February	March	April		
Current (1–30 days old)	55.0%	51.8%	55.4%	38.9%		
1–30 days past due	15.0%	21.4%	24.6%	34.7%		
31–60 days past due	13.3%	10.7%	9.2%	15.3%		
61–90 days past due	11.7%	8.9%	6.2%	6.9%		
> 90 days past due	5.0%	7.1%	4.6%	4.2%		
Panel B: Calculation of the Weighted Average Collection Period						
Aging Group	March			April		
	Collection Days ¹	Weight ²	Weighted Days ³	Collection Days	Weight	Weighted Days
Current (1–30 days)	20	55.4%	11.1	29	38.9%	11.3
31–60 days	48	24.6%	11.8	55	34.7%	19.1
61–90 days	80	9.2%	7.4	88	15.3%	13.5
91–120 days	110	6.2%	6.8	115	6.9%	7.9
121+ days	130	4.6%	<u>6.0</u>	145	4.2%	<u>6.1</u>
Weighted average collection days ⁴			43.0			57.9

Notes:

1. The average days for collecting receivables in each grouping.
2. The weighting from the aging schedule.
3. This figure, expressed in days, is the product of the previous two columns.
4. The sum of each grouping's product equals the overall days.

in regular increments, such as 30-day periods, and then weight the collection period in each group by the monetary amount of accounts in the group.

Using the data provided in Exhibit 8-12, Panel A, it is possible to compute number of days of receivables for March and April, as shown in Panel B of this exhibit. As you can see in this example, we can get a better idea of why the number of days of receivables changed from

one month to the next. The weighted average collection days increased from March to April, primarily because of the large representation in receivable accounts in the 31–60 and 61–90 day ranges, which made up only 24.6 percent + 9.2 percent = 33.8 percent of accounts in March, but 50 percent of accounts in April.

The primary drawback to this measure is that it requires more information than number of days of receivables, and this information is not readily available, especially for comparisons among companies.

6. MANAGING INVENTORY

The primary goal for an inventory system is to maintain the level of inventory so that production management and sales management can make and sell the company's products without more than necessary invested in this asset. Like cash and accounts receivable management, inventory management involves balancing: having sufficient inventory, but not too much.

Inventory is a current asset that is created by purchasing, paid by accounts payable, and funded by the treasury. The investment in inventory does not produce cash until it is sold or otherwise disposed of. Excessive levels of inventory can possibly overstate the value of inventory because the more that is on hand, the greater the potential for obsolete inventory, which can be sold off, but at a discount. Shortages of inventory result in lost sales.

The amount of inventory that a company holds or feels it has to hold creates a financial requirement for the company. If the company's product lines are more diverse or if its production processes are more involved in using inventory to make final products and then store the products, the company may have a significant financial investment in inventory.

The investment in inventory has been quite staggering for many companies, which has caused them to look for new inventory management techniques. New techniques in inventory control, aided by improved technology, have enabled substantial reduction of the inventory levels a company must maintain and still be able to make products and have them available for sale as needed. For instance, newer just-in-time approaches to inventory management have lowered required inventory balances and cemented major trading partner relationships.

The motives for holding inventory, which dictate how much inventory will be held and, in turn, how much working capital will be tied up in inventory, are very similar to the need for holding cash. The major motives include the transactions motive, the precautionary motives, and the speculative motive.

The **transactions motive** reflects the need for inventory as part of the routine production–sales cycle. Inventory need is equal to the planned manufacturing activity, and the approach to inventory will be dictated by the manufacturing plan.

Precautionary stocks also may be desirable to avoid any **stock-out losses**, which are profits lost from not having sufficient inventory on hand to satisfy demand. Managing inventory well means keeping extra inventory, especially if it could become obsolete quickly, at a minimum. To do this, a company must have a reliable forecast and a flexible inventory approach. In addition, many companies that do not have a reliable forecast maintain a reserve as a precaution for shortfalls in the plan. Of course, how much stock is determined by the lead time for additional inventory purchases, the length of time it takes to deliver final products to the market, and how much can be spent on extra inventory.

In certain industries, managers may acquire inventory for speculative reasons, such as ensuring the availability and pricing of inventory. Inventory managers working together with purchasing managers can benefit from out-of-the-ordinary purchases. For instance, if a publisher is certain that paper costs will be increasing for the next year, it can buy more paper

in the current year and store it for future use. This decision assumes that the storage costs are not greater than the savings.

Companies usually attempt to strike a balance in managing their inventory levels. Overinvestment can result in liquidity squeezes or related problems with an increase in debt without an increase in cash. Overinvestment can also lead to the misuse of facilities as more storage is required for the built-up inventory. Having large amounts of inventory on hand can result in losses from shrinkage, spoilage, and so on. Finally, overinvestment can reduce the company's competitiveness as it may not be able to match pricing because of its large inventory costs.

On the other hand, underinvestment in inventory can create problems from losing customers who could not purchase a product, or gaining their ill-will from long delays in delivery. Plant shutdowns and expensive special runs can also be costly. Finally, a risk with underinvestment is the company's inability to avoid price increases by suppliers.

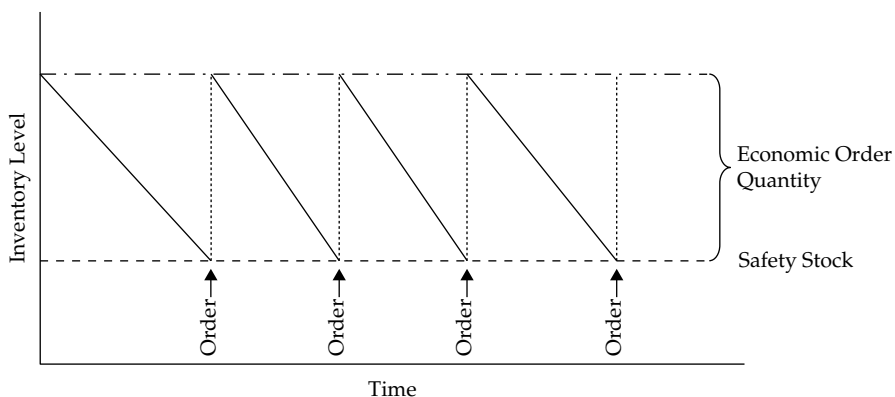
6.1. Approaches to Managing Levels of Inventory

To control inventory costs, a company should adopt the appropriate approach for its inventory. The two basic approaches are the economic order quantity and just-in-time.

Many companies use the classical approach, **economic order quantity–reorder point (EOQ–ROP)**, at least for some portion of their inventory. This method is based on expected demand and the predictability of demand, and it requires determining the level of inventory at which new inventory is ordered. This ordering point is determined based on the costs of ordering and carrying inventory, such that the total cost associated with inventory is minimized. The demand and lead times determine the inventory level. For EOQ–ROP to work well, there must be a reliable short-term forecast. Often, a company may use EOQ–ROP for smaller items that have low unit costs.

Use of the EOQ–ROP method may involve safety stocks and anticipation stocks. A **safety stock** is a level of inventory beyond anticipated needs that provides a cushion in the event that it takes longer to replenish inventory than expected or in the case of greater than expected demand. A company may consider the number of days of inventory on hand and the lead time in replenishing stock in determining the appropriate level of the safety stock. An **anticipation stock** is inventory in excess of that needed for anticipated demand, which may fluctuate with the company's sales or production seasonality. We illustrate the EOQ–ROP method in Exhibit 8-13.

EXHIBIT 8-13 EOQ–ROP Inventory Method



The **just-in-time (JIT) method** is a system that minimizes in-process inventory stocks—raw materials and in production—by evaluating the entire system of the delivery of materials and production. Materials are ordered, for example, at a point at which current stocks of material reach a reorder point, a point determined primarily by historical demand. **Materials** or **manufacturing resource planning (MRP)** systems incorporate production planning into inventory management. The analysis of production and materials needed for production are incorporated into an analysis that provides both a materials acquisition schedule and a production schedule. Combining the JIT and MRP methods can provide a broader base for integrating inventory into the company's supply chain management and effectively reduce inventory levels.⁸

In most instances, companies will have several types of inventory that can be managed effectively using one or more of these approaches. Obviously, a company should select the method that allows the most cost-beneficial investment in inventory.

6.2. Inventory Costs

There are several component costs of inventory. Some components represent opportunity costs, whereas others may be real costs. The component costs include:

- *Ordering.* Procurement or replenishment costs, both of which may be fixed or variable. These costs depend on number of orders placed. Examples: freight, labor and handling, paperwork, and machine setup.
- *Carrying.* Financing and holding costs, which are opportunity or real costs. These costs depend on average inventory levels and the type of goods. Examples: storage, capital costs, obsolescence, insurance, and taxes.
- *Stock-out.* Opportunity or real costs, which are affected by level of inventory, item mix, and processing time versus term of sale. These costs might vary greatly depending on how they are estimated. Examples: lost sales, back-order costs, and substitution costs.
- *Policy.* Costs of gathering data and general operating costs, which may be real costs or “soft” costs. These costs depend on inventory mix and complexity. Examples: data processing, labor charges, overtime, and training.

6.3. Evaluating Inventory Management

The most common way to measure the company's investment in inventory and evaluate its inventory management is to compute the inventory turnover ratio and the number of days of inventory. The inventory turnover is a rough measure, but it is simple to calculate and compare with other standards or past history. Inventory turnover will vary among industries, as you can see in Exhibit 8-14, which provides a calculated inventory turnover and number of days of inventory for various industries.

⁸More recent innovations have integrated cash management and inventory management. For example, the moment a customer orders and pays for a computer with Dell Corporation, the production process begins. This efficiency results in a negative operating cycle; that is, Dell Corporation is collecting on accounts as it invests in the inventory production. Because it uses trade credit for its supplies, it has little need for working capital.

EXHIBIT 8-14 Inventory Turnover and Number of Days of Inventory for U.S. Corporations in Different Industries, 2002

Industry	Inventory Turnover (times)	Number of Days of Inventory
Apparel manufacturing	4.9	74.0
Chemical manufacturing	5.7	64.4
Electronics and appliances stores	7.3	50.2
Food manufacturing	8.1	44.9
Food, beverage, and liquor stores	11.2	32.7
Machinery manufacturing	5.6	65.2
Mining	10.4	35.2
Motor vehicle dealers and parts dealers	5.6	65.2
Paper manufacturing	6.8	53.8
Transportation equipment manufacturing	9.7	37.7

Source of data: *Statistics of Income, 2002*, Corporation Returns with Net Income, Table 7, www.irs.gov.

Further, the inventory turnover may differ among companies within an industry because of different product mixes. For example, in fiscal year 2005, Wal-Mart Stores had an inventory turnover of 7.5 times compared with Target's 5.7 times. This difference may be because of Wal-Mart's greater foothold in the higher turnover grocery business, as compared with Target.

Although the analysis of trends is important, care should be taken when interpreting changes. For example, a decrease in the inventory turnover may mean that more inventory is on hand and is not moving through manufacturing and being sold. On the other hand, a decrease in inventory turnover may indicate a change in the company's product mix, or it may mean that the company is reducing its risk of inventory stock-outs.

EXAMPLE 8-5 Financial Impact of Inventory Methods

If a company's inventory turnover ratio is 6.1 times (annually) and the industry average number of days of inventory is 52 days, how does the company compare with the industry average?

Solution. Convert the turnover ratio to a number of days of inventory:

$$\text{Number of days of inventory} = 365 / \text{Inventory turnover} = 365 / 6.1 = 59.84 \text{ days}$$

Comparing this answer with the industry average, 52.0 days, it appears that the company's inventory turnover is slower than the industry average.

7. MANAGING ACCOUNTS PAYABLE

Accounts payable are amounts due suppliers of goods and services that have not been paid. They arise from **trade credit**, which is a spontaneous form of credit in which a purchaser of the goods or service is, effectively, financing its purchase by delaying the date on which payment is made. Trade credit may involve a delay of payment, with a discount for early payment. The terms of the latter form of credit are generally stated in the discount form: A discount from the purchase price is allowed if payment is received within a specified number of days, otherwise the full amount is due by a specified date. For example, the terms “2/10, net 30” indicate that a two percent discount is available if the account is paid within 10 days, otherwise the full amount is due by the 30th day. The terms will differ among industries, influenced by tradition within the industry, terms of competitors, and current interest rates.

A key working capital link is the purchasing–inventory–payables process. This process is concerned with the procurement of goods—finished or not—that become the company’s items for sale. Handled efficiently, the process minimizes excess funds “in the pipeline.” Handled inefficiently, the process can create a severe drain on a company’s liquidity, tying up funds and reducing the company’s financial reserves.

Inefficiencies may arise in managing purchasing, inventory, and payables. Each area has to be organized and efficiently linked with the other areas. Purchasing can often influence how payments are to be made and the terms of credit. Here again, purchasing management needs to be kept informed as to the types of payment mechanisms the company can handle to avoid agreeing with suppliers to make payments in a medium that the company does not yet support.

The effective management of accounts payable is an important working capital management activity because inefficient payables management may result in opportunity costs from payments made too early, lost opportunities to take advantage of trade discounts, and failure to use the benefits of technologies offered by e-commerce and other web-based activities.

Accounts payable is the final step in the procurement cycle because it combines the paperwork, approvals, and disbursements of funds. An effective accounts payable function helps integrate the components of the cycle and does not require the uneconomical outlay of the company’s funds until the outlay is due.

A company may not believe that it needs a formal guideline or policy to manage the function well. However, there must be some method to assure that payables practices are organized, consistent, and cost-effective. For example, if payables management is decentralized and more than one operating entity deals with the same supplier, the credit terms offered to each entity should be the same unless there are special circumstances, such as volume constraints, that warrant different terms. To handle payables effectively, a company needs rules to ensure that company assets are not being depleted unnecessarily.

There are several factors that a company should consider as guidelines for effectively managing its accounts payable, including:

- *Financial organization’s centralization.* The degree to which the company’s core financial function is centralized or decentralized affects how tightly payables can be controlled.
- *Number, size, and location of vendors.* The composition of the company’s supply chain and how dependent the company is on its trading partners (and vice versa) determines how sophisticated a payables system it needs.
- *Trade credit and cost of borrowing or alternative cost.* The importance of credit to the company and its ability to evaluate trade credit opportunities, such as trade discounts,

encourages standardized payables procedures and enhanced information management throughout the company.

- *Control of disbursement float.* Many companies still pay suppliers by check and create **disbursement float**—the amount of time between check issuance and a check's clearing back against the company's account. This float has value to many companies because it allows them to use their funds longer than if they had to fund their checking account on the day the checks were mailed.
- *Inventory management.* Newer inventory control techniques, such as MRP and JIT, increase the number of payments that must be processed by accounts payable. Many older systems cannot accommodate this extra volume, so newer management techniques and systems are required.
- *E-commerce and electronic data interchange (EDI).* Global developments to use the Internet and other direct connections between customer and supplier are revolutionizing the supply chain for many companies. Because payments for many of these activities should be considered as part of the overall process, many companies have determined that paying electronically offers a more efficient, cost-effective alternative to checks, which only are more valuable when the disbursement float value is large and interest rates (which provide value to float) are also high.

Stretching payables, also known as pushing on payables when it stretches beyond the due date, is sometimes done by corporate cash managers and other financial managers.⁹ Stretching payables is taking advantage of vendor grace periods. The evaluation of payables stretching opportunities is fairly straightforward. The number of additional days that payments can be extended or stretched is determined and valued by applying the company's opportunity cost for the additional days times the amount of the payable.

For example, if a payable that averaged \$100,000 can be stretched for an additional seven days, the company gains an additional seven days' use of the funds. This opportunity can be valued by multiplying the amount, \$100,000, by the company's opportunity cost for short-term funds. For example, if the company's estimated cost for short-term funds is 8 percent annually (0.02191 percent daily), then the value of stretching a \$100,000 payment for seven days is \$153.42. The values for each opportunity (throughout a year's activity) can be valued in this way to determine the overall benefit, which can then be weighed against the costs (both financial and nonfinancial ones).

There are basically two countering forces: Paying too early is costly unless the company can take advantage of discounts, and paying late affects the company's perceived creditworthiness.

7.1. The Economics of Taking a Trade Discount

One key activity that companies should review from time to time is the evaluation of trade discounts. Trade discounts should be evaluated using the formula shown below, which computes the implicit rate (of return) that is represented by the trade discount offer; that is, it is the equivalent return to the customer of an alternative investment.

The implicit rate is calculated as follows:

$$\text{Cost of trade credit} = \left(1 + \frac{\text{Discount}}{1 - \text{Discount}} \right)^{\left(365 / \frac{\text{Number of days beyond discount period}}{\text{}} \right)} - 1$$

⁹Keep in mind that stretching payments beyond their due dates might be considered unethical and may draw retaliation from suppliers in the form of tighter credit terms in the future.

The cost of funds during the discount period is 0 percent, so it is beneficial for the customer to pay close to the end of the discount period. Once the discount period ends, the cost of the credit to the customer jumps up and then declines as the net day is approached. For example, if the terms are 2/10, net 30, which means that there is a 2 percent discount for paying within 10 days and the net amount is due by the 30th day, the cost of trade credit is 109 percent if the credit is paid on the 20th day, but it is only 44.6 percent if paid on the 30th day.

If the customer's cost of funds or short-term investment rate is less than the calculated rate, the discount offers a better return or incremental return over the company's short-term borrowing rate.

EXAMPLE 8-6 Evaluating Trade Discounts

Compute the cost of trade credit if terms are 1/10, net 30 and the account is paid on

- 20th day.
- 30th day.

Solution.

$$\text{Cost of trade credit if paid on day 20} = \left(1 + \frac{0.01}{1 - 0.01} \right)^{(365/10)} - 1 = 44.32 \text{ percent}$$

$$\text{Cost of trade credit if paid on day 30} = \left(1 + \frac{0.01}{1 - 0.01} \right)^{(365/20)} - 1 = 20.13 \text{ percent}$$

As you can see, the cost of the credit is much lower when the company pays on the net day than any day prior to the net day.

7.2. Managing Cash Disbursements

Handling cash disbursements effectively is a common goal for most companies. To accomplish this, companies use best practices that include the ability to delay funding bank accounts until the day checks clear, to erect safeguards against check fraud, to pay electronically when it is cost effective to do so, and to manage bank charges for disbursement services. Best practices in cash disbursements, like check collections, depend on the nature of the payments—that is, whether they are made electronically or by check.

Banks offer controlled disbursement services to optimize the funding of checks on the same day they clear against the company's account. When combined with a positive pay service, which provides a filter against check fraud, this method provides the best practice in handling paper-based (check) disbursements.

7.3. Evaluating Accounts Payable Management

The **number of days of payables**, which is also referred to as the **average age of payables**, is a useful measure in evaluating a company's credit extension and collection.

If the accounts payable balance from the company's balance sheet is €450 million and the amount of purchases is €4,100 million, the number of days of payables is

$$\text{Number of days of payables} = \frac{\text{Accounts payable}}{\text{Average day's purchases}} = \frac{450}{4100/365} = 40.06 \text{ days}$$

Comparing the number of days of payables with the credit terms under which credit was granted to the company is important; paying sooner than necessary is costly in terms of the cost of credit, and paying later than the net day is costly in terms of relations with suppliers.

In some cases, treasurers will manage the company's payables closely, comparing the number of days of payables with the number of days of inventory because in some industries these two numbers of days are similar to one another.

8. MANAGING SHORT-TERM FINANCING

An overall short-term financial strategy should focus on assuring that the company maintains a sound liquidity position. It should also reflect the degree of risk the company believes can be managed without affecting the company's stability. It is common to consider short-term financial strategies as applying mostly to investments. However, they should include other financial activities as well. In many cases, a company will only be an investor or borrower, but it is common for large multinational corporations to have both short-term investments and short-term borrowing.

A short-term policy should include guidelines for managing investment, borrowing, foreign exchange, and risk management activities and should encompass all the company's operations, including foreign subsidiaries and other domestic subsidiaries that are self-financing. These guidelines accomplish several things.

Too often companies do not explore their options sufficiently, and as a result, they do not take advantage of cost savings that some forms of borrowing offer. This lack of awareness usually indicates that a company's treasurer may not be familiar with the common forms of short-term borrowing and has not factored them into an effective borrowing strategy.

8.1. Sources of Short-Term Financing

The main types of short-term borrowing alternatives that borrowers should consider include bank sources as well as money market sources. The main types of bank short-term borrowing include uncommitted and committed bank lines of credit and revolving credit agreements ("revolvers"). The latter two types can be unsecured or secured, depending on the company's financial strength and the general credit situation, which may vary from country to country. Two of these types—uncommitted lines and revolvers—are more common in the United States, whereas regular lines are more common in other parts of the world. We provide examples of several types of short-term borrowing options in Exhibit 8-15, with bank sources in Panel A of this exhibit and nonbank sources in Panel B. In this exhibit, we provide the primary features for each type of borrowing, including the typical users, source(s) for the alternative, the base rate for computing interest, type of compensation required, and any other comments.

EXHIBIT 8-15 Short-Term Financing Instruments

Panel A: Bank Sources				
Source/Type	Users	Rate Base	Compensation	Other
Uncommitted line	Large corporations	Prime (U.S.) or base rate (other countries), money market, LIBOR +	None	Mainly in U.S.; limited reliability
Regular line	All sizes		Commitment fee	Common everywhere
Overdraft line	All sizes		Commitment fee	Mainly outside U.S.
Revolving credit agreement	Larger corporations		Commitment fee + extra fees	Strongest form (primarily in U.S.)
Collateralized loan	Small, weak borrowers	Base +	Collateral	Common everywhere
Discounted receivables	Large companies	Varies	Extra fees	More overseas, but some in U.S.
Banker's acceptances	International companies	Spread over commercial paper	None	Small volume
Factoring	Smaller	Prime + +	Service fees	Special industries
Panel B: Nonbank Sources				
Source/Type	Users	Rate Base	Compensation	Other
Nonbank finance companies	Small, weak borrowers	Prime + + +	Service fees	Weak credits
Commercial paper	Largest corporations	Money market sets rate	Backup line of credit, commissions +	Lowest rates for short-term funds

Uncommitted lines of credit are, as the name suggests, the weakest form of bank borrowing. A bank may offer an uncommitted line of credit for an extended period of time, but it reserves the right to refuse to honor any request for use of the line. In other words, an uncommitted line is very unstable and is only as good as the bank's desire to offer it. Therefore, companies should not rely very much on uncommitted lines. In fact, banks will not "officially" acknowledge that an uncommitted line is usable, which means that uncommitted lines cannot be shown as a financial reserve in a footnote to the company's financial statements. The primary attraction of uncommitted lines is that they do not require any compensation other than interest.

Committed lines of credit are the form of bank line of credit that most companies refer to as regular lines of credit. They are stronger than uncommitted lines of credit because of the bank's formal commitment, which can be verified through an acknowledgment letter as part of the annual financial audit and can be footnoted in the company's annual report. These lines of credit are in effect for 364 days (one day short of a full year). This effectively makes sure that they are short-term liabilities, usually classified as notes payable or the equivalent, on the financial statements.

Regular lines are unsecured and are prepayable without any penalties. The borrowing rate is a negotiated item. The most common interest rates negotiated are borrowing at the bank's prime rate or at a money market rate plus a spread. The most common money market rate is an offshore rate—the **London Interbank Offered Rate (LIBOR)**, which is a Eurodollar rate—plus a spread. The spread varies depending on the borrower's creditworthiness. Regular lines, unlike uncommitted lines, require compensation, usually in the form of a **commitment fee**. The fee is typically a fractional percent (e.g., $\frac{1}{2}$ percent) of the full amount or the unused amount of the line, depending on bank–company negotiations.

Revolving credit agreements, which are often referred to as **revolvers**, are the strongest form of short-term bank borrowing facilities. They have formal legal agreements that define the aspects of the agreement. These agreements are similar to regular lines with respect to borrowing rates, compensation, and being unsecured. Revolvers differ in that they are in effect for multiple years (e.g., 3–5 years) and may have optional medium-term loan features. In addition, they are often done for much larger amounts than a regular line, and these larger amounts are spread out among more than one bank.

For companies with weak financial positions, such as those facing financial distress or that have deteriorated profitability, and many smaller companies that do not have sufficient capital, banks or other lenders (see nonbank sources in Exhibit 8-15) require that the company (or individual for much smaller companies) provide collateral in the form of an asset, such as a fixed asset that the company owns or high quality receivables and inventory. These assets are pledged against the loans, and banks or other lenders file a lien against them with the state in which the loan is made. This lien becomes part of the borrower's financial record and is shown on its credit report.

8.2. Short-Term Borrowing Approaches

Given the various forms of short-term borrowing, it is essential that a borrower have a planned strategy before getting stuck in an uneconomical situation. Many borrowing companies spend too little time establishing a sound strategy for their short-term borrowing beyond making sure that they are able to borrow at all, from any source.

The major objectives of a short-term borrowing strategy include the following:

- Ensuring that there is sufficient capacity to handle peak cash needs.
- Maintaining sufficient sources of credit to be able to fund ongoing cash needs.
- Ensuring that rates obtained are cost effective and do not substantially exceed market averages.

In addition, there are several factors that borrowers should consider as part of their short-term borrowing strategies, including the following:

- *Size and creditworthiness.* There is no doubt that the size of the borrower dictates the options available. Larger companies can take advantage of economies of scale to access commercial paper, banker's acceptances, and so on. The size of the borrower often reflects a manufacturing company's need for short-term financing. The size of lender is also an important criterion as larger banks have higher house or legal lending limits. Creditworthiness of the borrower will determine the rate, compensation, or even whether the loan will be made at all.

- *Sufficient access.* Borrowers should diversify to have adequate alternatives and not be reliant too much on one lender or form of lending if the amount of their lending is very large. Even so, it is typical for borrowers to use one alternative primarily, but often with more than one provider. Borrowers should be ready to go to other sources and know how to. Borrowers should not stay too long with just one source or with lowest rates. Many borrowers are usually prepared to trade off rates (somewhat) for certainty.
- *Flexibility of borrowing options.* Flexibility means the ability to manage maturities efficiently; that is, there should not be any “big” days, when significant amounts of loans mature. To do this successfully, borrowers need active maturity management, awareness of the market conditions (e.g., knowing when the market or certain maturities should be avoided), and the ability to prepay loans when unexpected cash receipts happen.

Borrowing strategies, like investment strategies, can be either passive or active. Passive strategies usually involve minimal activity with one source or type of borrowing and with little (if any) planning. This “take what you can get” strategy is often reactive in responding to immediate needs or “panic attacks.” Passive strategies are characterized by steady, often routine rollovers of borrowings for the same amount of funds each time, without much comparison shopping. Passive strategies may also arise when borrowing is restricted, such as instances where borrowers are limited to one or two lenders by agreement (e.g., in a secured loan arrangement).

Active strategies are usually more flexible, reflecting planning, reliable forecasting, and seeking the best deal. With active strategies, borrowers are more in control and do not fall into the rollover “trap” that is possible with passive strategies.

Many active strategies are matching strategies. Matching borrowing strategies function in a manner similar to matching investment strategies—loans are scheduled to mature when large cash receipts are expected. These receipts can pay back the loan, so the company does not have to invest the funds at potentially lower rates than the borrowing cost, thereby creating unnecessary costs.

8.3. Asset-Based Loans

Many companies that do not have the credit quality sufficient to qualify for unsecured bank loans may borrow from financial institutions by arranging for a secured loan, where the loan is secured using assets of the company. These secured loans are often referred to as **asset-based loans**. Often the assets used in short-term secured loans are the current assets of receivables and inventory. Unlike the collateral that may be used in longer-term borrowing, asset-based loans secured by accounts receivable and inventory present a challenge for the lender because the cash flows from accounts receivable depend on the amount and timing of collections and are influenced by the business risk of the company and its customers.

Lenders of these short-term asset-based loans are protected by the existence of the collateral and by provisions in the law that may provide them with a **blanket lien** on current and future assets of the company. The downside of a blanket lien is that even if the asset-based loan was secured by, say, accounts receivable, the lender may have a legal interest in other assets of the company until the loan is repaid.

Besides using working capital as the security for a loan, a company can use other means to generate cash flow from these working capital accounts. For example, a company can use its accounts receivable to generate cash flow through the **assignment of accounts receivable**, which is the use of these receivables as collateral for a loan, or a company can factor its accounts receivable, which is selling the receivables to the factor. In an assignment

arrangement, the company remains responsible for the collection of the accounts, whereas in a factoring arrangement the company is shifting the credit granting and collection process to the factor. The cost of this credit depends on the credit quality of the accounts and the costs of collection.

Like accounts receivables, inventory may be a source of cash flow through the use of the inventory as collateral, with different types of arrangements possible:

- An **inventory blanket lien**, in which the lender has a claim on some or all of the company's inventory, but the company can sell the inventory in the ordinary course of business.
- A **trust receipt arrangement**, in which the lender requires the company to certify that the goods are segregated and held in trust, with proceeds of any sale remitted to the lender immediately.
- A **warehouse receipt arrangement** is similar to the trust receipt arrangement, but there is a third party (i.e., a warehouse company) that supervises the inventory.

The cost of asset-based loans security by inventory depends on the length of time it takes to sell the goods.

8.4. Computing the Costs of Borrowing

In carrying out a sound short-term borrowing strategy, one of the key decisions is selecting the most cost effective form of short-term loan. However, this selection is often not a simple task, because each of the major forms has to be adjusted to be on a common basis for comparability. The fundamental rule is to compute the total cost of the form of borrowing and divide that number by the total amount of loan you received (i.e., net proceeds), adjusted for any discounting or compensating balances.

For example, in the case of a line of credit that requires a commitment fee,¹⁰ the cost of the line of credit is

$$\text{Cost} = \frac{\text{Interest} + \text{Commitment fee}}{\text{Loan amount}}$$

On the other hand, if the interest rate is stated as “all inclusive” such that the amount borrowed includes the interest, as may be the case in a banker's acceptance, the interest is compared with the net proceeds when determining the cost:

$$\text{Cost} = \frac{\text{Interest}}{\text{Net proceeds}} = \frac{\text{Interest}}{\text{Loan amount} - \text{Interest}}$$

If there are dealer's fees and other fees, the cost must consider the expenses beyond the interest. For example, if a borrowing involves a dealer's fee and a back-up fee and is quoted as all inclusive, the cost is

$$\text{Cost} = \frac{\text{Interest} + \text{Dealer's commission} + \text{Back-up costs}}{\text{Loan amount} - \text{Interest}}$$

¹⁰A commitment fee is a fee paid to the lender in return for the legal commitment to lend funds in the future.

The key is to compare the interest and fees paid with the net proceeds of the loan. If the loan is for a period less than a year, then we annualize accordingly.

EXAMPLE 8-7 Computing the Effective Cost of Short-Term Borrowing Alternatives

You are asked to select one of the following choices as the best offer for borrowing \$5,000,000 for one month:

1. Drawing down on a line of credit at 6.5 percent with a $\frac{1}{2}$ percent commitment fee on the full amount. Note: One-twelfth of the cost of the commitment fee (which gives an option to borrow any time during the year) is allocated to the first month.
2. A banker's acceptance at 6.75 percent, an all-inclusive rate.
3. Commercial paper at 6.15 percent with a dealer's commission of $\frac{1}{8}$ percent and a backup line cost of $\frac{1}{4}$ percent, both of these would be assessed on the \$5 million of commercial paper issued.

Solution.

Line of credit cost:

$$\begin{aligned}
 \text{Line cost} &= \frac{\text{Interest} + \text{commitment fee}}{\text{Usable loan amount}} \times 12 \\
 &= \frac{(0.065 \times \$5,000,000 \times \frac{1}{12}) + (0.005 \times \$5,000,000 \times \frac{1}{12})}{\$5,000,000} \times 12 \\
 &= \frac{\$27,083.33 + 2,083.33}{\$5,000,000} \times 12 = 0.07 \text{ or } 7 \text{ percent}
 \end{aligned}$$

Banker's acceptance cost:

$$\begin{aligned}
 \text{BA cost} &= \frac{\text{Interest}}{\text{Net proceeds}} \times 12 \\
 &= \frac{0.0675 \times \$5,000,000 \times \frac{1}{12}}{\$5,000,000 - (0.0675 \times \$5,000,000 \times \frac{1}{12})} \times 12 \\
 &= \frac{\$28,125}{\$4,971,875} \times 12 = 0.0679 \text{ or } 6.79 \text{ percent}
 \end{aligned}$$

Commercial paper cost (quoted as nominal rate at a discount)

$$\begin{aligned}
 \text{CP cost} &= \frac{\text{Interest} + \text{Dealer's commission} + \text{Back-up costs}}{\text{Net proceeds}} \times 12 \\
 &= \frac{(0.0615 \times \$5,000,000 \times \frac{1}{12}) + (0.00125 \times \$5,000,000 \times \frac{1}{12}) + (0.0025 \times \$5,000,000 \times \frac{1}{12})}{\$5,000,000 - (0.0615 \times \$5,000,000 \times \frac{1}{12})} \times 12 \\
 &= \frac{\$25,625 + 520.83 + 1041.67}{\$5,000,000 - 25,625} \times 12 = 0.0656 \text{ or } 6.56 \text{ percent}
 \end{aligned}$$

We have simplified this cost analysis by assuming a loan for one month, using a factor of $\frac{1}{12}$ to determine the interest and a factor of 12 to annualize. For specific arrangements for which the cost is determined using a 365-day or 360-day year, the appropriate adjustment would be required.

As the results show, the commercial paper alternative comes out with the lowest effective cost and the line of credit has the highest effective cost. The commitment fee that was payable on the full line added more additional costs than the additional fees and discounting effects added in the other two options.

Line cost	7.00 percent
Banker's acceptance cost	6.79 percent
Commercial paper cost	6.56 percent

9. SUMMARY

In this chapter, we considered a key aspect of financial management: the management of a company's working capital. This aspect of finance is a critical one in that it assures, if done effectively, that the company will stay solvent and remain in business. If done improperly, the results can be disastrous for the company.

Working capital management covers a wide range of activities, most of which are focused on or involve the company's cash levels. Competing uses for the company's cash, which is often a scarce resource, create the need for an efficient method of handling the short-term financing of company activities.

Major points that were covered in this chapter:

- Understanding how to evaluate a company's liquidity position.
- Calculating and interpreting operating and cash conversion cycles.
- Evaluating overall working capital effectiveness of a company and comparing it with other peer companies.
- Identifying the components of a cash forecast to be able to prepare a short-term (i.e., up to one year) cash forecast.

- Understanding the common types of short-term investments, and computing comparable yields on securities.
- Measuring the performance of a company's accounts receivable function.
- Measuring the financial performance of a company's inventory management function.
- Measuring the performance of a company's accounts payable function.
- Evaluating the short-term financing choices available to a company and recommending a financing method.

Working capital management is an integral part of the financial management of a company because many short-term activities have effects on long-term financial decisions. Having an effective short-term financial strategy, for example, allows a company to plan ahead with the confidence that its short-term concerns are being handled properly. Perhaps unlike other areas of finance, short-term finance has more qualitative features, making each company's case somewhat different from another's. This unique nature, combined with the short time frame associated with this aspect of finance, makes short-term finance a dynamic, challenging activity.

PROBLEMS

1. Suppose a company has a current ratio of 2.5 times and a quick ratio of 1.5 times. If the company's current liabilities are €100 million, the amount of inventory is *closest* to:
 - A. €50 million.
 - B. €100 million.
 - C. €150 million.
2. Given the following financial statement data, calculate the operating cycle for this company.

	In millions
Credit sales	\$25,000
Cost of goods sold	\$20,000
Accounts receivable	\$2,500
Inventory – Beginning balance	\$2,000
Inventory – Ending balance	\$2,300
Accounts payable	\$1,700

The operating cycle for this company is *closest* to:

- A. 42.0 days.
- B. 47.9 days.
- C. 78.5 days.

3. Given the following financial statement data, calculate the net operating cycle for this company.

	In millions
Credit sales	\$40,000
Cost of goods sold	\$30,000
Accounts receivable	\$3,000
Inventory – Beginning balance	\$1,500
Inventory – Ending balance	\$2,000
Accounts payable	\$4,000

The net operating cycle of this company is *closest* to:

- A. 3.8 days.
 - B. 24.3 days.
 - C. 51.7 days.
4. The bond equivalent yield for a 182-day U.S. Treasury bill that has a price of \$9,725 per \$10,000 face value is *closest* to:
- A. 5.44%.
 - B. 5.53%.
 - C. 5.67%.
5. A company increasing its credit terms for customers from 1/10, net 30 to 1/10, net 60 will *most likely* experience:
- A. an increase in cash on hand.
 - B. a higher level of uncollectible accounts.
 - C. an increase in the average collection period.
6. Suppose a company uses trade credit with the terms of 2/10, net 50. If the company pays their account on the 50th day, the effective borrowing cost of skipping the discount on day 10 is *closest* to:
- A. 14.9%.
 - B. 15.0%.
 - C. 20.2%.
7. William Jones is evaluating three possible means of borrowing \$1 million for one month:
- 1. Drawing down on a line of credit at 7.2% with a $\frac{1}{2}$ percent commitment fee on the full amount with no compensating balances.
 - 2. A banker's acceptance at 7.1%, an all-inclusive rate.
 - 3. Commercial paper at 6.9% with a dealer's commission of $\frac{1}{4}$ % and a backup line cost of $\frac{1}{3}$ %, both of these would be assessed on the \$1 million of commercial paper issued.
- Which of these forms of borrowing results in the lowest cost of credit?
- A. Line of credit.
 - B. Banker's acceptance.
 - C. Commercial paper.

The following information relates to Questions 8–12.

Mary Gonzales is evaluating companies in the office supply industry and has compiled the following information:

Company	20X1		20X2	
	Credit Sales (\$)	Average Receivables Balance (\$)	Credit Sales (\$)	Average Receivables Balance (\$)
A	5.0 million	1.0 million	6.0 million	1.2 million
B	3.0 million	1.2 million	4.0 million	1.5 million
C	2.5 million	0.8 million	3.0 million	1.0 million
D	0.5 million	0.1 million	0.6 million	0.2 million
Industry	25.0 million	5.0 million	28.0 million	5.4 million

8. Which company had the highest number of days of receivables for the year 20X1?
 - A. Company A.
 - B. Company B.
 - C. Company C.
9. Which company has the lowest accounts receivable turnover in the year 20X2?
 - A. Company A.
 - B. Company B.
 - C. Company D.
10. The industry average receivables collection period:
 - A. increased from 20X1 to 20X2.
 - B. decreased from 20X1 to 20X2.
 - C. did not change from 20X1 to 20X2.
11. Which company reduced the average time it took to collect on accounts receivable from 20X1 to 20X2?
 - A. Company B.
 - B. Company C.
 - C. Company D.
12. Gonzales determined that Company A had an operating cycle of 100 days in 20X2, whereas Company D had an operating cycle of 145 days for the same fiscal year. This means that:
 - A. Company D's inventory turnover is less than that of Company A.
 - B. Company D's inventory turnover is greater than that of Company A.
 - C. Company D's cash conversion cycle is shorter than that of Company A.

CHAPTER 9

FINANCIAL STATEMENT ANALYSIS

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LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- Interpret common-size balance sheets and common-size income statements and demonstrate their use by applying either vertical analysis or horizontal analysis.
- Calculate and interpret measures of a company's operating efficiency, internal liquidity (liquidity ratios), solvency, and profitability, and demonstrate the use of these measures in company analysis.
- Calculate and interpret variations of the DuPont expression and demonstrate use of the DuPont approach in corporate analysis.
- Calculate and interpret basic earnings per share and diluted earnings per share.
- Calculate and interpret book value of equity per share, price-to-earnings ratio, dividends per share, dividend payout ratio, and plowback ratio.
- Demonstrate the use of pro forma income and balance sheet statements.

1. INTRODUCTION

The **financial analysis** of a company is a process of selecting, evaluating, and interpreting financial data, along with other pertinent information, in order to formulate an assessment of the company's present and future financial condition and performance. We can use financial analysis to evaluate the efficiency of a company's operations, its ability to manage expenses, the effectiveness of its credit policies, and its creditworthiness, among other things.

The analyst draws the data needed in financial analysis from many sources. The primary source of these data is the company itself, through its annual and quarterly reports and other required disclosures. The annual report comprises the income statement, the balance sheet, the statement of cash flows, and the statement of shareholders' equity, as well as footnotes to these statements and management's discussion and analysis.

In addition to information that companies are required to disclose through financial statements, we can find other useful information quite readily, including the market prices of securities of publicly traded corporations and industry statistics. Another source of information is economic data, such as the gross domestic product (GDP), the producer price index (PPI), and the consumer price index (CPI), which we can use in assessing the recent performance or future prospects of a company or industry.¹

Suppose you are evaluating a company that owns a chain of retail outlets. What information do you need to judge the company's performance and financial condition? You need financial data, but those data do not tell the whole story. You also need information on consumer spending, producer prices, consumer prices, and competition. These are economic data that are readily available from government and private sources. We are often concerned about how a company performs in different economic climates, so we would want to make sure to evaluate the company through at least one full economic cycle.²

In addition to financial statement data, market data, and economic data, we also need to examine events that may help explain the company's present condition and may have a bearing on its future prospects. For example, did the company recently close production facilities? Is the company developing a new product or acquiring another company? Current events can provide information that may be incorporated into financial analysis—both to explain recent performance and to help predict future performance.

The financial analyst must select the pertinent information, analyze it, and interpret the analysis, offering judgments on the current and future financial condition and operating performance of the company. This chapter introduces you to the tools of financial analysis. These tools include common-size analysis, financial ratio analysis, and pro forma analysis.

In common-size analysis, we restate financial statements in a form that helps the analyst detect significant changes and trends. The approach requires us to use a reference point—either an account in a given financial statement or a prior year's entire statement—to scale the financial statement data. This approach allows us to compare a company with itself over time or to compare companies of different sizes.

In financial ratio analysis, we select relevant information—primarily from the financial statement data—and evaluate it in the context of other financial data, as well as over time and in comparison with other companies or the industry. We show how to incorporate market data and economic data into the analysis and interpretation of financial ratios.

In pro forma analysis, we use what we have learned through common-size and financial ratio analyses to forecast the company's financial condition and performance. We can then use these pro forma statements to perform sensitivity analyses for future periods.

2. COMMON-SIZE ANALYSIS

If we examine financial statements over time for a company, it is fairly difficult to spot changes in relationships because the scale of the company's accounts changes over time due to

¹In the United States, for example, the GDP is calculated by the U.S. Department of Commerce, Bureau of Economic Analysis, and the PPI and CPI are produced by the U.S. Department of Labor, Bureau of Labor Statistics.

²An economic cycle is generally viewed as the period over which we can observe expansion, a peak, recession, and a trough in economic activity.

inflation, growth, and acquisitions and divestitures. It is also challenging to compare financial statements of companies of different sizes. A technique that we can use to control for the scale effect is common-size analysis.

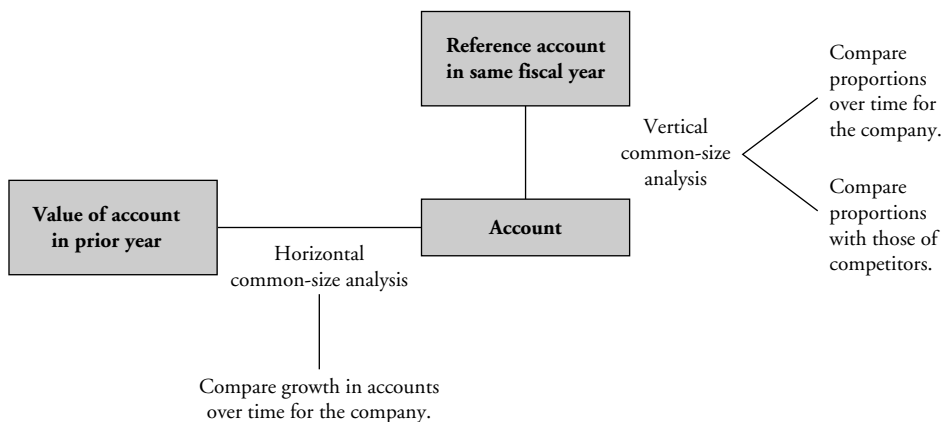
Common-size analysis is the restatement of financial statement items using a common denominator or reference item that allows us to identify trends and major differences. There are two types of common-size analysis. The most common is **vertical common-size analysis**, in which we compare the accounts in a given period to a benchmark item in that same year:

- For the income statement, the benchmark is revenues. For a given period, each item in the income statement is restated as a percentage of revenues.
- For the balance sheet, the benchmark is total assets. For a given point in time, each item in the balance sheet is restated as a percentage of total assets.

The analyst can then compare these proportions across time and across the company's industry:

- Comparing the same company in different years allows us to focus on changes in the composition of accounts or expenses over time.
- Comparison with competitors' vertical common-size statements for the same year allows us to examine differences in the makeup of accounts for similar companies.
- Comparison of the company's vertical common-size statements with competitors' common-size statements over time allows the analyst to compare shifts in accounts over time.

Another form of common-size analysis is **horizontal common-size analysis**, in which we use the accounts in a given period as the benchmark or base period and restate every account in *subsequent* periods as a percentage of the base period's same account. Horizontal common-size analysis is a time-series analysis and is useful for identifying trends and growth in accounts over time. Whereas each account in a vertical common-size analysis is restated each year as a proportion of the reference account (e.g., revenues or total assets), each account in a horizontal common-size analysis is instead compared with the value of that same account in a benchmark year:



2.1. Vertical Common-Size Analysis

We use vertical common-size analysis to analyze patterns in profitability (using common-size income statements) and patterns in investments and financing (using common-size balance sheets). Because we scale each account by the reference account, we can also use the resulting percentages to make comparisons across companies. For example, we can get a sense of how profit margins have changed over time by examining gross profit as a percentage of revenues over successive periods. Additionally, we can examine this percentage relative to the company's competitors. We can also see how a company's reliance on debt financing has changed over time by focusing on liabilities as a percentage of assets. Moreover, we can represent this information in graphical form, which allows us to more readily visualize trends in these components over time.

To see how this approach works, consider The Procter & Gamble Company's financial statements for 2003 and 2004, summarized below. The reported financial data from the "Amount" columns have been converted into percentages of revenues (i.e., common-size statements), shown in the "Common-Size Statement" columns:

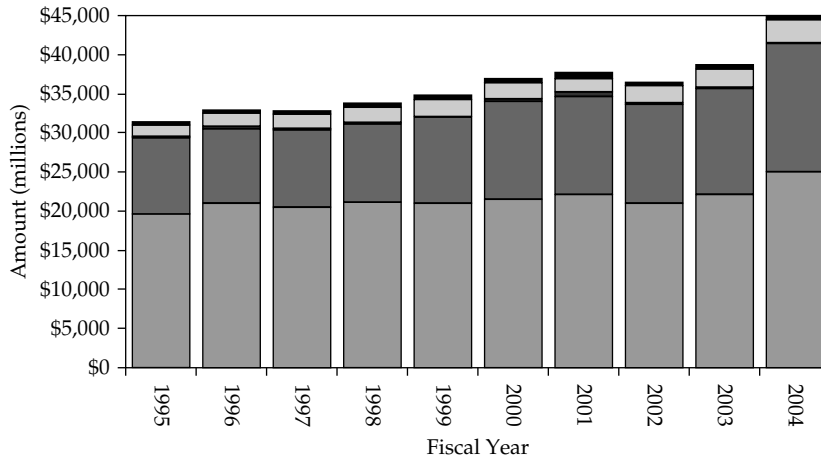
Fiscal Year Ending 30 June	Amount (millions of dollars)		Common-Size Statement (percent of revenues)	
	2003	2004	2003	2004
Revenues	\$43,377	\$51,407	100.0	100.0
Cost of goods sold	<u>22,141</u>	<u>25,076</u>	<u>51.0</u>	<u>48.8</u>
Gross profit	\$21,236	\$26,331	49.0	51.2
Selling, general, and administrative expenses	<u>13,383</u>	<u>16,504</u>	<u>30.9</u>	<u>32.1</u>
Operating income	\$7,853	\$9,827	18.1	19.1
Interest expense	561	629	1.3	1.2
Other nonoperating income, net	<u>238</u>	<u>152</u>	<u>0.5</u>	<u>0.3</u>
Earnings before income taxes	\$7,530	\$9,350	17.4	18.2
Income tax	<u>2,344</u>	<u>2,869</u>	<u>5.4</u>	<u>5.6</u>
Net income	\$5,186	\$6,481	12.0	12.6

Preparing these statements over several periods allows us to spot trends and interruptions in trends. For example, we can examine changes in profitability by comparing various expenses and net income as percentages of revenues, as in Exhibit 9-1. Panel A shows the dollar amounts of income and expenses, whereas Panel B shows the common-size income statement. In Panel B, in which everything has been scaled relative to revenues, it is easier to see the proportions of income and expenses and how those proportions changed over the years. In Panel B, we see that Procter & Gamble's net income has increased over time as a

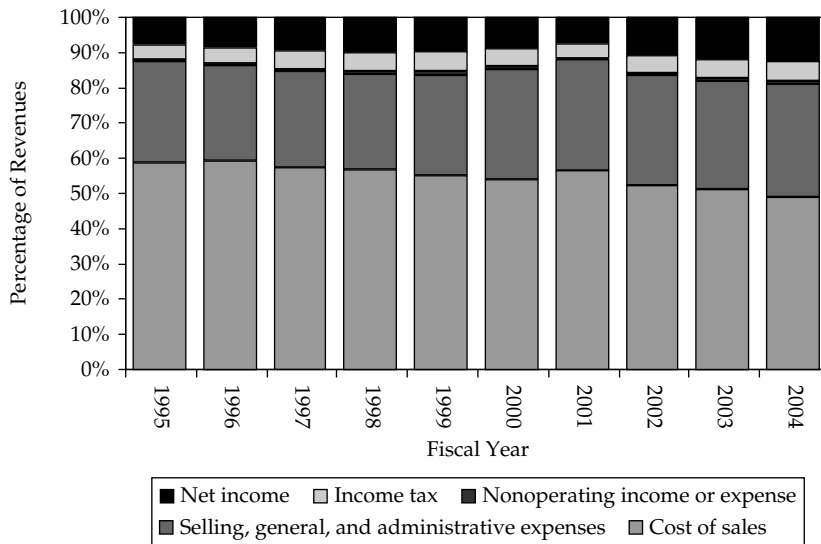
percentage of sales and that this increase is concurrent with a gradual decrease in the cost of sales.

EXHIBIT 9-1 Procter & Gamble Company Income Statements, 1995–2004

Panel A: As Reported



Panel B: Common-Size Income Statement



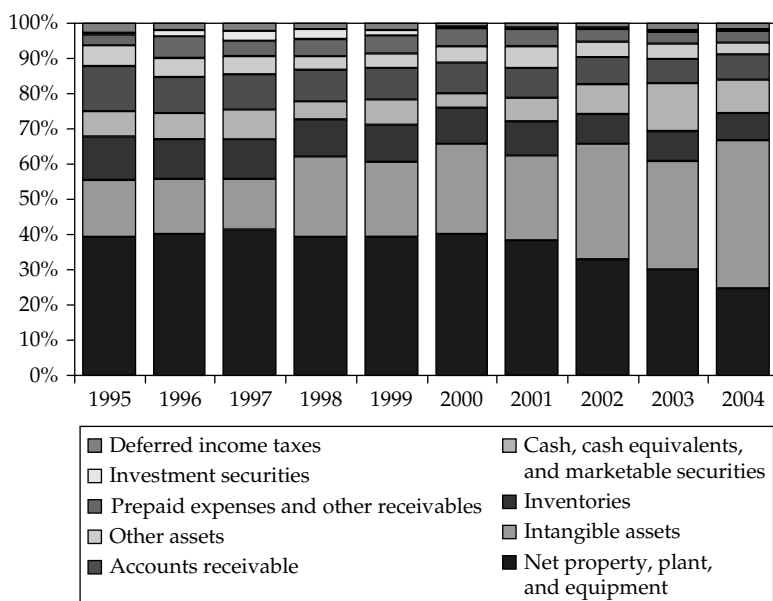
Source of data: The Procter & Gamble Company annual reports, various years.

As we did for the income statement, we can restate Procter & Gamble's reported balance sheet items in terms of a percentage of total assets:

Fiscal Year Ending 30 June	Amount (millions of dollars)		Common-Size Statement (percent of assets)	
	2003	2004	2003	2004
Cash, cash equiv., and marketable securities	\$5,912	\$5,469	13.5	9.6
Investment securities	300	423	0.7	0.7
Accounts receivable	3,038	4,062	7.0	7.1
Inventories	3,640	4,400	8.3	7.7
Deferred income taxes	843	958	1.9	1.7
Prepaid expenses and other receivables	<u>1,487</u>	<u>1,803</u>	<u>3.4</u>	<u>3.2</u>
Total current assets	\$15,220	\$17,115	34.8	30.0
Net property, plant, and equipment	\$13,104	\$14,108	30.0	24.7
Intangible assets	13,507	23,900	30.9	41.9
Other assets	<u>1,875</u>	<u>1,925</u>	<u>4.3</u>	<u>3.4</u>
Total assets	\$43,706	\$57,048	100.0	100.0

As with the income statement, it is also helpful to represent common-size balance sheet accounts over several successive periods, as in Exhibit 9-2, to gauge how the company's investments have changed over time. From an examination of these proportions over time, we

EXHIBIT 9-2 Common-Size Assets of Procter & Gamble, 1995–2004



can see how the company's investments in working capital accounts, fixed assets, and intangible assets have changed over the years. In the case of Procter & Gamble, there is an increase in the investment in intangibles, attributable to goodwill and other intangibles through acquisitions, and a lower relative investment in net property, plant, and equipment.

We can similarly restate liabilities and equity in terms of total assets, providing a look at patterns and changes in the composition of the company's capital structure:

Fiscal Year Ending 30 June	Amount (millions of dollars)		Common-Size Statement (percent of assets)	
	2003	2004	2003	2004
Accounts payable	\$2,795	\$3,617	6.4	6.3
Accrued and other liabilities	5,512	7,689	12.6	13.5
Taxes payable	1,879	2,554	4.3	4.5
Debt due in one year	<u>2,172</u>	<u>8,287</u>	<u>5.0</u>	<u>14.5</u>
Total current liabilities	\$12,358	\$22,147	28.3	38.8
Long-term debt	\$11,475	\$12,554	26.3	22.0
Deferred income taxes	1,396	2,261	3.2	4.0
Other noncurrent liabilities	<u>2,291</u>	<u>2,808</u>	<u>5.2</u>	<u>4.9</u>
Total liabilities	\$27,520	\$39,770	63.0	69.7
Convertible Class A preferred stock	\$1,580	\$1,526	3.6	2.7
Common shareholders' equity	<u>14,606</u>	<u>15,752</u>	<u>33.4</u>	<u>27.6</u>
Total shareholders' equity	<u>\$16,186</u>	<u>\$17,278</u>	<u>37.0</u>	<u>30.3</u>
Total liabilities and shareholders' equity	\$43,706	\$57,048	100.0	100.0

The common-size liabilities and equity for the years 1995–2004 are provided in Exhibit 9-3.

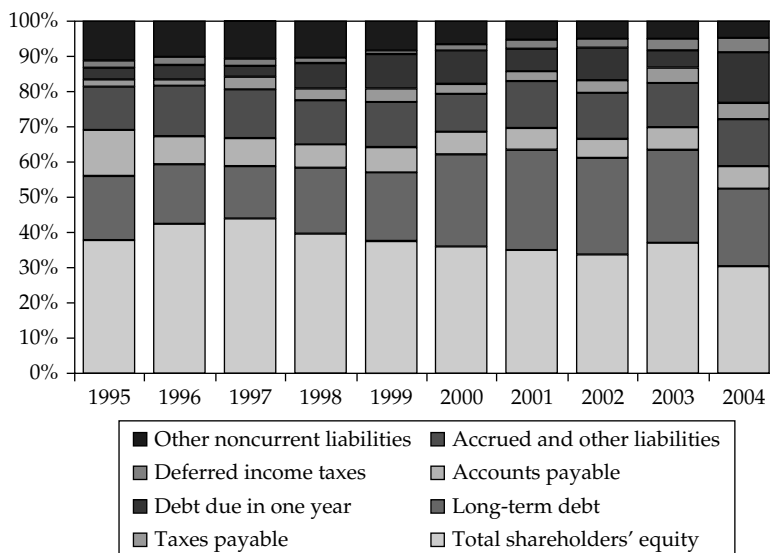
As we can see in this exhibit, Procter & Gamble has increased its relative use of debt in its capital structure over time, most notably following 1999, which coincides with its major restructuring in the 1999–2001 period.

2.2. Horizontal Common-Size Analysis

In horizontal common-size analysis, we use a base year as the benchmark and then restate all subsequent years relative to that base. In the case of Procter & Gamble, if we choose 2003 as the base, we would then calculate the common-size income statement for 2004 as follows:³

³Horizontal common-size analysis, as in this example, is often also referred to as “common-base-year analysis.” Note that for illustrative purposes we are examining the difference between two years. In practice, however, an analyst would typically examine trends over several years.

EXHIBIT 9-3 Common-Size Liabilities and Equity for Procter & Gamble, 1995–2004



Source of data: The Procter & Gamble Company annual reports, various years.

Fiscal Year Ending 30 June	Amount (millions of dollars)		Common-Size Statement (percent of 2003 value)	
	2003	2004	2003	2004
Revenues	\$43,377	\$51,407	100.0	118.5
Cost of goods sold	22,141	25,076	100.0	113.3
Gross profit	\$21,236	\$26,331	100.0	124.0
Selling, general, and administrative expenses	13,383	16,504	100.0	123.3
Operating income	\$7,853	\$9,827	100.0	125.1
Interest expense	561	629	100.0	112.1
Other nonoperating income, net	238	152	100.0	63.9
Earnings before income taxes	\$7,530	\$9,350	100.0	124.2
Income tax	2,344	2,869	100.0	122.4
Net income	\$5,186	\$6,481	100.0	125.0

We can see that the growth in net income is traceable largely to the slower growth of cost of goods sold and interest expense relative to revenue growth.

Calculating Procter & Gamble's common-size assets for 2004 relative to 2003, we see that much of the growth in assets is attributable to the growth in intangible assets:

Fiscal Year Ending 30 June	Amount (millions of dollars)		Common-Size Statement (percent of 2003 value)	
	2003	2004	2003	2004
Cash, cash equiv., and marketable securities	\$5,912	\$5,469	100.0	92.5
Investment securities	300	423	100.0	141.0
Accounts receivable	3,038	4,062	100.0	133.7
Inventories	3,640	4,400	100.0	120.9
Deferred income taxes	843	958	100.0	113.6
Prepaid expenses and other receivables	<u>1,487</u>	<u>1,803</u>	100.0	121.3
Total current assets	\$15,220	\$17,115	100.0	112.5
Net property, plant, and equipment	\$13,104	\$14,108	100.0	107.7
Intangible assets	13,507	23,900	100.0	176.9
Other assets	<u>1,875</u>	<u>1,925</u>	100.0	102.7
Total assets	\$43,706	\$57,048	100.0	130.5

Procter & Gamble's common-size liabilities for 2004 relative to 2003 indicate that much of the growth in assets was financed by debt rather than equity:

Fiscal Year Ending 30 June	Amount (millions of dollars)		Common-Size Statement (percent of 2003 value)	
	2003	2004	2003	2004
Accounts payable	\$2,795	\$3,617	100.0	129.4
Accrued and other liabilities	5,512	7,689	100.0	139.5
Taxes payable	1,879	2,554	100.0	135.9
Debt due in one year	<u>2,172</u>	<u>8,287</u>	100.0	381.5
Total current liabilities	\$12,358	\$22,147	100.0	179.2
Long-term debt	\$11,475	\$12,554	100.0	109.4
Deferred income taxes	1,396	2,261	100.0	162.0
Other noncurrent liabilities	<u>2,291</u>	<u>2,808</u>	100.0	122.6
Total liabilities	\$27,520	\$39,770	100.0	144.5
Convertible Class A preferred stock	\$1,580	\$1,526	100.0	96.6
Common shareholders' equity	<u>14,606</u>	<u>15,752</u>	100.0	107.8
Total shareholders' equity	<u>\$16,186</u>	<u>\$17,278</u>	100.0	106.7
Total liabilities and shareholders' equity	\$43,706	\$57,048	100.0	130.5

In the case of Procter & Gamble, total liabilities rose 44.5 percent from 2003 to 2004 whereas shareholders' equity increased by only 6.7 percent. We can also see that the increase in current liabilities is primarily attributable to the increase in debt due in one year.

As you can see in our example of Procter & Gamble, common-size analysis is useful for comparing different periods because we have scaled all the accounts either to a reference point within the statement (vertical common-size analysis) or to a reference point in time (horizontal common-size analysis). We can also use common-size analysis to aid in our comparisons of companies of different sizes. For example, to compare Procter & Gamble with Clorox, a much smaller company, we can apply vertical common-size analysis to scale the assets in the balance sheet for each company:

Fiscal Year Ending 30 June	2004 Amounts (millions of dollars)		Common-Size Statement (percent of total assets)	
	Clorox	P&G	Clorox	P&G
Cash, cash equiv., and marketable securities	\$232	\$5,469	6.1	9.6
Investment securities	0	423	0.0	0.7
Accounts receivable	460	4,062	12.0	7.1
Inventories	306	4,400	8.0	7.7
Other current assets	45	2,761	1.2	4.8
Total current assets	\$1,043	\$17,115	27.2	30.0
Net property, plant, and equipment	\$1,052	\$14,108	27.4	24.7
Intangible assets	1,375	23,900	35.9	41.9
Other assets	364	1,925	9.5	3.4
Total assets	\$3,834	\$57,048	100.0	100.0

We can see from this comparison that Clorox has a heavier investment in accounts receivable than Procter & Gamble, less invested in intangible assets, and less in cash and cash equivalents.

3. FINANCIAL RATIO ANALYSIS

Financial ratio analysis is the use of financial accounting and other information to assess a company's financial performance and financial condition. Specifically, financial ratio analysis uses comparisons of financial data in the form of ratios to assess a company's financial health and profitability.

There are hundreds of ratios that can be formed using available financial data. One of the challenges in financial analysis is determining which ratios are most appropriate for the particular company in question. In the analysis of a retail store, for example, ratios that relate to inventory, collections on credit, and comparative sales on a per store basis are informative in assessing financial performance. However, in assessing the success of an airline, ratios such

as seats sold versus capacity, costs per passenger or flight mile, and efficiency in using the investment in aircraft would be important, whereas ratios related to inventory or collections on credit might be less useful.

Another challenge is selecting ratios that are most appropriate for the purpose at hand. For example, if the purpose of the analysis is to understand a company's profitability, the ratios that relate to returns, which include profit margins and asset utilization, are important. If we want to understand a company's effectiveness in its credit policies and collections, we focus on ratios involving its accounts receivable. To evaluate a company's creditworthiness, an analyst might instead focus on ratios related to the company's debts and its ability to satisfy those obligations.

Financial ratios are calculated using a company's financial statement and market data, yet the interpretation of these ratios should also consider company-specific events and the general economic cycle. For example, if a company acquires another company that is in a different line of business, a noticeable shift in some ratios may accompany that acquisition. Such shifts may simply reflect the different balance in accounts and margins of the acquired business. Further, changes in ratios may be in response to changes in general economic conditions; for example, a cyclical company will likely experience a change in profitability as economic conditions change.

Though this chapter demonstrates the calculation of financial ratios, in practice, many analysts rely on financial ratios that have been calculated and provided by a vendor. In these instances, care must be taken to understand how the ratio is calculated by the vendor for several reasons. First, some ratios do not have a unique calculation. For example, the return on assets may be calculated by comparing operating profit to total assets by one financial service but calculated as the ratio of net profit to total assets by another. Second, a ratio may be calculated by one vendor using end-of-period values and by another using average values over the period. For example, one vendor may calculate the return on assets using the net profit for the fiscal year and the end-of-period balance in total assets, whereas another vendor may calculate the return on assets using the net profit for the fiscal year and the average of the total assets over the same year. Third, with the large number of possible financial ratios that can be calculated, there are many ratios that do not have a unique name. For example, the plowback ratio, which is the proportion of earnings reinvested in the company, may also be referred to as the retention ratio.

We can classify ratios into several types, based on the dimension of the company's performance and condition:

- We use **activity ratios** to evaluate a company's effectiveness in putting its asset investment to good use.
- We use **liquidity ratios** to measure a company's ability to meet its short-term, immediate obligations.
- We look at a company's **solvency ratios** to gauge its ability to meet its debt obligations.
- We use **profitability ratios** to analyze a company's ability to manage its expenses to generate profits from its sales.

A thorough financial analysis of a company requires the use of ratios from more than one of these classifications, along with other information about the company.

3.1. Activity Ratios

We often want to evaluate how well a company does in putting its investments to use. We can use **activity ratios** as measures of how well assets are used. Activity ratios can help us evaluate

the benefits produced by specific assets, such as inventory or accounts receivable. Or they can be used to evaluate the benefits produced by all of a company's assets collectively. There are two types of activity measures: turnover ratios and numbers of days. With turnover ratios, we measure how many times during the period the company has effectively used its assets to produce a benefit. With number of days measures, we arrive at an approximation of how long it takes to recoup the company's investment. As you will see, there is a direct relationship between turnover ratios and the numbers of days.

3.1.1. Turnover Ratios

We use turnover ratios to gauge the company's efficiency in the use of its assets. A turnover ratio compares a measure of output to the investment used to generate that output. The most common turnover ratios are the inventory turnover, the total asset turnover, and the receivables turnover. **Inventory turnover** is the ratio of cost of goods sold to inventory. This ratio is an indication of the resources tied up in inventory relative to the speed at which inventory is sold during the period:

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

Though it is possible to construct such a ratio with account balances as of the most recent financial statements, for account balances drawn from the balance sheet, it is ideal to use average balances over multiple periods. Many companies exhibit seasonality in their revenues. Additionally, many companies choose fiscal year-ends that coincide with the lowest points in their operating cycles. Consequently, inventory and other balance sheet items that are drawn from a company's annual financial statements may not be representative of the typical account balances that are carried throughout the year.

In the case of Procter & Gamble, we can see that there is seasonality in both revenues and inventory, as shown in Exhibit 9-4 with quarterly revenues and inventory over a four-year period. Procter & Gamble's revenues and inventory levels are lowest in the quarter ending in June of each year, its fiscal year-end. Therefore, in the calculation of the inventory turnover ratio, we would want to use an average inventory amount if it differs significantly from the year-end inventory.⁴

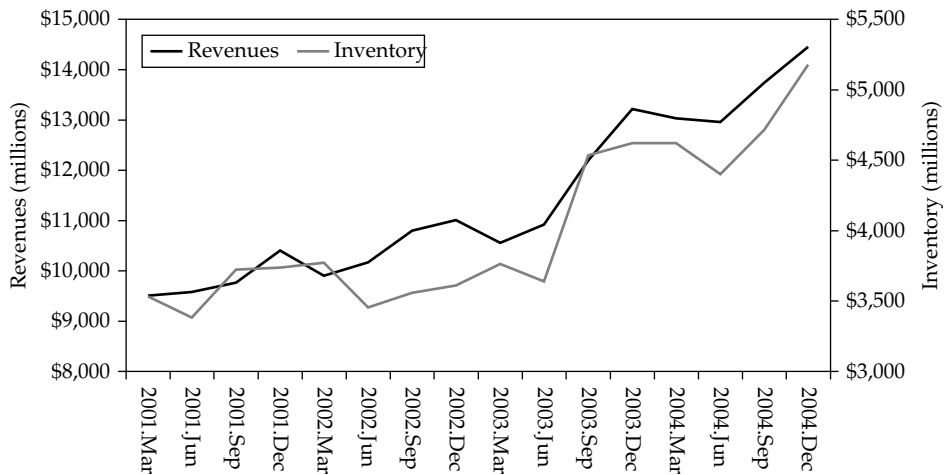
There is no particular number for an inventory turnover ratio that is inherently good or bad. An appropriate turnover ratio may vary among companies and even among product lines in the same company. What is important is the interaction of turnover and profitability, which then influences the returns on the company's or owners' investment.

Receivables turnover is the ratio of total revenue to average accounts receivable. This ratio provides an indication of the resources tied up in accounts receivable and the speed at which receivables are collected during the period:

$$\text{Receivables turnover} = \frac{\text{Total revenue}}{\text{Average receivables}}$$

⁴This is the case for any ratio that involves the balance in an account that is seasonal, such as inventory and accounts receivable. However, when we are on the outside looking in, as is often the case in financial analysis, we must use annual amounts or the average of the quarterly amounts to estimate this turnover ratio.

EXHIBIT 9-4 Quarterly Revenues and Inventory for Procter & Gamble, March 2001 through December 2004



Source of data: The Procter & Gamble Company quarterly reports, various years.

The receivables turnover is a measure of the number of times accounts receivables have been created through the sale of goods on credit and extinguished through customer payments during the period. In other words, this estimate helps us gauge how long it takes customers to pay, on average, during the period. If the turnover is, say, 12 times, we know that it takes customers approximately 30 days to pay on their accounts. The longer customers take to pay on their accounts, all else being equal, the higher the investment in working capital that will be required by the company. This ratio is therefore quite useful in assessing a company's credit policy.

Total asset turnover is the ratio of revenues to total assets. This ratio indicates the extent to which the investment in total assets results in revenues.

$$\text{Total asset turnover} = \frac{\text{Total revenue}}{\text{Average total assets}}$$

The resultant number is a multiplier of the revenues that are generated for the investment in total assets. For example, if assets are £100 million and revenues are £125 million, the total asset turnover is 1.25, meaning that £1.25 of revenues are generated per £1 of asset investment.

Still another turnover measure that may be useful in assessing a company's efficiency is working capital turnover. **Working capital** is the difference between current assets and current liabilities.⁵ With the **working capital turnover**, we compare revenues with working capital to produce a measure that shows how efficiently working capital is employed:

$$\text{Working capital turnover} = \frac{\text{Total revenue}}{\text{Average working capital}}$$

⁵The difference between current assets and current liabilities is sometimes also referred to as the **net current assets**.

As with any other ratio, turnover ratios cannot be judged in isolation but rather must be considered in conjunction with other dimensions of the company's condition and performance, the trends of the ratios over time, and industry norms.

Consider that a turnover ratio may be constructed to evaluate the use of any set of assets by comparing the gross benefit—usually revenues—to the employed assets. For example, if you wish to focus on a company's fixed assets, you can construct a fixed asset turnover as the ratio of revenues to net plant and equipment.

EXAMPLE 9-1 Turnover Ratios for Procter & Gamble, 2004

Given the 2004 financial results for Procter & Gamble provided in Section 2, calculate the inventory turnover, receivables turnover, and total asset turnover ratios for Procter & Gamble.

$$\text{Inventory turnover} = \frac{\$25,076}{\$4,400} = 5.70 \text{ times}$$

$$\text{Receivables turnover} = \frac{\$51,407}{\$4,062} = 12.66 \text{ times}$$

$$\text{Total asset turnover} = \frac{\$51,407}{\$57,048} = 0.90 \text{ times}$$

Notes:

1. Working capital turnover is not meaningful for Procter & Gamble for 2004 because working capital is negative.
2. Preferably, we would use the average of several quarterly balance sheets in calculating these ratios. But for the sake of brevity, in these examples, the calculations are based on the 2004 balance sheet.

3.1.2. The Operating Cycle and Its Components

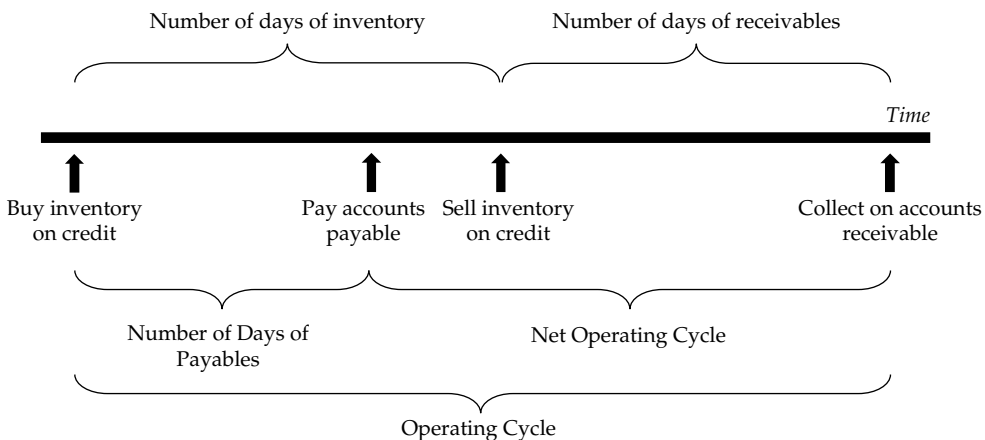
Turnover ratios help us measure how efficiently a company's management puts various assets to use. Another way of looking at efficiency is to examine the company's operating cycle—in other words, to “follow the money.” The **operating cycle** is the duration between the time a company makes an investment in goods and services—for example, to purchase inventory—and the time that investment produces cash. For example, a company that produces and sells goods has an operating cycle comprising four events:

1. The company purchases raw materials from suppliers and produces goods, investing in inventory.
2. The company sells goods, generating revenues, which may or may not be cash.
3. The company extends credit to customers, creating accounts receivable.
4. The company collects accounts receivable from customers, generating cash.

The operating cycle is therefore the length of time it takes to convert an investment of cash in inventory back into cash through collection of accounts.

Just as a company might extend credit to customers and create accounts receivable, not all investments in inventory and other purchases a company makes are paid for immediately with cash. The **net operating cycle** is the length of time it takes to convert an investment of cash in inventory back into cash considering that the company makes some purchases on credit.⁶ (See Exhibit 9-5.)

EXHIBIT 9-5 Operating Cycle and Net Operating Cycle



The number of days a company ties up funds in inventory is determined by the total amount of money represented in inventory and the average day's cost of goods sold. The current investment in inventory—that is, the money “tied up” in inventory—is the ending balance of inventory on the balance sheet. The average day's cost of goods sold is the cost of goods sold on an average day in the year, which can be estimated by dividing the cost of goods sold found on the income statement by the number of days in the year.

We compute the **number of days of inventory** by calculating the ratio of the amount of inventory on hand to the average day's cost of goods sold:

$$\text{Number of days of inventory} = \frac{\text{Inventory}}{\text{Average day's cost of goods sold}} = \frac{\text{Inventory}}{(\text{Cost of goods sold}/365)}$$

We can extend the same logic from the inventory turnover to estimate the **number of days of receivables**, which is the length of time between a sale—when an account receivable is created—and the collection of the account receivable in cash. If the balance of receivables at the end of the year is representative of the receivables on any day throughout the year, then it

⁶The net operating cycle is also known as the cash conversion cycle.

takes, on average, approximately the number of days of receivables to collect the accounts receivable:

$$\text{Number of days of receivables} = \frac{\text{Accounts receivable}}{\text{Average day's revenue}} = \frac{\text{Accounts receivable}}{(\text{Revenue}/365)}$$

We also need to look at the liabilities on the balance sheet to see how long it takes a company to pay its short-term obligations. We can apply the same logic to accounts payable as to accounts receivable and inventories, calculating the **number of days of payables**. How long does it take a company, on average, to go from creating a payable (buying on credit) to paying for it in cash?

$$\text{Number of days of payables} = \frac{\text{Accounts payable}}{\text{Average day's purchases}} = \frac{\text{Accounts payable}}{(\text{Purchases}/365)}$$

First, we need to determine the amount of an average day's purchases on credit. If we assume all purchases are made on credit, the total purchases for the year would be the cost of goods sold less any amounts included in this cost of goods sold that are not purchases, such as depreciation. An analyst outside the company would not have access to detailed purchasing data but could use the following accounting relationship to estimate purchases:

$$\text{Purchases} = \text{COGS} + \text{Ending inventory} - \text{Beginning inventory}$$

The operating cycle is a measure of how long it takes to convert an investment in cash in inventory back into cash through collection of accounts receivable:

$$\text{Operating cycle} = \frac{\text{Number of days}}{\text{of inventory}} + \frac{\text{Number of days}}{\text{of receivables}}$$

The number of days of payables tells us how long it takes the company to pay for purchases made to create the inventory. If we put these two pieces of information together, we can see how long, net, the company ties up cash. The difference between the operating cycle and the number of days of payables is the net operating cycle:

$$\text{Net operating cycle} = \text{Operating cycle} - \text{Number of days of payables},$$

or, substituting for the operating cycle,

$$\text{Net operating cycle} = \frac{\text{Number of days}}{\text{of inventory}} + \frac{\text{Number of days}}{\text{of receivables}} - \frac{\text{Number of days}}{\text{of payables}}$$

The net operating cycle is an estimate of how long it takes for the company to get cash back from its investment in inventory and accounts receivable, considering that purchases may be made on credit. By not paying for purchases immediately (that is, by using trade credit), the company reduces its liquidity needs.

EXAMPLE 9-2 The Net Operating Cycle Components for Procter & Gamble, 2004

$$\text{Number of days of inventory} = \frac{\$4,400}{(\$25,076/365)} = \frac{4,400}{68.70} = 64.05 \text{ days}$$

$$\text{Number of days of receivables} = \frac{\$4,062}{(\$51,407/365)} = \frac{4,062}{140.84} = 28.84 \text{ days}$$

$$\text{Number of days of payables}^* = \frac{\$3,617}{(\$25,836/365)} = \frac{3,617}{70.78} = 51.10 \text{ days}$$

Operating cycle = 92.89 days

Net operating cycle = 41.79 days

*Purchases estimated as $\text{COGS} + \text{Ending inventory} - \text{Beginning inventory} = \$25,076 + \$4,400 - \$3,640 = \$25,836$.

3.1.3. Turnover and the Numbers of Days

As you can see, there is a relationship between the turnover ratios and the numbers of days. Dividing 365 by inventory turnover will produce the number of days of inventory. Likewise, dividing 365 by the number of days of inventory will produce the inventory turnover. For example, suppose a company has a cost of goods sold of \$100 and an average inventory of \$20. Then, the inventory turnover is found as $\$100/\$20 = 5$ times. The number of days of inventory can be found as either $20/(\$100/365) = 73$ or $365/5 = 73$. The same relationship exists with other turnover and corresponding number of days ratios, such as receivables turnover and number of days of receivables.

The operating cycle connects the level of the company's activity with its liquidity. For example, the lower the turnover of its inventory, the longer its operating cycle and hence the more investment in current assets needed (relative to current liabilities) because it takes longer to convert inventory into cash. In other words, the longer the operating cycle, the more working capital required.

3.2. Liquidity Analysis

In the context of financial analysis, we refer to **liquidity** as the company's ability to satisfy its short-term obligations using assets that are most readily converted into cash. We refer to the

assets that may be converted into cash in a short period of time as the company's **liquid assets**. These assets are listed in financial statements as **current assets**.⁷

We assume that current assets are used to satisfy short-term obligations, or **current liabilities**. Current liabilities include accounts payable, wages payable, and accrued liabilities. The amount by which current assets exceed current liabilities is referred to as the company's **working capital**.

3.2.1. Measures of Liquidity

Liquidity ratios provide a measure of a company's ability to generate cash to meet its immediate needs. There are several liquidity ratios that we can construct to assess a company's liquidity. We will look at three of these ratios: the current ratio, the quick ratio, and the cash ratio.

The **current ratio** is the ratio of current assets to current liabilities. This ratio is a measure of a company's ability to satisfy its current liabilities with its current assets:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

A more stringent measure of liquidity is the **quick ratio**. This ratio indicates a company's ability to satisfy current liabilities with its most liquid assets:

$$\text{Quick ratio} = \frac{\text{Cash} + \text{Short-term marketable investments} + \text{Receivables}}{\text{Current liabilities}}$$

The quick ratio is also referred to as the **acid test ratio**. We can provide an even more stringent test with the **cash ratio**, which is a measure of the company's ability to meet its current obligations with just the cash and cash equivalents on hand:

$$\text{Cash ratio} = \frac{\text{Cash} + \text{Short-term marketable investments}}{\text{Current liabilities}}$$

In this ratio, we are not considering less liquid assets, such as accounts receivable, in the coverage of current liabilities. Rather, we are considering whether the company can pay off its immediate obligations without selling inventory or collecting on its accounts.

Generally, the larger these liquidity ratios are, the better the ability of the company to satisfy its immediate obligations. Is there a magic number that defines good or bad? Not really. Consider the current ratio. A large amount of current assets relative to current liabilities provides assurance that the company will be able to satisfy its immediate obligations. However, if the company has more current assets than it needs to provide this assurance, the company may be investing too heavily in these non- or low-earning assets and therefore not putting its assets to the most productive use. A more thorough interpretation of this liquidity ratio requires taking a look at the profitability of the company, trends in liquidity, and industry norms. As mentioned earlier, another consideration is the operating cycle.

⁷Current assets are often referred to as working capital because they represent the resources needed for the day-to-day operations of the company. However, we use the term working capital in this chapter to mean the difference between current assets and current liabilities.

A company with a long operating cycle may have more need for liquid assets than a company with a short operating cycle.⁸

EXAMPLE 9-3 Liquidity Ratios for Procter & Gamble, 2004

$$\text{Current ratio} = \frac{\$17,115}{\$22,147} = 0.77$$

$$\text{Quick ratio} = \frac{(\$5,469 + \$423 + \$4,062)}{\$22,147} = 0.45^*$$

$$\text{Cash ratio} = \frac{(\$5,469 + \$423)}{\$22,147} = 0.27^*$$

*We have assumed that “investment securities” are short-term marketable investments. However, we would need to investigate this assumption further when interpreting this ratio.

3.3. Solvency Analysis

A company can finance its assets with equity, debt, or some combination of the two. Financing with debt involves risk because debt legally obligates the company to pay interest and to repay the principal as promised. Equity financing does not obligate the company to pay anything; dividends are paid at the discretion of the board of directors. There is always some risk, which we refer to as **business risk**, inherent in any operating segment of a business. But how a company chooses to finance its operations—the particular mix of debt and equity—may add **financial risk** on top of business risk. Financial risk is the risk arising from the company’s obligation to meet required payments under its financing agreements, such as the payment of promised interest and principal repayment on a bond issue.⁹

We use solvency ratios to assess a company’s level of financial risk. There are two types of solvency ratios: component percentages and coverage ratios. Component percentages typically compare a company’s debt level with either its total assets or its equity capital.¹⁰ Coverage

⁸We should note that there may be a specific requirement—say, to comply with a bond covenant—that the current ratio be at least a specified number. In this case, the ratio is indeed “good” or “bad” as it relates to compliance with the bond indenture.

⁹Business risk and financial risk are discussed in greater detail in the chapters on Measures of Leverage and Capital Structure.

¹⁰Recall that total assets are equivalent to a company’s total capital because of the following accounting relationship: Assets = Liabilities + Shareholders’ equity.

ratios reflect a company's ability to satisfy the obligations that arise out of debt financing, such as interest, principal repayment, and lease payments.

3.3.1. Component-Percentage Solvency Ratios

We use component-percentage solvency ratios to gauge how reliant a company is on debt financing. Solvency ratios that compare debt with either equity or total assets are also commonly referred to as financial leverage ratios and gearing ratios. We construct these ratios by comparing the amount of debt either to the total capital of the company or to the equity capital. The amount of debt can be measured in several ways. Short-term debt includes those obligations due in less than a year as well as the portion of longer-term obligations that is due in less than a year. The calculation for long-term debt includes obligations with a maturity of more than a year. These obligations may be in the form of interest-bearing debt, such as bonds, or other long-term liabilities, such as deferred income taxes. In calculating total debt, analysts commonly disregard short-term liabilities that arise from the company's typical day-to-day operations, such as accounts payable, accrued current liabilities, and taxes payable.

The **debt-to-assets ratio** is a measure of the proportion of assets that is financed with debt (both short-term and long-term debt):

$$\text{Debt-to-assets ratio} = \frac{\text{Total debt}}{\text{Total assets}}$$

The **long-term debt-to-assets ratio** is the proportion of the company's assets that is financed with long-term debt:

$$\text{Long-term debt-to-assets ratio} = \frac{\text{Long-term debt}}{\text{Total assets}}$$

With the debt-to-equity ratio, we compare the uses of debt and equity as sources of capital to finance the company's assets, evaluated using book values of the capital sources, which are provided on the balance sheet:

$$\text{Debt-to-equity ratio} = \frac{\text{Total debt}}{\text{Total shareholders' equity}}$$

Still another ratio in this category is the financial leverage ratio, also called the equity multiplier. The significance of this ratio will become apparent in the sections covering return-on-investment ratios and DuPont analysis.

$$\text{Financial leverage} = \frac{\text{Total assets}}{\text{Total shareholders' equity}}$$

Though we compute these financial leverage ratios using different comparisons, they share a common characteristic: The greater the use of debt relative to equity in financing the company, the greater the financial leverage ratio.

One problem with looking at risk through a financial ratio that uses the book value of equity—for example, the debt-to-equity ratio—is that most often there is little relation between the book value of equity and its market value. The book value of equity consists of:

- The proceeds to the company of all the stock issued since it was first incorporated, less any treasury stock (stock repurchased by the company).
- The accumulation of all the earnings of the company, less any dividends, since it was first incorporated.

Consider the following example of book value versus market value of equity. Procter & Gamble was incorporated in 1890. Its book value of equity represents the sum of all its stock issued and all its earnings, less all dividends paid, *since 1890*. As of the end of June 2004, Procter & Gamble's book value of equity was approximately \$15.8 billion and its market value of equity was approximately \$140.5 billion. The book value understates the market value by nearly \$125 billion. The book value generally does not give a true picture of the investment of shareholders in the company because:

- Earnings are recorded according to accounting principles, which may not reflect the true economics of transactions.
- Due to inflation, the dollars from earnings and proceeds from stock issued in the past do not reflect today's values.

The market value, on the other hand, is the value of equity as perceived by investors. So, why bother with the book value of equity? First, many financial services and rating services report ratios using the book value rather than the market value, and it is important to understand the construction of these ratios. Second, many bond covenants are written in terms of the book value of accounts rather than the market value.

Incorporating the market value of equity into these ratios is straightforward: Replace the book value of shareholders' equity with the market value of equity (which is the current number of shares outstanding times the current market price per share of stock).¹¹

3.3.2. Coverage Ratios

In addition to the component-percentage solvency ratios, which use information about how debt is related to either assets or equity, there are a number of ratios that capture the company's ability to satisfy its debt obligations. Many ratios accomplish this end, but the two most common are the interest coverage ratio and the fixed-charge coverage ratio.

The **interest coverage ratio**, also referred to as the **times-interest-earned ratio**, compares the earnings available to meet the interest obligation with the interest obligation:

$$\text{Interest coverage ratio} = \frac{\text{Earnings before interest and taxes}}{\text{Interest payments}}$$

The assessment of the coverage of financial obligations may be expanded to include other obligations; for example, a fixed-charge coverage ratio can be constructed to include any fixed

¹¹It is much less common to replace the book value of debt with the market value of debt in component-percentage solvency ratios. Doing so can lead to contradictory results. For example, if the market value of a company's debt falls dramatically because of a ratings downgrade, using the market value of the company's debt would lead to a decline in the debt-to-assets ratio, which would make the company appear better off instead of worse off following the downgrade.

charges, such as lease payments and preferred dividends.¹² For example, to gauge a company's ability to cover its interest and lease payments, you could use the following ratio:

$$\text{Fixed-charge coverage ratio} = \frac{\text{Earnings before interest and taxes} + \text{Lease payments}}{\text{Interest payments} + \text{Lease payments}}$$

Because earnings may not fully reflect available funds, we often look at the coverage of interest using the **cash flow coverage ratio**. This ratio is similar to the interest and fixed-charge coverage ratios, yet we substitute cash flow from operations plus interest and taxes in the numerator to reflect the funds available to satisfy interest:

$$\text{Cash flow coverage ratio} = \frac{\text{Cash flow from operations} + \text{Interest payments} + \text{Tax payments}}{\text{Interest payments}}$$

Because we use cash flow instead of earnings to indicate available funds, we get a truer picture of the company's ability to satisfy its debt obligations.

Another measure of debt coverage is the cash-flow-to-debt ratio:

$$\text{Cash-flow-to-debt ratio} = \frac{\text{Cash flow from operations}}{\text{Total debt}}$$

With this ratio, we can estimate the length of time it would take for the company to repay its debt if it were to apply all of its cash flow from operations toward debt repayment. For example, if the cash-flow-to-debt ratio is 0.25, the company could pay off one quarter of its debt obligation with its current cash flow. This figure also means that if cash flows continue at the current level and there are no changes in the debt obligation, the company could pay off its debt obligation in $1/0.25 = 4$ years. Therefore, the greater the cash-flow-to-debt ratio, the greater the company's ability to repay its obligations and take on additional obligations if necessary.¹³

An alternative formulation of the cash-flow-to-debt ratio uses earnings before interest, taxes, depreciation, and amortization (EBITDA) in the numerator. Though widely used in some applications, this form of the ratio relies on EBITDA as a measure of cash flow. In some applications, the EBITDA-to-debt ratio will be similar to the cash-flow-to-debt ratio and will provide an indication of the ability of a company to meet its obligations that is similar to that of the interest coverage ratio. However, unlike cash flow from operations, EBITDA does not consider changes in working capital that could affect a company's ability to meet its obligations. A company with significant growth in investments in its receivables and inventory may have difficulty meeting its debt obligations because of the cash tied up in current assets, but this situation may not be apparent when EBITDA is compared with total debt.

¹²When you plan to include an obligation that is paid out of after-tax earnings, such as preferred stock dividends, you must first gross up the obligation to place it on a pretax basis. This is accomplished by dividing the obligation by a factor equal to one minus the tax rate.

¹³The use of cash flow from operations in the numerator assumes that the company's cash flows can be devoted to the repayment of debt. Though depreciation and amortization are noncash expenses, they represent expenditures that the company may eventually have to make for replacement of existing depreciable assets.

EXAMPLE 9-4 Solvency Ratios for Procter & Gamble, 2004

$$\text{Debt-to-assets}^* = \frac{\$25,910}{\$57,048} = 45.4\%$$

$$\text{Long-term debt-to-assets} = \frac{\$17,623}{\$57,048} = 30.9\%$$

$$\text{Debt-to-equity} = \frac{\$25,910}{\$17,278} = 1.50$$

$$\text{Financial leverage} = \frac{\$57,048}{\$17,278} = 3.30$$

$$\text{Interest coverage} = \frac{\$9,827}{\$629} = 15.62$$

$$\text{Cash flow coverage}^{**} = \frac{\$9,362 + \$629 + \$2,869}{\$629} = 20.45$$

$$\text{Cash-flow-to-debt} = \frac{\$9,362}{\$25,910} = 36.1\%$$

*Total debt was calculated as $\$8,287 + \$12,554 + \$2,261 + \$2,808 = \$25,910$.

**Cash flow from operations can be found on the company's statement of cash flows.

Coverage ratios are often used in debt covenants to help protect creditors because these ratios require that interest be “covered” along with a cushion. For example, a requirement to maintain an interest coverage ratio of 2.0 times results in a cushion equal to the interest commitment.

3.4. Profitability Analysis

An analyst can instantly tell whether a company is profitable or not based on whether net income is positive. Of course, net income alone does nothing to describe the efficiency with which profit was generated or the level of investment required to generate that profit. To conduct a more thorough analysis of profitability, analysts examine various margins and return-on-investment ratios.

3.4.1. Margins

We use margins (also referred to as profit margin ratios and return-on-sales ratios) to compare components of income with revenues—calculations that we saw earlier with the vertical common-size analysis of the income statement. These ratios give us an idea of what makes up a company's income and are usually expressed as a portion of each dollar of revenues. The profit margin ratios discussed here differ only in the numerator. It's in the numerator that we reflect and thus evaluate performance for different aspects of the business.

The **gross profit margin** is the ratio of gross profit to revenues. Gross profit is the difference between revenues and the cost of goods sold. We use this ratio to see how much of every dollar of revenues is left after the cost of goods sold:

$$\text{Gross profit margin} = \frac{\text{Gross profit}}{\text{Total revenue}}$$

The **operating profit margin** is the ratio of operating income (i.e., income before interest and taxes) to revenues. This ratio indicates how much of each dollar of revenues is left over after both cost of goods sold and operating expenses are considered:

$$\text{Operating profit margin} = \frac{\text{Operating income}}{\text{Total revenue}}$$

The **net profit margin** is the ratio of net income (a.k.a. net profit) to revenues and indicates how much of each dollar of revenues is left over after all costs and expenses:

$$\text{Net profit margin} = \frac{\text{Net income}}{\text{Total revenue}}$$

A further refinement in margins is to look at the company's profit margin before tax, or **pretax profit margin**, which allows us to isolate the effects of taxes on the company's profitability:

$$\text{Pretax profit margin} = \frac{\text{Earnings before taxes}}{\text{Total revenue}}$$

Profit margins alone do not tell us much about the company's performance or its ability to generate profits in the future. Additional information that we would need includes the trends in these profit margins over time, the company's turnover ratios and the trends in these ratios, and the industry norms for these ratios.

EXAMPLE 9-5 Profit Margins for Procter & Gamble, 2004

$$\text{Gross profit margin} = \frac{\$26,331}{\$51,407} = 51.2\%$$

$$\text{Operating profit margin} = \frac{\$9,827}{\$51,407} = 19.1\%$$

$$\text{Net profit margin} = \frac{\$6,481}{\$51,407} = 12.6\%$$

$$\text{Pretax profit margin} = \frac{\$9,350}{\$51,407} = 18.2\%$$

3.4.2. Return-on-Investment Ratios

We use return-on-investment ratios, also commonly called return-on-assets ratios, to compare benefits generated from investments. We represent the benefit in the numerator and the resources affecting that benefit, such as the total assets of the company, in the denominator.¹⁴

The **operating return on assets** is the ratio of operating earnings to assets:¹⁵

$$\text{Operating return on assets} = \frac{\text{Operating income}}{\text{Average total assets}}$$

This ratio is a measure of the operating income resulting from the company's investment in total assets and is useful in comparing companies that are in the same line of business.

The **return on assets** is the ratio of net income to assets and indicates the company's net profit generated per dollar invested in total assets:

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Average total assets}}$$

This ratio is a measure of what the company receives, as a whole, from the investment it has made in assets. We can be more specific and focus on the return to the investments made by both creditors and shareholders by calculating a **return on total capital**:

$$\text{Return on total capital} = \frac{\text{Net income}}{\text{Total capital}} = \frac{\text{Net income}}{\text{Average interest-bearing debt} + \text{Average total equity}}$$

The capital of the company consists of the interest-bearing debt and the equity—both preferred and common—of the company.

The **return on equity** is more specifically directed to the return to shareholders and is the ratio of net income to shareholders' equity. This return represents the profit generated per dollar of shareholders' investment:

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Average shareholders' equity}}$$

The difference between the return-on-assets ratio and the return-on-equity ratio is the investment that is considered; the return on equity is affected by the financial leverage of the company:

$$\begin{aligned} \text{Return on equity} &= \frac{\text{Net income}}{\text{Average shareholders' equity}} \\ &= \frac{\text{Net income}}{\text{Average total assets}} \times \frac{\text{Average total assets}}{\text{Average shareholders' equity}} \end{aligned}$$

¹⁴What distinguishes return-on-investment ratios from the activity ratios (such as inventory turnover and receivables turnover) is that the numerator is the net benefit, rather than the gross benefit, from an activity.

¹⁵This ratio is also referred to as the *basic earning power* ratio.

We can also be more specific in terms of the type of equity. For example, we can construct a **return on common equity**, which is the ratio of net income available to common shareholders to common shareholders' equity. This return is the profit generated per dollar of common shareholders' investment:

$$\text{Return on common equity} = \frac{\text{Net income} - \text{Preferred dividends}}{\text{Average common shareholders' equity}}$$

EXAMPLE 9-6 Return-on-Investment Ratios for Procter & Gamble, 2004

$$\text{Operating return on assets} = \frac{\$9,827}{\$57,048} = 17.23\%$$

$$\text{Return on assets} = \frac{\$6,481}{\$57,048} = 11.36\%$$

$$\text{Return on total capital} = \frac{\$6,481}{\$12,554 + 8,287 + 17,278} = 17.00\%$$

$$\text{Return on equity} = \frac{\$6,481}{\$17,278} = 37.51\%$$

$$\text{Return on common equity}^* = \frac{\$6,481 - \$131}{\$17,278 - \$1,526} = 40.31\%$$

*Preferred stock dividends were \$131 million in 2004.

3.4.3. DuPont Analysis

DuPont analysis was developed by E.I. du Pont de Nemours in 1919 as a way to better understand return ratios and why they change over time.¹⁶ The bases for this approach are the linkages made through financial ratios between the balance sheet and the income statement. We can better understand a company's returns over time or its returns in comparison with its competitors by breaking returns into their components. This approach began as an analysis of the elements in the return on assets. For example,

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Average total assets}} = \frac{\text{Net income}}{\text{Revenues}} \times \frac{\text{Revenues}}{\text{Average total assets}}$$

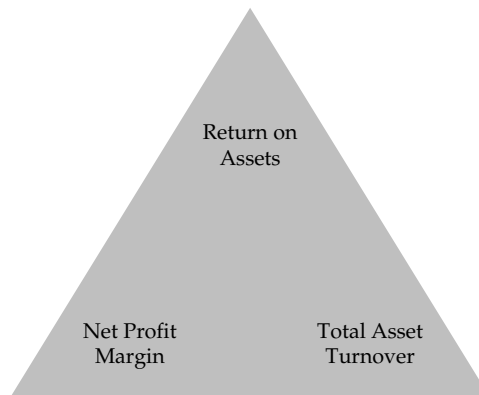
¹⁶American Management Association (1960). This system is consistent with the logic set forth by Alfred Marshall in his *Elements of Economics of Industry* (1892).

or

$$\text{Return on assets} = \text{Net profit margin} \times \text{Total asset turnover}$$

This breakdown of a return on assets into a two-component model is the simplest form of the DuPont approach.¹⁷ This approach to breaking down return ratios was originally depicted as the DuPont Triangle, shown in Exhibit 9-6, with the return on assets at the top of the triangle and the profit margin and total asset turnover at the bottom.

EXHIBIT 9-6 The DuPont Triangle



For example, using the financial data found in Exhibit 9-7, we can calculate that for the fiscal year 2004, Office Depot, Inc., had a return on assets of 4.95 percent. We can use the DuPont approach to look at the components of this return, with dollar amounts in millions:¹⁸

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Revenues}} \times \frac{\text{Revenues}}{\text{Average total assets}}$$

$$\frac{\$335}{\$6,767} = \frac{\$335}{\$13,565} \times \frac{\$13,565}{\$6,767}$$

$$4.95\% = 2.47\% \times 2.00$$

¹⁷An easy way to remember the DuPont system is to keep in mind that cross-cancellation of terms produces the desired return. For example, $\text{Return on assets} = \frac{\text{Net income}}{\text{Average total assets}} =$

$\frac{\text{Net income}}{\text{Revenues}} \times \frac{\text{Revenues}}{\text{Average total assets}}$.

¹⁸Source of financial data: Office Depot, 2004 annual report for fiscal year ending 25 December 2004.

EXHIBIT 9-7 Financial Data for Office Depot, Inc.

Office Depot, Inc.

Consolidated Balance Sheet

(millions of dollars)

	2003	2004
Assets		
Cash and cash equivalents	\$791	\$794
Investment securities	100	161
Accounts receivable	1,112	1,304
Inventories	1,336	1,409
Deferred income taxes	170	133
Prepaid expenses and other current assets	68	115
Total current assets	\$3,577	\$3,916
Net property, plant, and equipment	\$1,294	\$1,463
Goodwill	1,004	1,050
Other assets	320	338
Total Assets	\$6,195	\$6,767
Liabilities and Stockholders' Equity		
Accounts payable	\$1,323	\$1,650
Accrued and other liabilities	814	820
Taxes payable	129	133
Current maturities of long-term debt	13	15
Total current liabilities	\$2,279	\$2,618
Deferred income taxes	\$340	\$342
Long-term debt	829	584
Total liabilities	\$3,448	\$3,544
Common shareholders' equity	\$489	\$630
Retained earnings	2,258	2,593
Total shareholders' equity	\$2,747	\$3,223
Total liabilities and shareholders' equity	\$6,195	\$6,767

EXHIBIT 9-7 (Continued)

Office Depot, Inc.

Consolidated Statement of Earnings

(millions of dollars)

	2003	2004
Sales	\$12,359	\$13,565
Cost of sales	<u>8,484</u>	<u>9,309</u>
Gross profit	\$3,875	\$4,256
Selling, general, and administrative expenses	<u>3,409</u>	<u>3,726</u>
Operating income	\$466	\$530
Interest expense and other nonoperating expenses	<u>25</u>	<u>69</u>
Earnings before income taxes	\$441	\$461
Income tax	<u>142</u>	<u>126</u>
Earnings after income taxes	\$299	\$335
Cumulative effect of accounting change	<u>(26)</u>	<u>0</u>
Net earnings	\$273	\$335

*Fiscal year ending 25 December**Source: Office Depot, Inc., 10-K.*

Using the two-component breakdown, we can also use the DuPont approach to compare Office Depot's return on assets for 2003 and 2004 and examine why the return changed from 4.41 percent in 2003 to 4.95 percent in 2004:

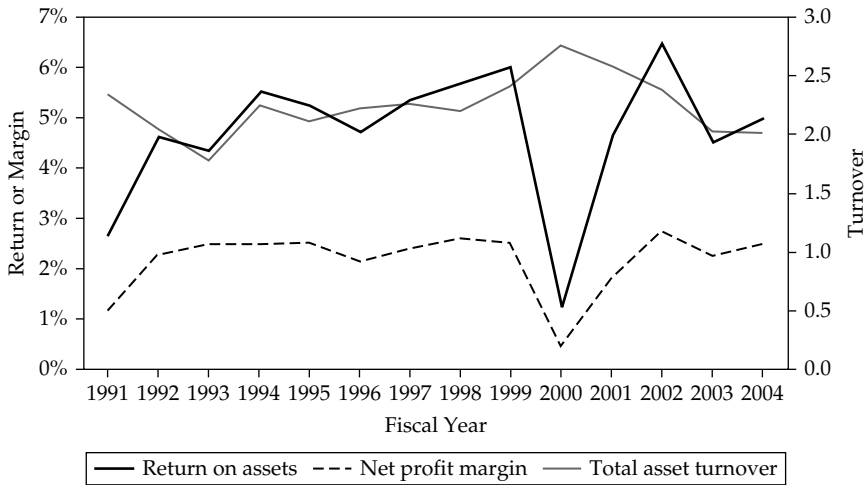
$$\text{Return on assets} = \frac{\text{Net income}}{\text{Revenues}} \times \frac{\text{Revenues}}{\text{Average total assets}}$$

$$\frac{\$273}{\$6,195} = \frac{\$273}{\$12,359} \times \frac{\$12,359}{\$6,195}$$

$$4.41\% = 2.21\% \times 1.99$$

Comparing the breakdowns from 2003, we see that we can attribute the increase in the return on assets to the increase in the net profit margin from 2.21 percent to 2.47 percent. Taking a look over a longer span of time, 1991–2004, as shown in Exhibit 9-8, we see that the primary driver of Office Depot's return on assets over time is its net profit margin. In 2000, for example, the return on assets declined, along with the net profit margin, despite an increasing total asset turnover. This observation tells us that to understand changes in return, we need to better understand what drives Office Depot's net profit margin.

EXHIBIT 9-8 Return on Assets for Office Depot for Fiscal Years 1991–2004



Source of data: The Office Depot, Inc., annual reports, various years.

We can also compare one company with another using the DuPont approach. Consider Office Depot's competitor Staples, Inc. In 2004, Staples had revenues of \$14,448 million, net income of \$708 million, and total assets of \$7,071 million. Its return on assets for 2004 is higher than Office Depot's—10.01 percent versus 4.95 percent—due to its higher net profit margin:

$$\text{Return on assets} = \frac{\text{Net income}}{\text{Revenues}} \times \frac{\text{Revenues}}{\text{Average total assets}}$$

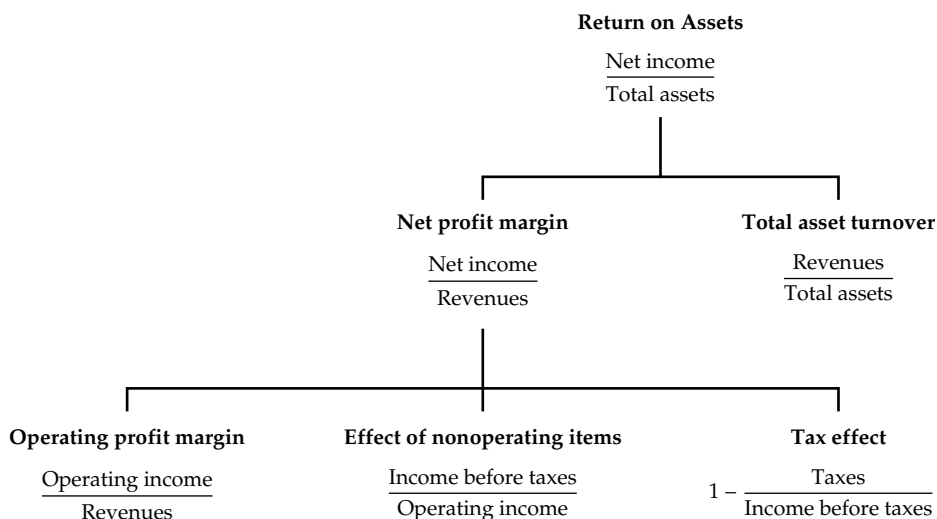
$$\frac{\$708}{\$7,071} = \frac{\$708}{\$14,448} \times \frac{\$14,448}{\$7,071}$$

$$10.01\% = 4.90\% \times 2.04$$

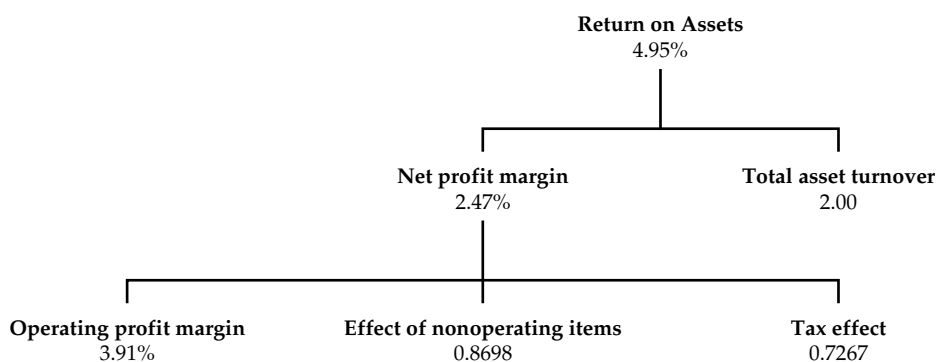
The key to understanding Office Depot's return on assets, both in comparison with itself over time and in comparison with competitors, is the net profit margin. We can gain a better understanding of the net profit margin by breaking this ratio into three components: the operating profit margin, the effect of nonoperating expenses (or nonoperating income), and the tax effect. Exhibit 9-9 shows this finer breakdown, with return on assets broken down into the four components of total asset turnover, the operating profit margin, the effect of nonoperating items, and the tax effect in Panel A. Panel B of this exhibit provides the two-component and four-component DuPont models for Office Depot's return on assets for 2004.

EXHIBIT 9-9 Two-Component and Four-Component DuPont Models of the Return on Assets

Panel A: Return-on-Assets Components



Panel B: Return-on-Assets Components for Office Depot (2004 Fiscal Year)



The effect of nonoperating items reflects everything in the company's income statement between its operating income and its earnings before taxes. If the company has net nonoperating expense, the ratio of income before tax to operating income is less than 1.0; on the other hand, if the company has net nonoperating income, this ratio is greater than 1.0. The effect of nonoperating items is often referred to as the *interest effect* or *interest burden* because for many companies the interest expense is the primary nonoperating expense. Companies with higher interest expense have lower ratios of income before taxes to operating income, whereas companies with larger nonoperating income have higher ratios of income before taxes to operating income. In the case of Office Depot in 2004, its nonoperating net expenses are 13.02 percent of its operating income.

The tax effect is one minus the ratio of taxes to income before taxes, or $1 - (\text{Taxes} / \text{Income before taxes})$. The complement of the tax effect is the average *tax burden*, which is the

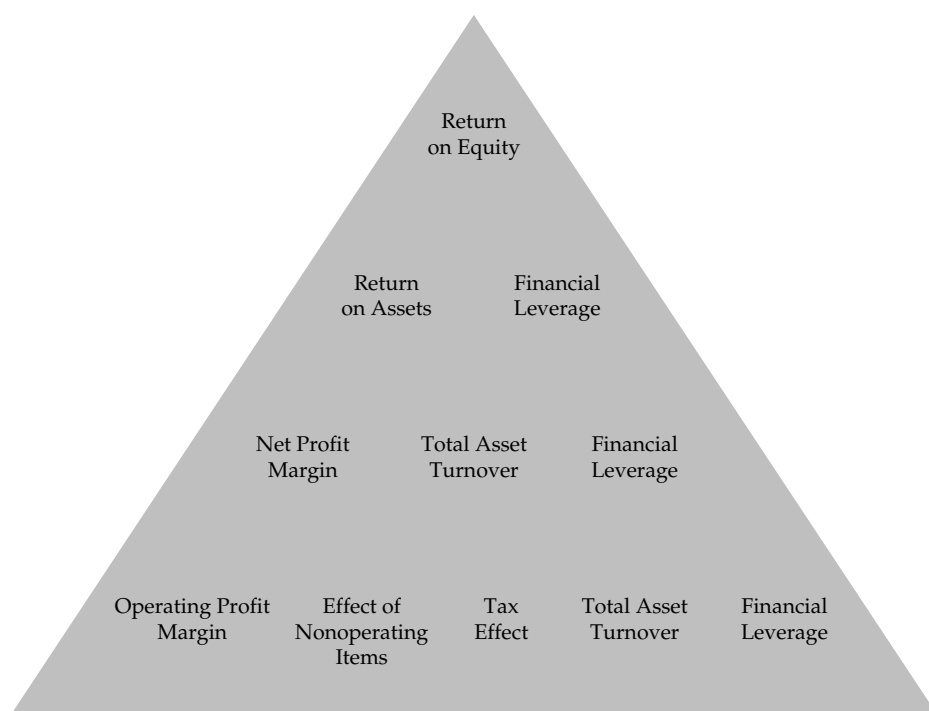
ratio of taxes to income before taxes. For Office Depot, the tax effect ratio is 0.7267; therefore, its average tax rate for 2004 is $1 - 0.7267 = 27.33$ percent.

So far, we have seen how the return on assets can be broken down into two or four components. Similarly, we can represent the return on shareholders' equity as a three-component DuPont model:

$$\text{Return on equity} = \frac{\text{Net income}}{\text{Average shareholders' equity}} = \frac{\text{Net income}}{\text{Revenues}} \times \frac{\text{Revenues}}{\text{Average total assets}} \times \frac{\text{Average total assets}}{\text{Average shareholders' equity}}$$

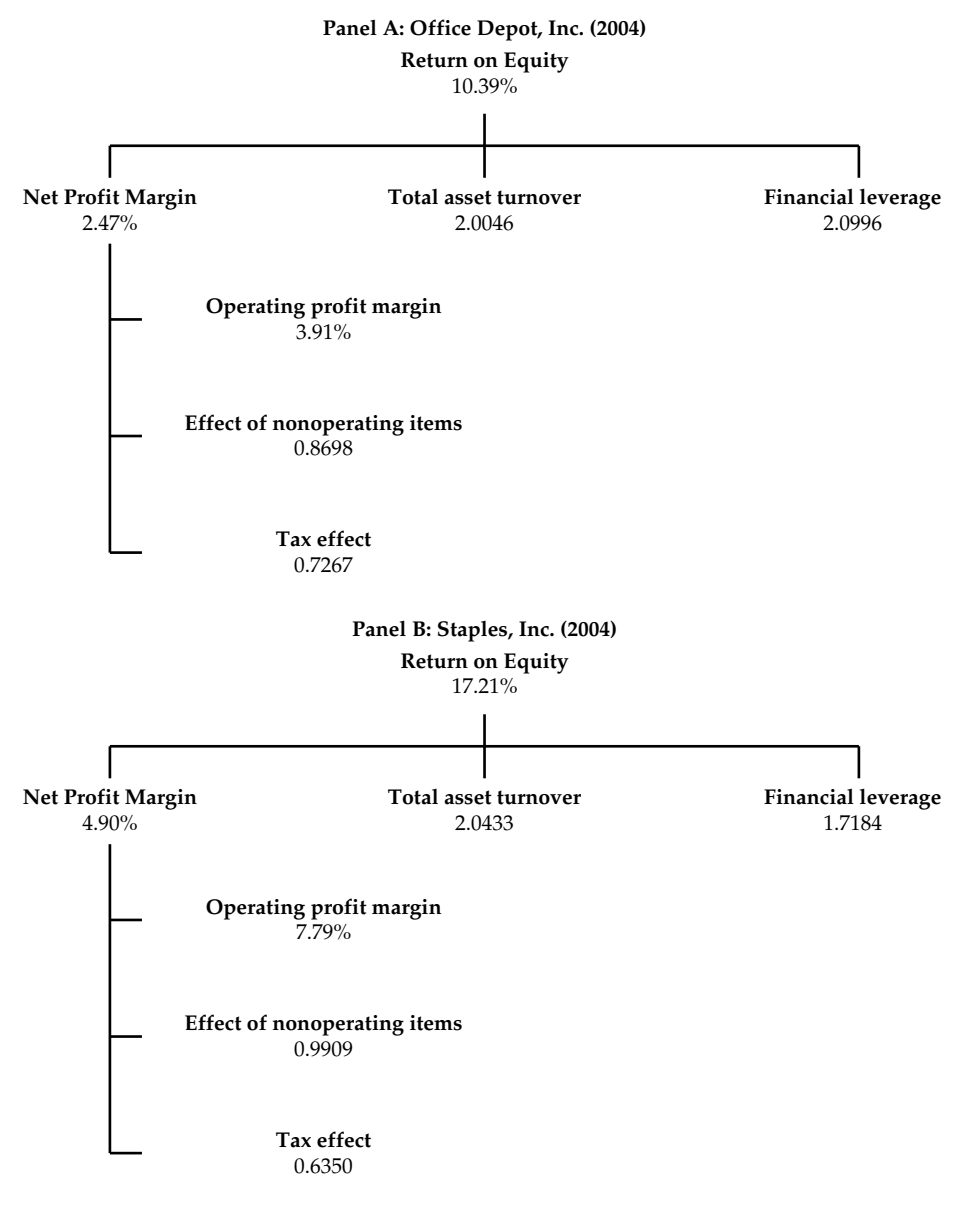
Extending this model to include the net profit margin in components as we did previously, we can produce a five-component DuPont model, as illustrated in the corresponding expanded DuPont Triangle in Exhibit 9-10.

EXHIBIT 9-10 The Five-Component DuPont Triangle



For example, we can use the five-component DuPont model for Office Depot's return on equity, as Panel A of Exhibit 9-11 shows.

EXHIBIT 9-11 Five-Component DuPont Model



Using the breakdown in Panel A, we can show that the product of the five components is the return on equity:

$$\begin{aligned} \text{Return on equity} &= \frac{\text{Operating income}}{\text{Revenues}} \times \frac{\text{Income before taxes}}{\text{Operating income}} \times \left[1 - \frac{\text{Taxes}}{\text{Income before taxes}} \right] \\ &\quad \times \frac{\text{Revenues}}{\text{Average total assets}} \times \frac{\text{Average total assets}}{\text{Average shareholders' equity}} \end{aligned}$$

$$10.39\% = \frac{\$530}{\$13,565} \times \frac{\$461}{\$530} \times \left[1 - \frac{\$126}{\$461} \right] \times \frac{\$13,565}{\$6,767} \times \frac{\$6,767}{\$3,223}$$

$$10.39\% = 0.0391 \times 0.8698 \times 0.7267 \times 2.0046 \times 2.0996$$

We can also compare these components with competitors' components to understand the differences among the companies' financial condition and performance that produce different returns on equity. For example, Staples in 2004 has a higher return on equity than Office Depot, 17.21 percent versus 10.39 percent. We can take a closer look at the differences by comparing Office Depot's five-component DuPont model with Staples' five-component model, as shown in Panel B of Exhibit 9-11. Here, we see that although the total asset turnover is similar for the two companies, the companies differ primarily in two ways:

1. The management of operating costs, as reflected in the operating profit margin, with Staples able to generate greater operating profits per dollar of revenues.
2. The financing decisions, with Office Depot slightly more reliant on debt financing. This reliance affects not only the financial leverage but also the interest expense that influences the net profit margin.

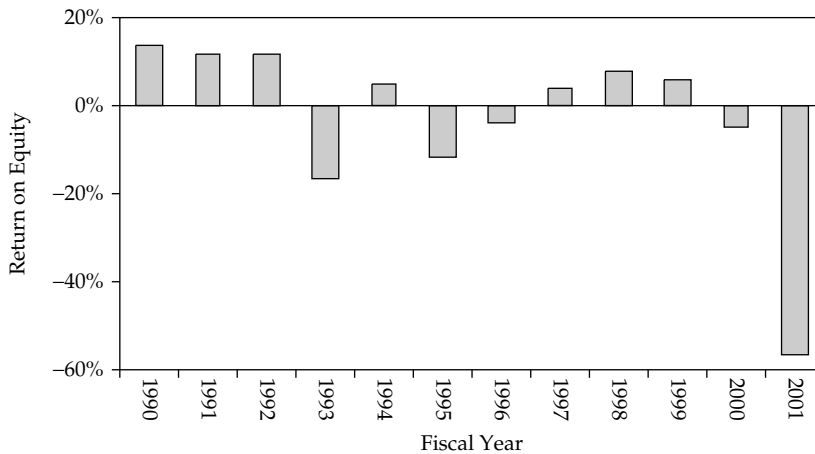
Another use of DuPont analysis is to diagnose the source of change in returns on equity over time. Consider Kmart during the years leading up to and including its bankruptcy filing in January of 2002. What was the source of Kmart's woes? A company's financial difficulties usually have more than one source, but the DuPont approach allows us to get some idea of what led to Kmart's challenges.

We can see in Panel A of Exhibit 9-12 that Kmart's return on equity was negative in several years and that Kmart was unable to provide consistent, positive returns to its shareholders. Looking more closely at the components of the return on equity, we get a clearer picture of the elements that led toward Kmart's bankruptcy. In Panel B, we see that the financial leverage ratio is relatively consistent, with the exception of the year ending around the bankruptcy filing. We can see that Kmart had total assets that were twice its equity throughout the 1990–2000 period. In other words, its debt-to-equity ratio was around 1.0 and its use of debt financing did not change much in the 10 years leading up to bankruptcy. Looking at Kmart's total asset turnover in Panel C, we see that the turnover in fact rose

slightly over the 10 years leading up to bankruptcy. The company's net profit margin, as shown in Panel D, is evidently the source of the problem. The changing net profit margin—and hence Kmart's inability to manage its expenses—appears to have been a strong influence on Kmart's return on equity.

EXHIBIT 9-12 DuPont Analysis of Kmart's Return on Assets Leading Up to Bankruptcy in 2002

Panel A: Return on Equity



Panel B: Financial Leverage

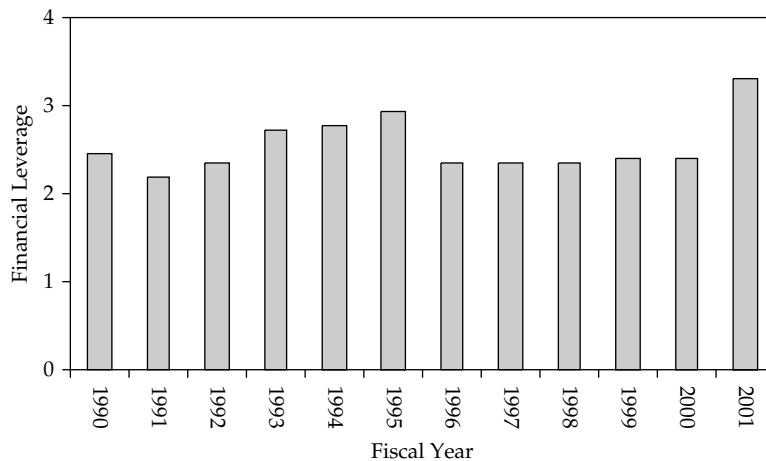
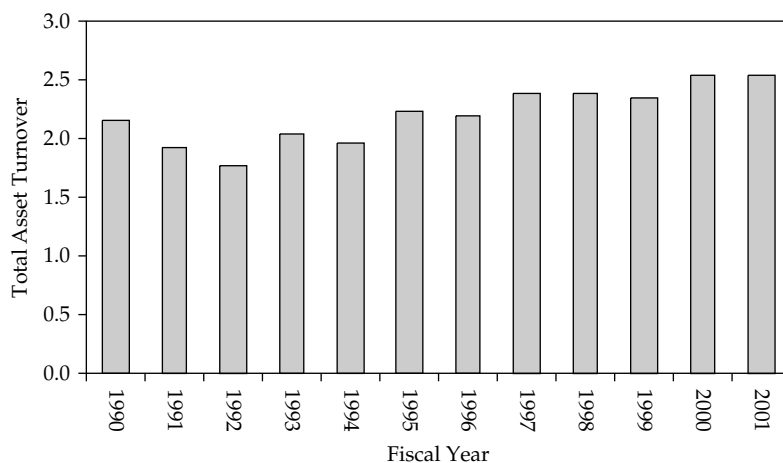
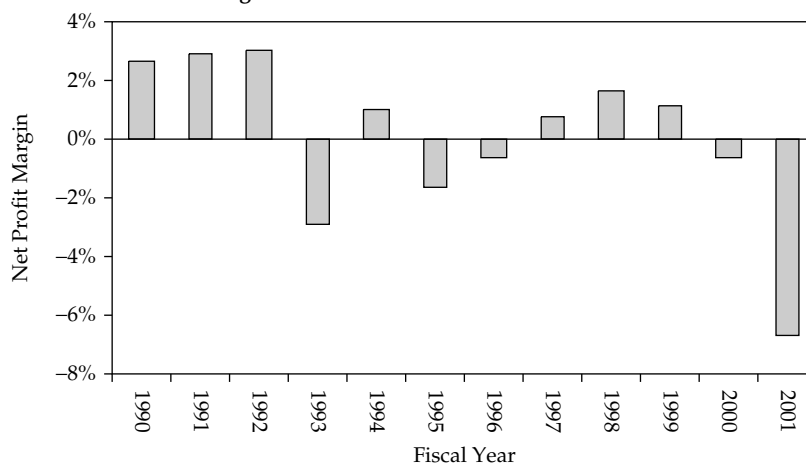


EXHIBIT 9-12 (Continued)

Panel C: Total Asset Turnover**Panel D: Net Profit Margin**

Source of data: Kmart's 10-K reports, various years.

What does this all mean? What we surmise from this analysis is that Kmart's difficulties are related to the management of expenses, rather than the deployment and use of its assets or its assumption of financial risk. If we wanted a more detailed picture, we would:

- Break the net profit margin into its components—the operation profit margin, the interest burden, and the tax burden—as we did for Office Depot and Staples, to see why the net profit margin changed over time.
- Compare the trends in these components with those of Kmart's major competitors during this period, namely, Wal-Mart Stores and Target Corporation.

3.5. Other Ratios

The ratios discussed thus far deal with the company's performance and financial condition. These ratios provide information for managers (who are interested in evaluating the company's performance) and for creditors (who are interested in the company's ability to pay its obligations). We will now take a look at ratios that focus on the interests of the owners: shareholder ratios. These ratios translate the overall results of operations so that they can be compared in terms of a share of stock.

Earnings per share (EPS) is the amount of income earned during a period per share of common stock:

$$\text{Earnings per share} = \frac{\text{Net income available to common shareholders}}{\text{Number of common shares outstanding}}$$

Companies provide information on earnings per share in their annual and quarterly financial statements, as well as in their periodic press releases. There are two numbers of earnings per share currently disclosed in financial reports: basic and diluted earnings per share. These numbers differ with respect to the definition of available net income and the number of shares outstanding.

Basic earnings per share is net income, minus preferred dividends, divided by the average number of common shares outstanding. **Diluted earnings per share** is net income, minus preferred dividends, divided by the number of shares outstanding considering all dilutive securities (e.g., convertible debt and options).¹⁹ Diluted earnings per share gives the shareholder information about the *potential* dilution of earnings. For companies with a large number of dilutive securities (e.g., stock options, convertible preferred stock, or convertible bonds), there can be a significant difference between basic and diluted EPS.

Book value equity per share is the amount of the book value (also called carrying value) of common equity per share of common stock, calculated by dividing the book value of shareholders' equity by the number of shares of common stock outstanding. As we saw earlier, the book value of equity may differ from the market value of equity. The market value per share, if available, is a much better indicator of the investment of shareholders in the company.

The price-to-earnings ratio (P/E, or PE ratio) is the ratio of the price per share of common stock to the earnings per share:

$$\text{Price-to-earnings ratio} = \frac{\text{Market price per share}}{\text{Earnings per share}}$$

The earnings per share typically used in the denominator is the sum of the earnings per share for the last four quarters. In this case, the P/E is often referred to as the **trailing P/E**. In contrast, the leading P/E is typically calculated using an estimate or forecast for earnings per share over the next four quarters.

The P/E is sometimes used as a proxy for investors' assessment of the company's ability to generate cash flows in the future. If the company has zero or negative earnings, the P/E that we calculate is meaningless.

A financial analyst is often interested in how much of a company's earnings is paid out to investors. Two common measures address this issue: dividends per share and the dividend

¹⁹If dilutive securities have obligations that affect the earnings available to shareholders (e.g., interest), these obligations are added back to the numerator in the diluted EPS calculation.

payout ratio. **Dividends per share** (DPS) is the dollar amount of cash dividends paid during a period per share of common stock:

$$\text{Dividends per share} = \frac{\text{Dividends paid to shareholders}}{\text{Weighted average number of ordinary shares outstanding}}$$

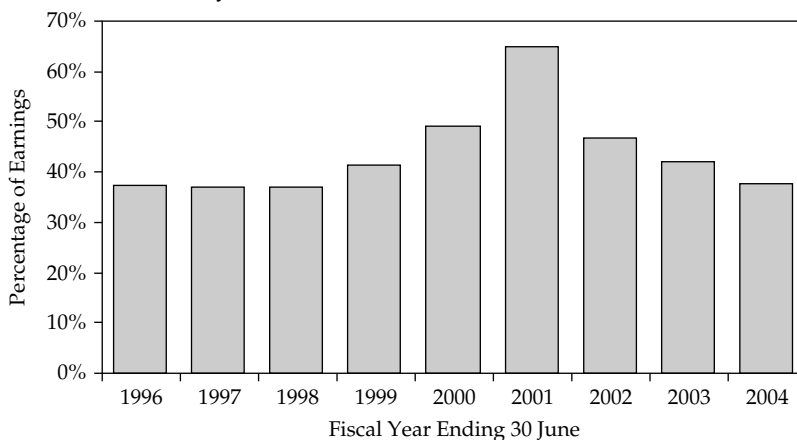
This measure represents the amount paid out in cash during a given period but does not reflect noncash distributions, such as stock dividends.

The dividend payout ratio is the ratio of cash dividends paid to earnings for a period:

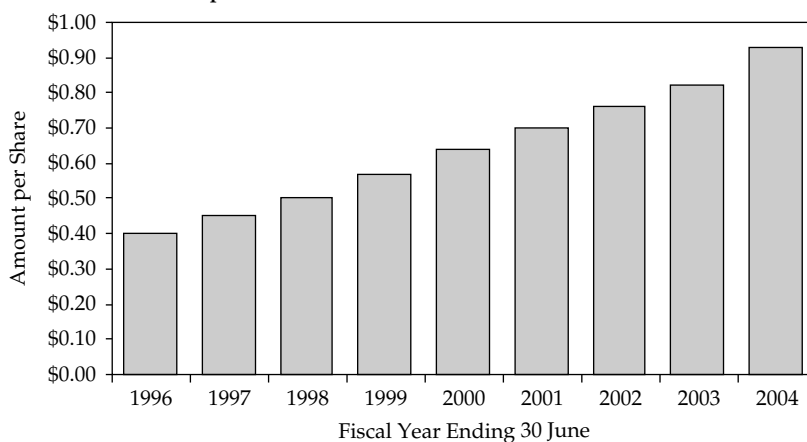
$$\text{Dividend payout ratio} = \frac{\text{Dividends paid to common shareholders}}{\text{Net income attributable to common shares}}$$

EXHIBIT 9-13 Procter & Gamble Dividends, 1996–2004

Panel A: Dividend Payout Ratio



Panel B: Dividends per Share



Source of data: The Procter & Gamble Company annual reports, various years.

The dividend payout ratio is the complement of the plowback ratio, which is the proportion of earnings that is reinvested in the company.²⁰

$$\begin{aligned}\text{Plowback ratio} &= \frac{\text{Net income attributable to common shares} - \text{Common share dividends}}{\text{Net income attributable to common shares}} \\ &= 1 - \left[\frac{\text{Dividends}}{\text{Net income attributable to common shares}} \right]\end{aligned}$$

Some companies' dividends appear to follow a pattern of constant or constantly growing dividends per share, while a smaller number of companies' dividends appear to be a constant percentage of earnings. Panel A of Exhibit 9-13 shows Procter & Gamble's dividend payout ratio, and Panel B shows its dividends per share. We can see in these charts that Procter & Gamble tends to pay dividends that increase by a relatively constant amount each year.

EXAMPLE 9-7 Other Ratios for Procter & Gamble, 2004

$$\text{Basic earnings per share}^* = \frac{(\$6,481 - \$131)}{2,580.1} = \$2.46$$

$$\text{Diluted earnings per share}^* = \frac{(\$6,481 - \$4)}{2,790.1} = \$2.32$$

$$\text{Market price per share} = \$54.44$$

$$\text{Book value per share} = \frac{\$17,278 - \$1,526}{2,580.1} = \$6.11$$

$$\text{Dividends per share} = \frac{\$2,408}{2,580.1} = \$0.93$$

$$\text{Dividends per share} = \frac{\$2,408}{2,580.1} = \$0.93$$

$$\text{Dividend payout ratio} = \frac{\$2,408}{\$6,481 - \$131} = 37.92\%$$

$$\text{Plowback ratio} = \frac{\$3,942}{\$6,350} = 62.08\%$$

*Average number of common shares outstanding and the effects of dilutive securities were found in Procter & Gamble's 2004 10-K filing.

²⁰The plowback ratio is also commonly referred to as the retention ratio or retention rate.

3.6. Effective Use of Ratio Analysis

Financial analysis requires pulling together many pieces of information. Analysis of a company requires gathering information such as the following:

- A description of the company, including its line(s) of business, and major corporate events, such as acquisitions and divestitures.
- Information on the industry or industries in which the company operates and its major competitors.
- Major factors (e.g., economic, competitive, and legal) that have affected the company in the recent past and may affect the company in the future.
- Relevant financial ratios for at least the past five years, but preferably extending over at least one complete economic cycle.

A thorough analysis of a company would require more space than can be allowed here, but we can look at the basic financial ratio analysis. We will take Procter & Gamble as an example, using published annual financial data for fiscal years 30 June 1995 through 30 June 2004.

One of the important lessons of financial ratio analysis is that there is no value for a particular ratio that is good or bad. The interpretation of a financial ratio depends on how that ratio fits into the broader scheme of the company's overall financial condition and performance. For example, a company that has 65 percent of its assets financed with debt may be worrisome to its creditors and owners if it has a high degree of business risk, but the situation may be less troubling in cases where the company has a lower degree of business risk. As another example, consider a company that has a high rate of inventory turnover. High turnover may be good, indicating that the company is managing its inventory very efficiently. On the other hand, high turnover may be bad, indicating that the company has a high risk of stock-outs. How do we resolve whether this situation is good or bad? We look at other dimensions of the company. In the case of the inventory turnover, for example, we would also look at the company's profitability to see whether the high turnover is a problem.

With respect to trends over time, we generally look at the company's ratios over a period of at least five years, but preferably over enough years to see how the company performs at different points in an economic cycle (i.e., peaks and troughs). Additionally, we must consider major company events that may explain changes over time. For example, a major acquisition or divestiture will affect any trends.

Also, consider whether there were significant changes in accounting principles that may affect the observed trend. For example, consider goodwill, an intangible balance sheet account. In 2001, goodwill was changed so that it is no longer amortized. Instead, goodwill is now reviewed annually to see whether its value is impaired. Consequently, financial statements after 2001 will show a slight upward bias in the company's net income because goodwill amortization is no longer charged against earnings. For companies that choose to write off a portion of this goodwill (e.g., because it is found to be impaired), the financial picture is distorted because:

- The company takes a large, one-time expense when the goodwill is written off.
- Returns on assets are enhanced from a lower asset base following the write-off.²¹

²¹For example, Therma-Wave, Inc., a manufacturer of systems used in semiconductor manufacturing, wrote off \$68 million of goodwill for its year ending March 2003, which was 34 percent of its total assets.

Therefore, it is important to consider the impact of accounting changes on the comparability of financial results over time.

3.6.1. Company Description, Industry, and Major Factors

The Procter & Gamble Company is a consumer products producer with a wide range of household and personal care products. Procter & Gamble is the largest consumer products company, with approximately 50 percent of the market share and revenues over \$51 billion in 2004. Its major U.S. competitors are Kimberly-Clark Corporation and Colgate-Palmolive Company.

The consumer and household products industry is a noncyclical industry, which means that the revenues and earnings are not affected by the health of the general economy. As we saw earlier, there is seasonality in Procter and Gamble's revenues, with the peak in the December-ending quarter of each year and the trough in the June-ending quarter. Procter & Gamble is the leading U.S. company in its industry and is continuing to grow, partly through acquisitions.

In this example, we are using financial data for the past 10 years to analyze the financial condition and performance of this company in order to assess how the company is likely to perform in the future. In doing so, we need to understand the major influences on the past 10 years' performance so that we can include this information in our analysis of trends. Factors occurring in the past 10 years that affect the financial data that we are using in this analysis include the following:

- Changes in accounting, including accounting for derivatives and hedging (Statement of Financial Accounting Standards [SFAS] Nos. 133 and 149), accounting for business combinations and goodwill (SFAS Nos. 141 and 142), and accounting for asset retirement obligations (SFAS No. 143).
- Changes in the product mix, including the divestiture of Hawaiian Punch in 1999 and the acquisition of Tambrands in 1997, Iams in 1999, Clairol in 2001, and Wella in 2003.
- A restructuring program during the years 1999–2000.

The changes in the product mix, the changes in the accounting, and the restructuring should be kept in mind when looking at the trends in financial ratios over the 10-year period.

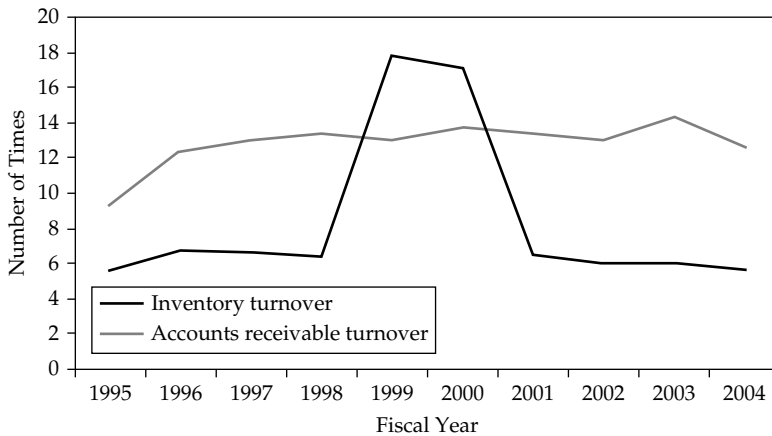
3.6.2. Activity

Exhibit 9-14 shows the turnover ratios for Procter & Gamble over the period 1995–2004. The turnover ratios provide information on the effectiveness with which a company puts its assets to use. In the case of Procter & Gamble, we see that inventory turnover declined slightly over time, with a significant increase in the 1999–2000 restructuring period, and that accounts receivable turnover remained relatively stable throughout the 1995–2004 period.

3.6.3. Liquidity

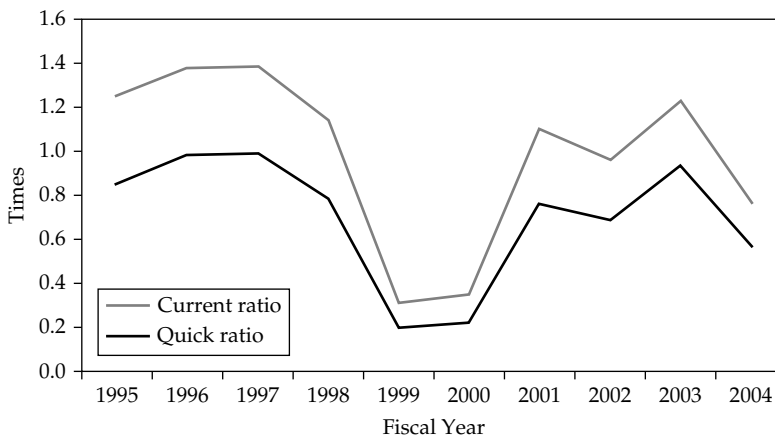
Exhibit 9-15 provides a chart of the current and quick ratios of Procter & Gamble for the 1995–2004 fiscal years. These ratios follow similar trends over these years, with a drop in the restructuring years, 1999–2000.

EXHIBIT 9-14 Turnover Ratios for Procter & Gamble, 1995–2004



Source of data: The Procter & Gamble Company annual reports, various years.

EXHIBIT 9-15 Liquidity Ratios of Procter & Gamble, 1995–2004



Source of data: The Procter & Gamble Company annual reports, various years.

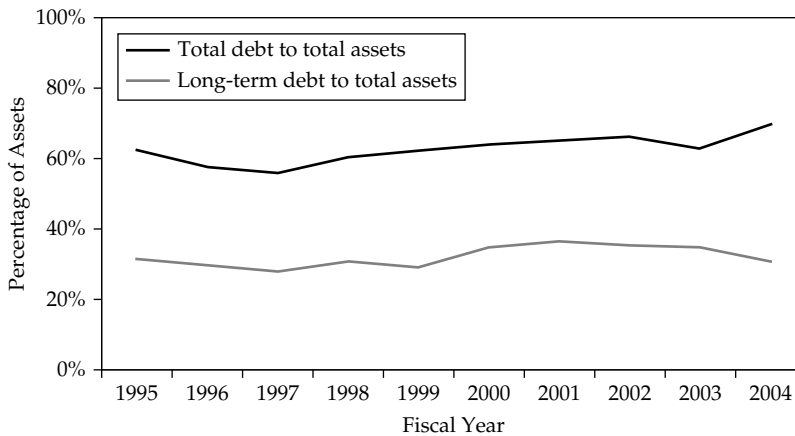
You will notice a change in the physical distance between these two trend lines in this exhibit. The difference between the quick and current ratios is in the numerator, where the quick ratio excludes inventory. The tightening of these two lines indicates that inventory has declined relative to the other current assets over time. This decline may reflect changes in the management of inventory but also may reflect changes in the product mix from acquisitions and divestitures.

3.6.4. Solvency

Exhibit 9-16 provides both the total debt-to-assets and the long-term debt-to-assets ratios for Procter & Gamble over the 1995–2004 fiscal years. Procter & Gamble increased its financial leverage overall from 1995 to 2004. However, the change in the leverage in the latter part of

this period is due to a greater reliance on short-term liabilities, as indicated by the divergence of the two debt ratios.

EXHIBIT 9-16 Solvency Ratios, Procter & Gamble, 1995–2004

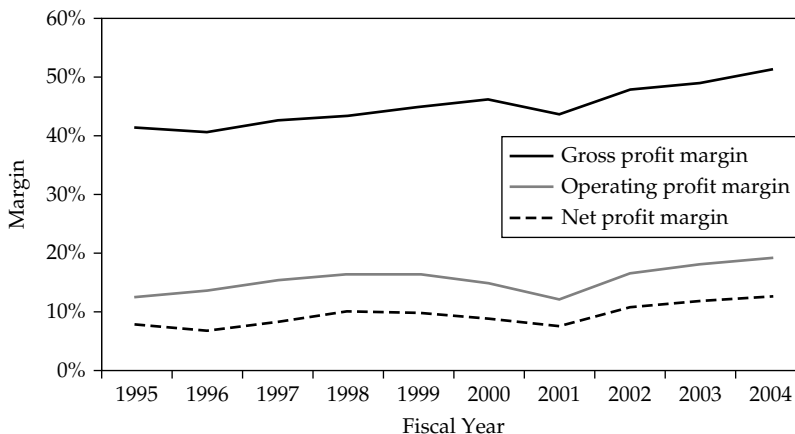


Source of data: The Procter & Gamble Company annual reports, various years.

3.6.5. Profitability

The profit margins of Procter & Gamble are shown in Exhibit 9-17. These profit margins have increased over time, with the noticeable exception of the 1999 and 2000 fiscal years. A look at the management's discussion of the financial results in that period indicates that this fall in margins is attributable to spending on acquisitions and lower earnings in those years due to restructuring expenses.

EXHIBIT 9-17 Profit Margins, Procter & Gamble, 1995–2004

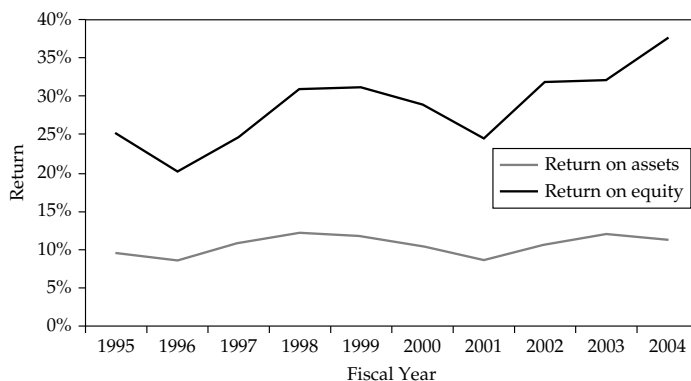


Source of data: The Procter & Gamble Company annual reports, various years.

3.6.6. Returns

Exhibit 9-18 provides a graph of the return on assets and the return on equity for Procter & Gamble for the period 1995–2004. The return on assets is flat during the 1995–2004 period, whereas the return on equity trends upward. This situation is attributed to Procter & Gamble's increased use of short-term debt financing, which is consistent with what we saw in Exhibit 9-16.

EXHIBIT 9-18 Return on Investment for Procter & Gamble, 1995–2004

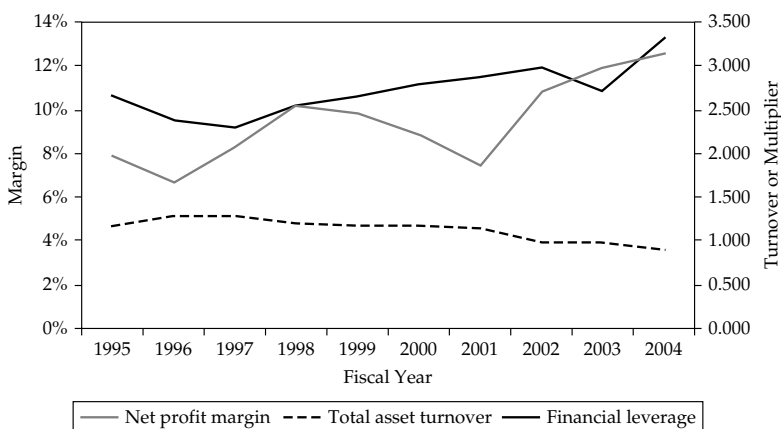


Source of data: The Procter & Gamble Company annual reports, various years.

The return on equity trended upward during this 10-year period, though there was a drop-off in 2001, which is consistent with the lower profit margins in 2001.

The breakdown of the return on equity into the three components of net profit margin, total asset turnover, and financial leverage, as shown in Exhibit 9-19, indicates that the upward trend in the return on equity is attributable to the increased ability to manage expenses and the increased use of debt. The downward trend in the turnover, which puts downward pressure on returns, likely reflects the change in product mix due to divestitures and joint ventures.

EXHIBIT 9-19 DuPont Components, Procter & Gamble, 1995–2004



Source of data: The Procter & Gamble Company annual reports, various years.

One interpretation of the data represented in Exhibits 9-18 and 9-19 is that the primary driver for the change in return on equity is the change in the net profit margin. A secondary driver is the change in debt, specifically the short-term debt.

3.6.7. Other Analysis and Factors

To this point, we have focused on a few ratios that depict the condition and performance of Procter & Gamble over a limited period of time. Additional information that we would want to consider includes the condition and performance of competitors and forecasts of the economy.

3.6.8. Comparables

In assessing the financial health of a company, we often compare the financial ratios of a company with those of its major competitors or the industry as a whole. The challenge is often found in identifying the appropriate competitors or industry to use as a basis for comparison. With respect to competitors, we want to compare the company with those competitors that have similar lines of business in similar proportions.

It may be difficult in some cases to find competitors that are truly comparable. Consider the comparison of Procter & Gamble (PG) with Colgate-Palmolive (CL). Though both companies are in the consumer products industry, their participation in the industry differs, as we can see from the business segment data from their respective 10-K filings for 2004:

Procter & Gamble	Revenues (in billions)
P&G Beauty	\$19.483
Health Care	7.786
Baby Care and Family Care	11.890
Fabric Care and Home Care	15.262
Snacks and Coffee	3.140
<hr/>	
Colgate-Palmolive	Revenues (in billions)
Oral, Personal, and Home Care	\$8.587
Pet Nutrition	1.316

The competitor dimension of the analysis is an important aspect to explore in order to gauge the normal or typical ratio level for businesses with similar product lines and to understand the ability of competitors to affect the market in the future. For example, as Procter & Gamble incorporates its newest acquisition, Gillette, and perhaps embarks on additional products, how financially nimble are its competitors and how fast might they be able to introduce competing products?

Suppose we wish to use an industry average instead of comparing a company with one or two competitors. This approach would give us a broader picture of the condition and performance of the industry. One issue that becomes important, especially in industries that include companies of different sizes, is how to compute the average. Suppose we are calculating an industry average of the return on assets for the consumer products industry. And suppose we want to calculate an average that includes Procter & Gamble's major competitors:

Kimberly-Clark, Colgate-Palmolive, Newell Rubbermaid, and Clorox.²² These companies are of different sizes, so just how we compute the average will affect the conclusions we draw. We can calculate an equal-weighted industry average, in which each company has the same weight in the average, or a value-weighted industry average, in which each company's ratio is included in proportion to its size.²³ Procter & Gamble's major competitors range in size from Kimberly-Clark, with total assets of over \$17 billion, to Clorox, which has assets of just over \$3.6 billion. Therefore, the weighting may make a difference in what is considered "average" for these competitors.

Another consideration in looking at an industry average is that, no matter how it is calculated, it is less volatile than a given company's ratio because of the portfolio effect; the ups and downs of an individual company are smoothed by the ups and downs of the other companies that are not perfectly in synch with one another.

A thorough analysis of Procter & Gamble requires examining each dimension of its financial condition and performance—activity, liquidity, solvency, and profitability—and comparing these dimensions over time and against major competitors and the industry as a whole. In addition, a thorough analysis requires an examination of the company's common-size statements in conjunction with those of the major competitors. Further, company-specific information (e.g., the expected length of time for incorporating its newest acquisition) must be incorporated into any projections made of future condition and performance based on the analysis of financial statements.

4. PRO FORMA ANALYSIS

We use common-size statements and financial ratios to gauge the company's financial condition and performance over recent fiscal periods. These analyses are useful in the assessment of what the company has done in the past and what trends and patterns may continue into the future. We can get an even stronger sense of a company's future by constructing pro forma statements, based both on relationships that existed in the recent past and on anticipated events and changes.²⁴ Pro forma statements are income statements and balance sheets based on projections. We often make these projections by using relations that we estimate from the recent past, forecasting revenues, and then using these forecasted revenues in conjunction with the past relations to develop a picture of the company's future.

²²It is important for analysts to carefully consider the benchmark that is desired. Is it of interest to consider all the companies in the industry? A drawback to this approach is that we are including results for both the leaders and the laggards in the industry. Another issue is identifying the appropriate competitors. For example, some analysts consider Johnson & Johnson to be in the consumer products industry, whereas other analysts classify this company within the health care sector.

²³An equal-weighted industry average includes each company with an equal weight, so the calculation is simple: Sum the returns on assets and divide by the number of companies in the average. A value-weighted industry average, on the other hand, allows larger companies to play a larger role. Computing a value-weighted average requires summing the components and then calculating the ratio. For the value-weighted industry average return on assets, for example, we sum the net income for all companies and divide this result by the sum of the total assets of the companies.

²⁴*Pro forma statements* should not be confused with pro forma financial information released by companies in disclosures regarding financial performance. In the former use of the term *pro forma*, we are referring to projections or predictions of future results and conditions; in the latter case, the term *pro forma* is used to indicate reported results that are not calculated in conformity with generally accepted accounting principles.

If we simply take a company's current balance sheet and income statement and make the bold assumptions that all elements vary with sales and that the company will continue to grow at a rate similar to its most recent past growth rate, we can generate pro forma income statements and balance sheets quite easily. For example, using Procter & Gamble and assuming the same growth in revenues in 2005 as in 2004, the pro forma income statement for 2005 is as follows:

Fiscal Year Ending 30 June	Actual 2004 (in millions)	Projected Percent of Sales	Pro forma 2005 (in millions)
Sales	\$51,407	100.0	\$60,924
Cost of sales	<u>25,076</u>	48.8	<u>29,718</u>
Gross profit	\$26,331	51.2	\$31,206
Selling, general, and administrative expenses	<u>16,504</u>	32.1	<u>19,559</u>
Operating income	\$9,827	19.1	\$11,647
Interest expense	629	1.2	745
Other nonoperating income, net	<u>152</u>	0.3	<u>180</u>
Earnings before income taxes	\$9,350	18.2	\$11,082
Income tax	<u>2,869</u>	5.6	<u>3,400</u>
Net income	\$6,481	12.6	\$7,682

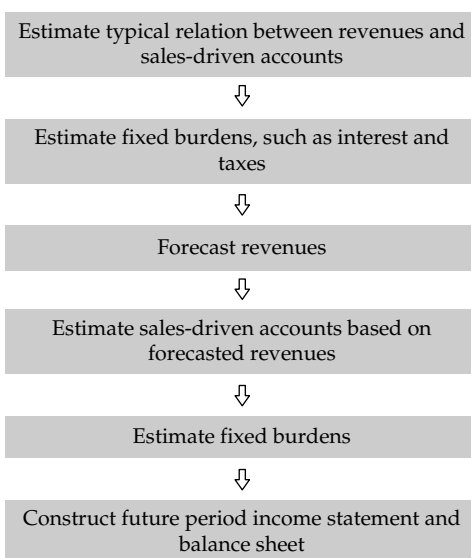
How far did we miss in our projections? We predicted \$7.682 billion in net income, yet the actual net income for 2005 was \$7.257 billion. As you can see, we were off by approximately \$425 million:

Fiscal Year Ending 30 June	Projected Percent of Sales	Pro Forma 2005 (in millions)	Actual Percent of Sales	Actual 2005 (in millions)
Sales	100.0	\$60,924	100.0	\$56,741
Cost of sales	48.8	<u>29,718</u>	49.0	<u>27,804</u>
Gross profit	51.2	\$31,206	51.0	\$28,937
Selling, general, and administrative expenses	32.1	<u>19,559</u>	31.7	<u>18,010</u>
Operating income	19.1	\$11,647	19.3	\$10,927
Interest expense	1.2	745	1.5	834
Other nonoperating income, net	0.3	<u>180</u>	0.6	<u>346</u>
Earnings before income taxes	18.2	\$11,082	18.4	\$10,439
Income tax	5.6	<u>3,400</u>	5.6	<u>3,182</u>
Net income	12.6	\$7,682	12.8	\$7,257

Why did we miss the mark? The projected percentages of sales were actually quite close to the actual percentages of sales, with the primary exception being “other nonoperating income, net,” which is difficult to predict for most companies. We also missed slightly in terms of revenue growth. Using 2004 revenue growth of 18.5 percent, we predicted sales of roughly \$60.9 billion. Actual revenue growth was lower, at 10.4 percent.

As you can see in this example, it is important to produce a good prediction of revenue growth, as well as refinement in terms of how other income and expenses vary with sales. We can develop more accurate forecasts by determining which accounts in the income statement and balance sheet tend to vary with revenues and which do not. For example, interest expense and nonoperating income and expenses do not tend to vary with revenues but rather are driven by other factors. Exhibit 9-20 outlines the process of considering both sales-driven and non-sales-driven accounts in the development of pro forma statements.

EXHIBIT 9-20 Pro Forma Analysis



For purposes of demonstrating this process, we will use the statements for Imaginaire, a fictitious company:²⁵

Imaginaire Company Income Statement, Year 0 (in millions)		Imaginaire Company Balance Sheet, End of Year 0 (in millions)	
Sales revenues	€1,000.0	Current assets	€600.0
Cost of goods sold	<u>600.0</u>	Net plant and equipment	<u>1,000.0</u>

²⁵Note that at various points throughout our Imaginaire example, the calculations may vary slightly due to rounding. For this example, calculations were completed with a spreadsheet.

Imaginaire Company Income Statement, Year 0 (in millions)		Imaginaire Company Balance Sheet, End of Year 0 (in millions)	
Gross profit	€400.0	Total assets	€1,600.0
Selling, general, and administrative expenses	100.0		
Operating income	€300.0	Current liabilities	€250.0
Interest expense	32.0	Long-term debt	400.0
Earnings before taxes	€268.0	Common stock and paid-in capital	25.0
Taxes	93.8	Retained earnings	925.0
Net income	€174.2	Total liabilities and equity	€1,600.0
Dividends	€87.1		

4.1. Estimating the Sales-Driven Relations

There are several accounts that tend to vary with the revenues of a business. In other words, the relation between these accounts and revenues is relatively fixed over time. In general, these sales-driven accounts include the cost of goods sold; selling, general, and administrative expenses; and the working capital accounts included in current assets and current liabilities.

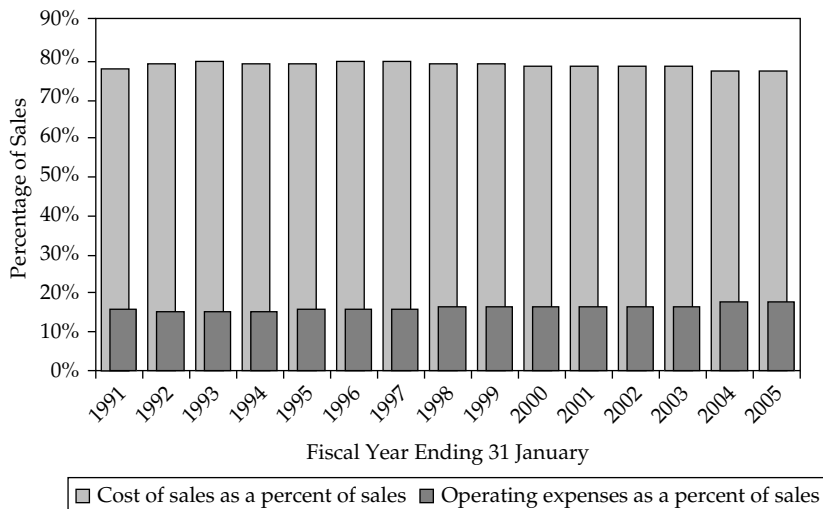
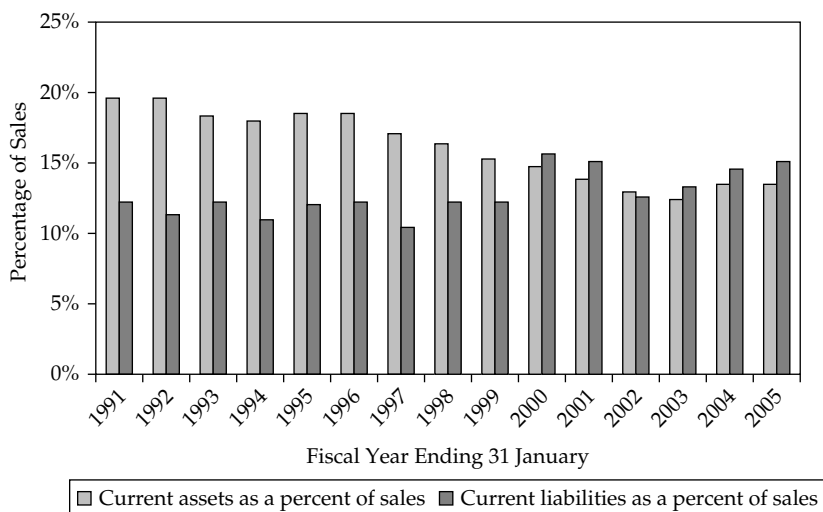
In the case of the Imaginaire Company, we calculate the following:

Cost of goods sold as a percentage of sales	60%
Operating expenses as a percentage of sales	10%
Current assets as a percentage of sales	60%
Current liabilities as a percentage of sales	25%

As a real-world example, Exhibit 9-21 shows the sales-driven relations for Wal-Mart Stores. The cost of goods sold as a percentage of sales has been rather constant at about 79 percent during the past 15 years. Operating expenses, including selling, general, and administrative expenses, have been approximately 16 percent of sales. When making projections involving Wal-Mart Stores, we can be fairly confident that the sales-driven costs of sales and operations are relatively constant.

If we look at Wal-Mart's current assets and current liabilities, we see that while these may be sales-driven, there is some variability in the percentages. The current assets range from 12.5 percent to 19 percent of sales, whereas the current liabilities range from 10.4 percent to 15.6 percent of sales. However, the past five years' percentages are rather constant for both accounts, providing a reasonable estimation of current assets of approximately 13.5 percent of sales and current liabilities of approximately 15 percent of sales.

EXHIBIT 9-21 Sales-Driven Accounts for Wal-Mart Stores, 1990–2004

Panel A: Sales-Driven Income Statement Accounts**Panel B: Sales-Driven Balance Sheet Accounts**

Source of data: Wal-Mart Stores annual reports, various years.

4.2. Estimating the Fixed Burdens

The fixed burdens are primarily interest and taxes. If we make the assumption that tax rates will not change in the near future, we can look at the company's recent experience with taxes to assess the tax burden. In the case of the Imaginaire Company, the tax rate is 35 percent. In most cases, the tax burden is constant unless a change occurs in the federal corporate tax structure. We can see this constancy in the income tax burden of Procter & Gamble in Exhibit 9-1. If tax rates are expected to change, this estimate can be adjusted accordingly.

Also, if we project that a company will, say, generate losses instead of gains, we will want to adjust the tax burden to reflect this change.²⁶

The interest burden is a function of the company's capital structure. In making our forecasts, we must make an assumption about the company's capital structure in the future and then work from there to determine the interest burden. If we assume that the capital structure will not change, we look at the interest burden in the past to make our projections for the future.

In the case of Procter & Gamble, we can see in Exhibit 9-3 that the capital structure has changed over time, with more financial leverage in the more recent years. In making our predictions, we may want to focus on the more recent years (say, 2000–2004), which reflect the capital structure most likely to continue in the future.

4.3. Forecasting Revenues

We can forecast future revenues a number of ways. We already saw that if we simply use the most recent year's revenue growth for Procter & Gamble, we wind up with a significant forecast error for 2005. If we forecast revenues into the future using the average growth rate of 5.43 percent over the period 1994–2004, we predict revenues of \$54,198 million for the fiscal year ending 30 June 2005.²⁷ On the other hand, if we use a time-series linear regression to forecast revenues, we predict revenues of \$47,841 million in 2005.²⁸ The actual revenues for 2005 were \$56,741 million. In other words, whether relying on the average growth rate to continue for the following year or extrapolating a linear trend, we would have under forecasted revenues. Why are we off?

Strictly using forecasts from prior periods does not take into account the other factors that affect revenues. In the case of Procter & Gamble, recent acquisitions and divestitures changed the product mix, affecting the predictability of the different segments' revenues.

In predicting revenues, we want to consider not only the path that revenues have taken in the past but also company-specific, market, and economic events that may affect future revenues. If the company provides consistent segment data, we can often track trends in these segments to develop the forecasts for the company as a whole.

4.4. Constructing Pro Forma Statements

We construct the financial statements based on the sales-driven estimates and the interest and tax burdens. If all accounts vary with sales, the projections that we provide in the pro forma statements are simple: We extrapolate forward in time using the percentages, typically using the components we determined in our common-size analysis. But not all accounts vary with sales, so we will encounter a residual that we need to resolve.

When we make predictions for both the sales-driven accounts and the fixed burdens, we will inevitably encounter either a financing deficiency or a surplus. We must then make an assumption regarding how we expect the company to deal with this residual. Will the company finance expansion with debt? Equity? Both? When funds are available in excess of operating needs, will they be used to pay down debt? Repurchase stock? Both? In other words,

²⁶In the case of Kmart, for example, the losses generated tax-loss carryovers and actually produced a tax benefit instead of a burden in the years leading up to bankruptcy in 2002.

²⁷The growth rate of revenues varied widely between 1994 and 2004, from –1.77 percent in 2001 to 18.51 percent in 2004.

²⁸We estimate the linear regression based on the 11 years of revenues, 1994 through 2004, against time, forecasting the following year's revenues as $\$29,301 + \$1,545(12) = \$47,841$.

we need to make an assumption about the company's capital structure decisions. To see how this question plays out, we will forecast one year ahead for the Imaginaire Company. If we assume that revenues will grow at 5 percent, the predicted net income one year ahead, assuming no changes in financing, is €184 million:

Imaginaire Company Income Statement (in millions)

	Year 0	One Year Ahead	
Sales revenues	€1,000.0	€1,050.0	⇨ Growth at 5 percent
Cost of goods sold	<u>600.0</u>	<u>630.0</u>	⇨ 60 percent of revenues
Gross profit	€400.0	€420.0	⇨ Sales revenues less cost of goods sold
Selling, general, and admin. expenses	<u>100.0</u>	<u>105.0</u>	⇨ 10 percent of revenues
Operating income	€300.0	€315.0	⇨ Gross profit less operating expenses
Interest expense	<u>32.0</u>	<u>32.0</u>	⇨ 8 percent of long-term debt
Earnings before taxes	€268.0	€283.0	⇨ Operating income less interest expense
Taxes	<u>93.8</u>	<u>99.1</u>	⇨ 35 percent of earnings before taxes
Net income	€174.2	€184.0	⇨ Earnings before taxes less taxes
Dividends	€87.1	€92.0	⇨ Assume dividend payout ratio of 50 percent

We then carry the income statement information into our forecast for the next year's balance sheet:

Imaginaire Company Balance Sheet, End of Year (in millions)

	Year 0	One Year Ahead	
Current assets	€600.0	€630.0	⇨ 60 percent of revenues
Net plant and equipment	<u>1,000.0</u>	<u>1,050.0</u>	⇨ 100 percent of revenues
Total assets	€1,600.0	€1,680.0	
Current liabilities	€250.0	€262.5	⇨ 25 percent of revenues
Long-term debt	400.0	400.0	⇨ Assume no change
Common stock and paid-in capital	25.0	25.0	⇨ Assume no change
Retained earnings	<u>925.0</u>	<u>1,017.0</u>	⇨ Retained earnings in Year 0, plus net income, less dividends
Total shareholders' equity	<u>950.0</u>	<u>1,042.0</u>	
Total financing	€1,600.0	€1,704.5	⇨ Sum of projected liabilities and equity
Total assets		<u>1,680.0</u>	
Financing surplus (or deficiency)		€24.5	⇨ Difference between financing and assets

Whenever we make projections with a combination of percentages of sales and fixed burdens, we are likely to need a “plug” item to balance the accounts. In this case, we see that there is a financing surplus of €24.5 million, which means that the company can pay down debt, repurchase equity, or increase dividends by €24.5 million. If we assume that the company’s capital structure does not change, we assume that the €24.5 million is spread proportionately between debt and equity. But now we have another issue: If debt changes, there are consequences for the interest expense, taxes, net income, and equity. In other words, the adjustment is not a simple one but rather one that requires iterations until the appropriate solution is determined.

For example, if we assume that Imaginaire will make adjustments only in debt, then the pro forma financial statements are as follows:

Imaginaire Company Income Statement (in millions)

	Year 0	One Year Ahead	
Sales revenues	€1,000.0	€1,050.0	⇨ Growth at 5 percent
Cost of goods sold	<u>600.0</u>	<u>630.0</u>	⇨ 60 percent of revenues
Gross profit	€400.0	€420.0	⇨ Sales revenues less cost of goods sold
Selling, general, and admin. expenses	<u>100.0</u>	<u>105.0</u>	⇨ 10 percent of revenues
Operating income	€300.0	€315.0	⇨ Gross profit less operating expenses
Interest expense	<u>32.0</u>	<u>30.0</u>	⇨ 8 percent of long-term debt (originally €400 million, now €375.5 million)
Earnings before taxes	€268.0	€285.0	⇨ Operating income less interest expense
Taxes	<u>93.8</u>	<u>99.7</u>	⇨ 35 percent of earnings before taxes
Net income	€174.2	€185.2	⇨ Earnings before taxes less taxes
Dividends	€87.1	€92.6	⇨ Assume dividend payout ratio of 50 percent

Imaginaire Company Balance Sheet, End of Year (in millions)

	Year 0	One Year Ahead	
Current assets	€600.0	€630.0	⇨ 60 percent of revenues
Net plant and equipment	<u>1,000.0</u>	<u>1,050.0</u>	⇨ 100 percent of revenues
Total assets	€1,600.0	€1,680.0	
Current liabilities	€250.0	€262.5	⇨ 25 percent of revenues
Long-term debt	400.0	375.5	⇨ Financing surplus applied toward debt

(Continued)

	Year 0	One Year Ahead	
Common stock and paid-in capital	25.0	25.0	⇔ Assume no change
Retained earnings	925.0	1,017.6	⇔ Retained earnings in Year 0, plus net income, less dividends
Total liabilities and equity	€1,600.0	€1,680.6	

With one iteration, we have reduced the financing surplus to €0.6 million. Additional iterations would eventually reduce the surplus (or deficit) to the point where it would be small enough to eliminate through rounding. For example, a second iteration would reduce long-term debt to €374.9 million and reduce the surplus to €328.00.

If we were instead to make the assumption that the company will maintain its current relation between total debt and equity, the pro forma statements would be slightly different:

Imaginaire Company Income Statement (in millions)

	Year 0	One Year Ahead	
Sales revenues	€1,000.0	€1,050.0	⇔ Growth at 5 percent
Cost of goods sold	600.0	630.0	⇔ 60 percent of revenues
Gross profit	€400.0	€420.0	⇔ Sales revenues less cost of goods sold
Selling, general, and admin. expenses	100.0	105.0	⇔ 10 percent of revenues
Operating income	€300.0	€315.0	⇔ Gross profit less operating expenses
Interest expense	32.0	33.6	⇔ 8 percent of long-term debt (now €420.0 million)
Earnings before taxes	€268.0	€281.4	⇔ Operating income less interest expense
Taxes	93.8	98.5	⇔ 35 percent of earnings before taxes
Net income	€174.2	€182.9	⇔ Earnings before taxes less taxes
Dividends	€87.1	€91.5	⇔ Assume a dividend payout ratio of 50 percent

Imaginaire Company Balance Sheet, End of Year (in millions)

	Year 0	One Year Ahead	
Current assets	€600.0	€630.0	⇔ 60 percent of revenues
Net plant and equipment	1,000.0	1,050.0	⇔ 100 percent of revenues
Total assets	€1,600.0	€1,680.0	

	Year 0	One Year Ahead	
Current liabilities	€250.0	€262.5	⇨ 25 percent of revenues
Long-term debt	400.0	420.0	⇨ Debt increased by €20 million to maintain the same capital structure
Common stock and paid-in capital	25.0	25.0	⇨ Assume no change
Treasury stock		(44.0)	⇨ Repurchased shares
Retained earnings	925.0	1,016.5	⇨ Retained earnings in Year 0, plus net income, less dividends
Total liabilities and equity	€1,600.0	€1,680.0	

Retained earnings for one year ahead were found by adding net income less dividends to retained earnings in Year 0. If the common stock and paid-in capital account remains at €25.0 million, then a Treasury stock purchase of €44.0 million is required to eliminate the financing surplus. A repurchase of shares creates a Treasury stock contra-equity account, which results in a reduction of the company's reported equity.

As you can see, generating pro forma statements requires a reliance on assumptions about the growth in revenues, which items in the balance sheet and income statement tend to vary with revenues, and how the company will deal with financing shortfalls or surpluses. Divergences from these assumptions can have a dramatic impact on overall results. Thus, great care should be taken to ensure that pro forma assumptions are as realistic as possible.

5. SUMMARY

A challenge that we face in financial analysis is making sense of the wealth of information that is available about a company and the industry in which it operates. Companies provide shareholders and investors with quarterly and annual financial statements, as well as numerous other financial releases. Financial ratio analysis and common-size analysis help us gauge the financial performance and condition of a company through an examination of relationships among these many financial items.

A thorough financial analysis of a company requires examining its efficiency in putting its assets to work, its liquidity position, its solvency, and its profitability. We can use the tools of common-size analysis and financial ratio analysis, including the DuPont model, to help understand where a company has been. We then apply these relationships in pro forma analysis, forecasting the company's income statements and balance sheets for future periods, to see how the company's performance is likely to evolve.

PROBLEMS

The following information relates to Problems 1, 2, and 3.

Tab, Inc., Income Statements for Fiscal Years 2003, 2004, and 2005

	Amount (in millions of dollars)		
	2005	2004	2003
Revenues	\$25,000	\$22,000	\$21,000
Cost of sales	20,000	18,000	17,000
Gross profit	\$5,000	\$4,000	\$4,000
Selling, general, and administrative expenses	500	500	800
Operating income	\$4,500	\$3,500	\$3,200
Interest and other nonoperating expense	200	250	250
Earnings before income taxes	\$4,300	\$3,250	\$2,950
Income tax	1,410	975	885
Net income	\$2,890	\$2,275	\$2,065

Tab, Inc., Balance Sheets as of End of Fiscal Years 2003, 2004, and 2005

	Amount (in millions of dollars)		
	2005	2004	2003
Cash, cash equiv., and marketable securities	\$200	\$150	\$100
Accounts receivable	1,800	1,350	900
Inventories	8,000	7,500	7,000
Total current assets	\$10,000	\$9,000	\$8,000
Net property, plant, and equipment	\$20,000	19,000	19,000
Intangible assets	1,000	1,000	1,000
Total assets	\$31,000	\$29,000	\$28,000
Accounts payable	\$500	\$790	\$615
Debt due in one year	1,000	1,000	1,000
Long-term debt	12,000	13,000	14,000
Shareholders' equity	17,500	14,210	12,385
Total liabilities and equity	\$31,000	\$29,000	\$28,000

1. Using vertical common-size analysis and restating the balance sheets using total assets as the benchmark to analyze changes at Tab between fiscal year 2003 and fiscal year 2005, an analyst would correctly conclude that Tab:
 - A. reduced its relative investment in inventory.
 - B. increased the role of intangible assets in its investments.
 - C. decreased its reliance on debt financing relative to equity financing.
2. Using vertical common-size analysis of the income statement of Tab for 2005, the cost of sales relative to the benchmark is *closest* to:
 - A. 75%.
 - B. 80%.
 - C. 85%.
3. Using horizontal common-size analysis of the income statement of Tab for 2005, the cost of sales relative to the benchmark of 2003 is *closest* to:
 - A. 95%.
 - B. 118%.
 - C. 123%.
4. Common-size analysis is used in financial analysis to:
 - A. evaluate changes in a company's operating cycle over time.
 - B. compare companies of different sizes or to compare a company with itself over time.
 - C. restate each element in a company's financial statement as a proportion of the similar account for another company in the same industry.
5. The TBI Company has a number of days of inventory of 50. Therefore, the TBI Company's inventory turnover is *closest* to:
 - A. 4.8 times.
 - B. 7.3 times.
 - C. 8.4 times.
6. The difference between a company's operating cycle and its net operating cycle is:
 - A. the number of days that it takes, on average, for the company to sell its inventory.
 - B. the number of days that it takes the company to pay on the accounts due its suppliers.
 - C. the number of days that it takes for the company's cash investment in inventory to result in cash collections from customers.
7. The net operating cycle is:
 - A. inversely related to a company's need for liquidity.
 - B. the length of time it takes for an investment in inventory to be returned from collected accounts.
 - C. the sum of the number of days of inventory and the number of days of receivables, less the number of days of payables.
8. A measure of the extent to which a company is able to satisfy its short-term obligations is referred to as:
 - A. a liquidity ratio.
 - B. an activity ratio.
 - C. a financial leverage ratio.

-
9. Which of the following *best* describes the relationship between the current ratio and the cash ratio?
- A. The current ratio and the cash ratio should not bear any relation to one another.
 - B. The current ratio is at least equal to the cash ratio but may be larger than the cash ratio.
 - C. The cash ratio is at least equal to the current ratio but may be larger than the current ratio.
10. Suppose a company has earnings before taxes of \$20 billion and its income tax is 35% of its earnings before taxes. If the company has an interest expense of \$2 billion, its interest coverage ratio is *closest* to:
- A. 6.5 times.
 - B. 10.0 times.
 - C. 11.0 times.
11. If a company has a net profit margin of 12% and a tax rate of 40%, the before-tax profit margin is *closest* to:
- A. 7.2%.
 - B. 12.4%.
 - C. 20.0%.
12. If a company's operating profit margin is 4% and its total asset turnover is 1.5 times, its operating return on assets is:
- A. 2.7%.
 - B. 6.0%.
 - C. 7.3%.
13. DuPont analysis involves breaking return-on-assets ratios into their:
- A. marginal and average components.
 - B. operating and financing components.
 - C. profit margin and turnover components.
14. The DuPont system allows us to break down the return on equity into:
- A. return on assets and the financial leverage ratio.
 - B. profit margin, the tax retention ratio, and inventory turnover.
 - C. gross profit margin, total asset turnover, and the debt-to-equity ratio.
15. If a company's net profit margin is -5%, its total asset turnover is 1.5 times, and its financial leverage ratio is 1.2 times, its return on equity is *closest* to:
- A. -9.0%.
 - B. -7.5%.
 - C. -3.2%.

The following information relates to Problems 16 and 17.

LaPearla Company Income Statement for Year 2005 (in millions)		LaPearla Company Balance Sheet, End of Year 2005 (in millions)	
Revenues	€10,000	Current assets	€2,000
Cost of goods sold	<u>5,500</u>	Net plant and equipment	<u>18,000</u>
Gross profit	€4,500	Total assets	€20,000
Selling, general, and administrative expenses	<u>800</u>		
Operating income	€3,700	Current liabilities	€1,000
Interest expense	<u>500</u>	Long-term debt	5,000
Earnings before taxes	€3,200	Common stock and paid-in capital	500
Taxes	<u>960</u>	Retained earnings	<u>13,500</u>
Net income	€2,240	Total liabilities and equity	€20,000

16. Suppose that LaPearla's revenues are expected to grow at a rate of 10% and all elements of the income statement and balance sheet are sales-driven except for the tax burden, which remains at 30%. LaPearla's pro forma net income for 2006 is *closest* to:
- €2.2 billion.
 - €2.5 billion.
 - €2.8 billion.
17. If LaPearla's long-term debt and paid-in capital accounts remain at their 2005 levels, the tax rate remains at the 2005 rate, and all other income statement and balance sheet accounts are sales-driven with an expected growth rate of revenues of 10%, in 2006 LaPearla will have a financing:
- deficiency if it pays no dividends.
 - surplus if it pays out 50% of its net income in dividends.
 - deficiency if it pays out 50% of its net income in dividends.

CHAPTER 10

MERGERS AND ACQUISITIONS

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LEARNING OUTCOMES

After completing this chapter, you will be able to do the following:

- Classify merger and acquisition (M&A) activities based on forms of integration and types of mergers.
- Explain common motivations behind M&A activity.
- Explain how earnings per share (EPS) bootstrapping works and calculate a company's post-merger EPS.
- Explain the relationship among merger motivations and types of mergers based on industry life cycles.
- Contrast merger transaction characteristics by form of acquisition, method of payment, and attitude of target management.
- Distinguish among pre-offer and post-offer takeover defense mechanisms.
- Calculate the Herfindahl–Hirschman Index (HHI) and evaluate the likelihood of an antitrust challenge for a given business combination.
- Compare the discounted cash flow, comparable company, and comparable transaction analyses for valuing a target company, including the advantages and disadvantages of each.
- Calculate free cash flows for a target company and estimate the company's intrinsic value based on discounted cash flow analysis.
- Estimate the value of a target company using comparable company and comparable transaction analyses.
- Evaluate a merger bid, calculate the estimated post-merger value of an acquirer, and calculate the gains accrued to the target shareholders versus the acquirer shareholders.

- Explain the effects of price and payment method on the distribution of risks and benefits in a merger transaction.
- Describe empirical evidence related to the distribution of benefits in a merger.
- Distinguish among divestitures, equity carve-outs, spin-offs, split-offs, and liquidation.
- Explain major reasons for divestitures.

1. INTRODUCTION

Companies enter into merger and acquisition activities for a variety of reasons. Many companies use mergers as a means to achieve growth. Others seek to diversify their businesses. In all cases, it is important for corporate executives and analysts to understand both the motives for mergers and their financial and operational consequences.

Merger and acquisition (M&A) activities involve a variety of complexities and risks. For the case described in Example 10-1, corporate managers, investors, regulators, and a bevy of advisers—including investment bankers, financial analysts, lawyers, and accountants—each evaluated the various offers from a variety of perspectives.

EXAMPLE 10-1 Guidant–Boston Scientific Merger

On 15 December 2004, Guidant Corporation (GDT), a manufacturer of heart defibrillators and other specialized medical equipment, agreed to merge with Johnson & Johnson (JNJ), a large, multinational producer of medical products and equipment. Guidant shareholders were to receive \$30.40 in cash and \$45.60 in JNJ stock (subject to conditions) per share of Guidant stock held. Although a merger such as the combination between GDT and JNJ normally would take about four months to complete, unanticipated events caused the planned merger transaction to become a yearlong saga.

While the companies worked to obtain the required regulatory clearances, a number of investigative articles exposing problems with GDT's defibrillators appeared in the *New York Times* in the spring of 2005. The company issued notices to physicians who prescribed the company's products warning them of potential problems with various defibrillator models. During the summer of 2005, GDT removed some defibrillators from the market as it tried to correct the technical problems. Meanwhile, numerous liability suits were filed against the company, and GDT subsequently lost a significant portion of its sales. Because of these negative developments, JNJ sought to renegotiate the terms of the transaction claiming that the "material adverse change" clause in the merger agreement had been violated.¹

GDT held that the loss of business did not violate the "material adverse change" clause. After initially filing a lawsuit in the U.S. District Court in an attempt to force JNJ to adhere to the original agreement, GDT later decided to enter into negotiations

¹Many merger and acquisition agreements include provisions for renegotiation or cancellation following events that have a significant negative effect on the company's value or business operations.

with JNJ to see if the two companies could agree on an acceptable modified agreement. In November 2005, the two companies agreed to modify the consideration that JNJ would pay GDT shareholders. In the new agreement, GDT shareholders were to receive \$33.25 in cash and 0.493 shares of JNJ stock for each share of GDT held. With JNJ stock trading at a price of about \$62.00 in November 2005, the total value of the deal to GDT shareholders was about \$63.82 per share of GDT held, which was a significantly lower merger price than in the original agreement.

Shortly after the modified merger agreement was announced, the chairman of another medical device manufacturer, Boston Scientific Corporation (BSX), contacted the chairman of GDT and indicated an interest in pursuing a business combination as an alternative to the JNJ merger. Because of the existing GDT–JNJ merger agreement, Guidant’s legal advisers reminded the company’s managers that they were prevented from entering into any competing merger discussions unless there was a merger proposal that could be deemed “superior” to the JNJ offer. As a result, on 5 December 2005, BSX communicated an offer to acquire GDT for \$36 in cash and \$36 in BSX common stock (subject to various conditions).

Although JNJ had fought for many months to acquire GDT at a reduced price, within a month, it improved the price it was willing to pay for GDT. A bidding war was under way. On 11 January 2006, JNJ’s offer was for \$37.25 in cash and 0.493 shares of JNJ stock—an increase of \$4 in cash. The following day, BSX responded by increasing its offer to a total of \$73—\$36.50 in cash and \$36.50 in stock plus \$0.012 interest per day for every day after 1 April that the merger was not completed. By offering compensation for any delay past 1 April, BSX sought to reassure any shareholders who might otherwise decline the offer out of concerns that antitrust objections might delay completion of the merger.

JNJ responded the next day, on 13 January, by increasing its offer to \$40.52 in cash and 0.493 shares of JNJ stock. Although some believed that the auction was over, BSX was not done. On 15 January 2006, BSX increased its offer to \$42 in cash and \$38 in BSX stock for a total of \$80. The two companies entered into a definitive merger agreement, the agreement with JNJ was terminated, and the GDT–BSX merger was ultimately completed in April 2006.

Despite all the legal issues and product liability problems, a competitive bidding war resulted in a more lucrative merger consideration for Guidant shareholders, who ultimately received \$4.00 more than the original JNJ merger proposal.

This chapter will discuss many of the issues brought forth in Example 10-1, such as the forms of payment in a merger, legal and contractual issues, and the necessity for regulatory approval. More important, this chapter aims to equip you with the basic tools for analyzing M&A deals and the companies behind them. In subsequent sections, we will discuss the motives behind business combinations, various transaction characteristics of M&A deals, the regulations governing M&A activity, and how to evaluate a target company and a proposed merger. Section 2 discusses the basic types of mergers. Section 3 examines the common motives that drive merger activities. In Section 4, we consider various transaction characteristics and their impact on different facets of M&A deals. Section 5 focuses on takeovers and the common defenses used to defeat unwelcome takeover attempts. In Section 6, we

outline the various regulations that apply to M&A activity. Section 7 explores methods for analyzing a target company and provides a framework for analyzing merger bids. In Section 8, we review the empirical evidence related to the distribution of gains in mergers. Section 9 provides a brief introduction to corporate restructuring activities, and Section 10 summarizes the chapter.

2. MERGERS AND ACQUISITIONS: DEFINITIONS AND CLASSIFICATIONS

Business combinations come in different forms. A distinction can be made between acquisitions and mergers. In the context of M&A, an **acquisition** is the purchase of some portion of one company by another. An acquisition might refer to the purchase of assets from another company, the purchase of a definable segment of another entity, such as a subsidiary, or the purchase of an entire company, in which case the acquisition would be known as a merger. A **merger** represents the absorption of one company by another. That is, one of the companies remains and the other ceases to exist as a separate entity. Typically, the smaller of the two entities is merged into the larger, but that is not always the case.

Mergers can be classified by the form of integration. In a **statutory merger**, one of the companies ceases to exist as an identifiable entity and all its assets and liabilities become part of the purchasing company. In a **subsidiary merger**, the company being purchased becomes a subsidiary of the purchaser, which is often done in cases where the company being purchased has a strong brand or good image among consumers that the acquiring company wants to retain. A **consolidation** is similar to a statutory merger except that in a consolidation, *both* companies terminate their previous legal existence and become part of a newly formed company. A consolidation is common in mergers where both companies are approximately the same size.

The parties to a merger are often identified as the target company and the acquiring company. The company that is being acquired is the **target company**, or simply the **target**. The company acquiring the target is called the **acquiring company**, or the **acquirer**. We will use this terminology throughout the chapter.

In practice, many of the terms used to describe various types of transactions are used loosely such that the distinctions between them are blurred. For example, the term “consolidation” is often applied to transactions where the entities are about the same size, even if the transaction is technically a statutory merger. Similarly, mergers are often described more generally as **takeovers**, although that term is often reserved to describe **hostile transactions**, which are attempts to acquire a company against the wishes of its managers and board of directors. A **friendly transaction**, in contrast, describes a potential business combination that is endorsed by the managers of both companies, although that is certainly no guarantee that the merger will ultimately occur.

An additional way that mergers are classified is based on the relatedness of the merging companies’ business activities. Considered this way, there are three basic types of mergers: horizontal, vertical, and conglomerate.

A **horizontal merger** is one in which the merging companies are in the same kind of business, usually as competitors. The Vodafone AirTouch acquisition of telecommunications competitor Mannesmann AG in 2000 is one example of a horizontal merger. Another example is the merger of Mobil and Exxon in 1999. One of the great motivators behind horizontal mergers is the pursuit of **economies of scale**, which are savings achieved through the consolidation of operations and elimination of duplicate resources. Another common

reason for horizontal mergers is to increase market power, because the merger results in a reduction of the number of industry competitors and an increase in the size of the acquiring company.

In a **vertical merger**, the acquirer buys another company in the same production chain, for example, a supplier or a distributor. In addition to cost savings, a vertical merger may provide greater control over the production process in terms of quality or procurement of resources or greater control over the distribution of the acquirer's finished goods. If the acquirer purchases a target that is ahead of it in the value chain (a supplier), it is called **backward integration**. An example of backward integration is if a steel manufacturer purchases an iron ore mining company. When an acquirer purchases a company that is further down the value chain (a distributor), it is called **forward integration**. An example of forward integration is Merck & Co.'s 1993 acquisition of Medco Containment Services, a marketer of discount prescription medicines. The merger brought together the production and distribution of pharmaceuticals into one integrated company.

When an acquirer purchases another company that is unrelated to its core business, it may be called a **conglomerate merger**. General Electric is an example of a conglomerate, having purchased companies in a wide range of industries, including media, finance, home appliances, aircraft parts, and medical equipment. Conglomerate mergers were particularly popular from the 1960s through the 1980s. The concept of company-level diversification was commonly used as a rationale for inter-industry mergers during this period. By investing in companies from a variety of industries, companies hoped to reduce the volatility of the conglomerate's total cash flows. As we will discuss in the section on merger motivations, company-level diversification is not necessarily in the shareholders' best interests.

EXAMPLE 10-2 History of U.S. Merger Activity

The history of merger activity in the United States illustrates the various types of M&A combinations. Merger and acquisition activities have historically been clustered in waves. The predominant types of mergers and the structures of merger deals have varied with each wave, typically as a result of differences in the regulatory environment. Similarly, the industries involved tend to vary by wave. Merger activity is apt to be concentrated in a relatively small number of industries, usually those going through dramatic changes, such as deregulation or rapid technological advancement.

First Wave (1897–1904)

At the close of the 1800s, growth in the railroads linked regional markets and created an environment conducive to larger companies that could capitalize on the emerging national U.S. economy, particularly within the mining and manufacturing industries. A relatively lax regulatory environment contributed to the situation, and many horizontal mergers resulted in near monopolistic conditions in several industries. The wave ended in 1904 as a result of a landmark decision by the U.S. Supreme Court limiting horizontal mergers among large competitors.

Second Wave (1916–1929)

In the 1920s, motor vehicles and radio coupled with improved railroad infrastructure further bolstered the U.S. economy. Like the previous wave, the second wave was accompanied by a sharp increase in stock prices. This time, however, the regulatory environment was less friendly to horizontal combinations and more sensitive to market power. Because market power was already concentrated among a few companies and further horizontal integration was difficult, companies sought to integrate backward into supply and forward into distribution through vertical mergers. Consequently, business combinations in this wave tended to create oligopolies. This second wave came to a conclusion with the 1929 stock market crash.

Third Wave (1965–1969)

The third wave occurred in a regulatory environment that strongly discouraged any merger—horizontal or vertical—that would reduce competition within an industry. Companies seeking to expand thus looked outside their own industries and began forming conglomerates. Many of the conglomerates created during this period subsequently underperformed the market. The third merger wave ended in 1969 as antitrust enforcement curtailed the rise of conglomerates.

Fourth Wave (1981–1989)

The regulatory environment in the 1980s was friendlier to both horizontal and vertical mergers than it had been in the 1960s, but what really fueled business combinations during this period was the development of the high-yield bond market, which benefited as falling interest rates and rising stock prices created an environment conducive to the greater use of leverage.

Although hostile takeovers were nothing new, increased ability to tap the high-yield bond market put the capacity to finance a takeover in the hands of people and companies that otherwise might not have had access to the necessary capital. This period was marked by the rise of the corporate raider and increasingly sophisticated takeover attempts (and defenses). A **corporate raider** is a person or organization seeking to profit by acquiring a company and reselling it.² As the 1980s came to a close, the stock market and economy softened, bringing the fourth wave to its conclusion.

Fifth Wave (1992–2001)

Following the 1990–1991 recession, merger activity increased in 1992 and intensified throughout the decade. A strong and long-running bull market created many companies with high market valuations, which were then more easily able to use their equity to purchase other companies; thus, stock-swap mergers became more common during this wave. Additionally, during the latter half of the 1990s, U.S. regulators were more

²As we will point out later in the section on takeover defenses, in some circumstances a corporate raider can profit from an unsuccessful takeover attempt. It was common during this merger wave for companies to pay raiders a premium in exchange for the raider terminating the attempted takeover, a tactic commonly referred to as “greenmail.” Indeed, many raiders initiated takeover attempts without expecting to complete the acquisition.

open to industry consolidation as merger waves in Europe and Asia created larger international competitors. Deregulation and technological advancement further fueled merger activity, particularly in banking, health care, defense, and telecommunications. The fifth wave ended with a dramatic decline in transactions in 2001 as the market and the economy waned following the end of the Internet bubble of the late 1990s.

Sixth Wave (2003–Present)

Based on M&A industry statistics, such as M&A deal volume, it appears that we are in the midst of a sixth wave that began in 2003. After a sharp decline in the number of M&A deals directly following the conclusion of the fifth wave in 2001, the market began to pick up again in 2003 and strengthened rapidly through 2004. The number of transactions increased again in 2005 and surpassed the transaction volume records set at the height of the Internet bubble to reach a new all-time high. As in the fifth wave, there has been much industry consolidation in the sixth wave, which is producing larger companies that are better able to compete globally.

3. MOTIVES FOR MERGER

In the previous section, we mentioned some of the basic motives behind mergers, such as the search for economies of scale (in a horizontal merger) or cost savings through integration (in a vertical merger). In this section, we will expand on this topic and survey some of the reasons companies merge—the motives or rationales for a merger.

The topic is important because in assessing a proposed combination, investors and analysts need to carefully evaluate the rationale behind the merger. Does the stated rationale make sense? Is the merger likely to create value? What is the probability that each of the stated goals for the merger will be attained? Keep in mind that many motives are interrelated and that there are typically several motives, both acknowledged and tacit, behind any given merger.

3.1. Synergy

Among the most common motivations for a merger is the creation of synergy, in which the whole of the combined company will be worth more than the sum of its parts. Generally speaking, synergies created through a merger will either reduce costs or enhance revenues. Cost synergies are typically achieved through economies of scale in research and development, procurement, manufacturing, sales and marketing, distribution, and administration. Revenue synergies are created through the cross-selling of products, expanded market share, or higher prices arising from reduced competition. For example, a bank that acquires its competitors can both increase its market share and realize operating efficiencies by closing duplicate branches and integrating back-office operations.

3.2. Growth

Corporate managers are under constant pressure to grow their companies' revenues, and they often turn to M&A activity to achieve that growth. Companies can grow either by making

investments internally (i.e., **organic growth**) or by buying the necessary resources externally (i.e., **external growth**). It is typically faster for companies to grow externally. Growth through M&A activity is common when a company is in a mature industry. For example, the global oil industry is a mature industry, and BP, Exxon Mobil, and Chevron Corporation have increased their reserves and output by acquiring smaller competitors.

External growth can also mitigate risk. It is considered less risky to merge with an existing company than to enter an unfamiliar market and establish the resources internally. The past several years of the fifth merger wave in the 1990s were characterized by a surge in cross-border M&A transactions, many of which were motivated by the desire to establish footholds in international markets.

3.3. Increasing Market Power

In industries where there are few competitors or where market share is sufficiently concentrated, horizontal integration may be a means by which to increase market power. When a company increases its market power through horizontal mergers, it may have a greater ability to influence market prices. Taken to an extreme, horizontal integration results in a monopoly.

Vertical integration may also result in increased market power. Vertical mergers can lock in a company's sources of critical supplies or create captive markets for its products. Imagine, for example, an industry in which one company supplies raw materials to two separate manufacturing companies. If one of the manufacturers were to acquire the raw materials provider, the acquirer would be in a position to influence industry output and ultimately prices. As we will discuss further in the section on antitrust regulation, government regulators routinely block both horizontal and vertical mergers that sufficiently reduce competition in an industry and concentrate market power in the hands of too few companies.

3.4. Acquiring Unique Capabilities and Resources

Many companies undertake a merger or an acquisition either to pursue competitive advantages or to shore up lacking resources. When a company cannot cost-effectively create internally the capabilities needed to sustain its future success, it may seek to acquire them elsewhere. For example, a company may engage in M&A activity in order to acquire specific competencies or resources it lacks, such as a strong research department, nimble sales force, intellectual capital, or creative talent.

3.5. Diversification

Companies sometimes cite diversification as one of the motives behind a merger. Indeed, this was an especially popular motive for conglomerates during the third merger wave. The idea behind company-level diversification is that the company can be treated as a portfolio of investments in other companies. If a conglomerate invests in companies from a variety of industries, then the variability of the conglomerate's total cash flows should be reduced, at least to the extent that the industries are uncorrelated.

Although this may seem like a rational motive, typically, it is not in the best interests of the conglomerate's shareholders. In a well-functioning capital market, investors can diversify their own portfolios more easily and at less expense. Additionally, the desire to diversify has led some companies to lose sight of their major competitive strengths and to expand into businesses where they lack comparative advantages.

3.6. Bootstrapping Earnings

Even when there are no reasons to believe that synergies or growth would result from a merger, it is possible to create the illusion of synergies or growth. When a company's earnings increase as a consequence of the merger transaction itself (rather than because of resulting economic benefits of the combination), it is referred to as the "bootstrap effect" or "**bootstrapping earnings**." The bootstrap effect occurs when the shares of the acquirer trade at a higher price-earnings ratio (P/E) than those of the target and the acquirer's P/E does not decline following the merger.

EXAMPLE 10-3 Bootstrapping Earnings

Assume two companies are planning a merger. Company A is the acquirer, Company T is the target, and Company A* is the post-merger combination of the two companies. The companies' stock prices and earnings per share are as shown below. Note that the acquirer has a P/E of 25.0 and the target has a P/E of 20.0:

	A	T	A*
Stock price	\$100.00	\$50.00	
EPS	\$4.00	\$2.50	\$4.20
P/E	25.0	20.0	
Total shares outstanding	100,000	50,000	125,000
Total earnings	\$400,000	\$125,000	\$525,000
Market value of equity	\$10,000,000	\$2,500,000	

Given its stock price, the acquirer can issue 25,000 of its own shares and use the proceeds to buy the target company. This amount is determined by dividing the target's market value by the acquirer's stock price ($\$2,500,000/\$100 = 25,000$). The total shares outstanding of the merged company will be 125,000—the acquirer's initial 100,000 shares plus the 25,000 shares that the acquirer issued to purchase the target. After the merger, the company's combined earnings are divided by the number of shares outstanding to determine the new EPS ($\$525,000/125,000 = \4.20), which is \$0.20 higher per share than the acquirer would have reported without the merger.

If the acquirer's pre-merger stock price had been \$80 instead of \$100, then A's pre-merger P/E would have been 20.0 ($\$80/\4.00). Under that scenario, the acquirer would have issued 31,250 shares to purchase the target. The EPS of the merged company would then have been $\$525,000/131,250 = \4.00 , thus illustrating that for bootstrapping to work, the acquirer's P/E must be higher than the target's P/E.

If the market is efficient, the post-merger P/E should adjust to the weighted average of the two companies' contributions to the merged company's earnings. In the previous example, the P/E of the merged company would be about 23.8, which implies that the acquirer's stock price would remain at \$100. If, however, the acquiring company's P/E is higher than the target's and management can convince investors to value the merged company using the acquirer's pre-merger P/E, then the stock price of the new company should rise. If the acquirer bootstraps earnings to \$4.20 per share as shown in the example above, then the share price should increase to \$105 if investors apply the pre-merger P/E of 25.0 times earnings ($\$4.20 \times 25.0 = \105). When there are no expected gains from synergy or other factors, such share price increases are not expected.

The market usually recognizes the bootstrapping effect, and post-merger P/Es adjust accordingly. But there have been periods when bootstrapping seemed to pay off for managers, at least in the short run. During the third merger wave, many conglomerates benefited from bootstrapping as investors grappled with how to value these diversified corporate behemoths. Likewise, during the dot-com bubble of the late 1990s, many high P/E companies bootstrapped their earnings and showed continuous EPS growth through a constant string of mergers with lower P/E companies.

3.7. Managers' Personal Incentives

Various managerial-related theories for mergers have been developed over the years based on evidence of agency problems. **Managerialism theories** posit that because executive compensation is highly correlated with company size, corporate executives are motivated to engage in mergers to maximize the size of their companies rather than shareholder value. Additionally, corporate executives may be motivated by self-aggrandizement. For example, being the senior executive of a large company conveys greater power and more prestige.

3.8. Tax Considerations

It is possible for a profitable acquirer to benefit from merging with a target that has accumulated a large amount of tax losses. Instead of carrying the tax losses forward, the merged company would use the tax losses to immediately lower its tax liability. In many countries, the taxing authority disallows an offset in cases where the primary reason for the merger is tax avoidance. Mergers are typically conducted for a variety of reasons, however, and it is difficult for regulatory authorities to prove that tax considerations are a primary motivator.

3.9. Unlocking Hidden Value

A potential target company may be uncompetitive over a sustained period for a host of reasons, including poor management, lack of resources, high legacy costs, or poor organizational structure. In those instances, when a potential target is underperforming, an acquirer may believe it can acquire the company cheaply and then unlock hidden value through reorganization, better management, or synergy. If the target has been underperforming significantly, the acquirer may even believe it can obtain the company for less than its breakup value. A company's **breakup value** is the value that can be achieved if a company's assets are divided and sold separately.

Sometimes mergers are conducted because the acquirer believes that it is purchasing assets for below their replacement cost. For example, a pharmaceutical company may believe it can acquire another company's research more cheaply than to undergo a lengthy development process of its own. Or, an oil company may believe it will be less expensive to acquire another oil company's assets than to find and develop additional reserves of its own.

3.10. Cross-Border Motivations

The growth of cross-border deals was high during the 1990s, and foreign M&A became a popular strategic tool for multinational companies seeking to extend their market reach, acquire new manufacturing facilities, develop new sources of raw materials, and tap into the capital markets. Given the increasing international privatization trends, reduction in cumbersome industry regulations and bureaucracy, and development of uniform accounting standards, cross-border mergers and acquisitions will likely intensify in the future. In addition to the various factors that drive domestic mergers, cross-border mergers can provide an efficient way of achieving other international business goals.

3.10.1. Exploiting Market Imperfections

Cross-border transactions can enable companies to more fully exploit market imperfections. For example, to take advantage of differences in the relative cost of labor, a manufacturer may purchase a company in a country where the relative cost of labor is lower.

3.10.2. Overcoming Adverse Government Policy

Cross-border mergers can be a means by which to overcome disadvantageous government policy, for example, to circumvent protective tariffs, quotas, or other barriers to free trade.

3.10.3. Technology Transfer

Companies that possess a new or superior technology may make acquisitions abroad in order to open new markets or otherwise more fully exploit their business advantage. Conversely, it is common for a company to purchase a foreign company that possesses a new or superior technology in order to enhance the acquirer's competitive position both at home and abroad.

3.10.4. Product Differentiation

Companies often purchase foreign companies to exploit the advantages of having a highly differentiated line of products. Similarly, buying certain intangibles, such as a good reputation, helps to ensure success in the global market. Lenovo's (China) acquisition of IBM's (United States) personal computer line is one example of this strategy.

3.10.5. Following Clients

Companies may engage in a cross-border merger to follow and support domestic clients more effectively. As an example, many German banks have established cross-border presences to provide services abroad to their domestic clients.

EXAMPLE 10-4 Mergers and the Industry Life Cycle

The types of mergers (e.g., horizontal, vertical, or conglomerate) occurring in an industry and the motivations behind those mergers will vary over time as an industry proceeds through its life cycle. The stages in an industry life cycle are normally categorized by their rates of growth in sales; growth stages can vary in length.

Mergers and the Industry Life Cycle

Industry Life Cycle Stage	Industry Description	Motives for Merger	Types of Mergers
Pioneering development	Industry exhibits substantial development costs and has low, but slowly increasing, sales growth.	Younger, smaller companies may sell themselves to larger companies in mature or declining industries and look for ways to enter into a new growth industry. Young companies may look to merge with companies that allow them to pool management and capital resources.	Conglomerate Horizontal
Rapid accelerating growth	Industry exhibits high profit margins caused by few participants in the market.	Explosive growth in sales may require large capital requirements to expand existing capacity.	Conglomerate Horizontal
Mature growth	Industry experiences a drop in the entry of new competitors, but growth potential remains.	Mergers may be undertaken to achieve economies of scale, savings, and operational efficiencies.	Horizontal Vertical
Stabilization and market maturity	Industry faces increasing competition and capacity constraints.	Mergers may be undertaken to achieve economies of scale in research, production, and marketing to match the low cost and price performance of other companies (domestic and foreign). Large companies may acquire smaller companies to improve management and provide a broader financial base.	Horizontal
Deceleration of growth and decline	Industry faces overcapacity and eroding profit margins.	Horizontal mergers may be undertaken to ensure survival. Vertical mergers may be carried out to increase efficiency and profit margins. Companies in related industries may merge to exploit synergy. Companies in this industry may acquire companies in young industries.	Horizontal Vertical Conglomerate

Source: Adapted from Weston, Chung, and Hoag (1990, 102), and Solnik and McLeavey (2004, 264–265).

4. TRANSACTION CHARACTERISTICS

The specifics of M&A transactions can vary along many dimensions, including the form of acquisition, financing, timing, control and governance, accounting choices, and numerous details ranging from the post-merger board composition to the location of the new headquarters. In this section, we will focus on the form of acquisition, method of payment, and

mind-set of target management. These three characteristics play a large role in determining how the transaction will occur, which regulatory rules might apply, how the transaction will be valued, and how it will be taxed.

4.1. Form of Acquisition

There are two basic forms of acquisition: An acquirer can purchase the target's stock or its assets. The decision will have several consequences, as summarized in Exhibit 10-1.

Stock purchases are the most common form of acquisition. A **stock purchase** occurs when the acquirer gives the target company's shareholders some combination of cash and securities in exchange for shares of the target company's stock. For a stock purchase to proceed, it must be approved by at least 50 percent of the target company's shareholders and sometimes more depending on the legal jurisdiction. Although it can be difficult and time consuming to win shareholder approval, it also stands as an opportunity to circumvent the target company's management in cases where management opposes the merger.

In an **asset purchase**, the acquirer purchases the target company's assets and payment is made directly to the target company. One advantage of this type of transaction is that it can be conducted more quickly and easily than a stock purchase because shareholder approval is not normally required unless a substantial proportion of the assets are being sold, usually more than 50 percent. Another advantage is that an acquirer can focus on buying the parts of a company of particular interest, such as a specific division, rather than the entire company.

EXHIBIT 10-1 Major Differences of Stock versus Asset Purchases

	Stock Purchase	Asset Purchase
Payment	Target shareholders receive compensation in exchange for their shares.	Payment is made to the selling company rather than directly to the shareholders.
Approval	Shareholder approval required.	Shareholder approval might not be required.
Tax: Corporate	No corporate-level taxes.	Target company pays taxes on any capital gains.
Tax: Shareholder	Target company's shareholders are taxed on their capital gain.	No direct tax consequence for target company's shareholders.
Liabilities	Acquirer assumes the target's liabilities.	Acquirer generally avoids the assumption of liabilities.

Some of the more dramatic consequences of the decision to pursue one form of acquisition versus another concern taxation. In a stock purchase, the target company's shareholders exchange their shares for compensation and must pay tax on their gains, but there are no tax consequences at the corporate level.³ For an asset purchase, in contrast, there are no direct tax consequences for the target company's shareholders but the target company itself may be subject to corporate taxes.

³Keep in mind throughout this discussion of taxation that we are speaking in generalities and that the complexity of M&A deals, coupled with the complexity and variability of tax laws in different jurisdictions, can generate a host of exceptions.

In addition to shifting the basic tax burden, the form-of-acquisition decision plays a role in determining how tax rules are applied in accounting for the merger. For example, use of a target's accumulated tax losses is allowable in the United States for stock purchases, but not for asset purchases.

Another key difference between stock and asset purchases relates to the assumption of liabilities. In stock purchases, the acquiring company assumes the target company's liabilities. Acquiring companies must thus be on guard to avoid assuming unexpected or undisclosed liabilities. With asset purchases, acquiring companies generally avoid assuming the target's liabilities. However, purchasing substantially all of a company's assets instead of conducting a stock purchase so as to specifically avoid assuming liabilities is fraught with legal risk because courts have tended to hold acquirers responsible for the liabilities in these cases.

4.2. Method of Payment

The acquirer can pay for the merger with cash, securities, or some combination of the two in what is called a **mixed offering**. In a **cash offering**, the cash might come from the acquiring company's existing assets or from a debt issue. In the most general case of a **securities offering**, the target shareholders receive shares of the acquirer's common stock as compensation.⁴ Instead of common stock, however, the acquirer might offer other securities, such as preferred shares or even debt securities.

In a stock offering, the **exchange ratio** determines the number of shares that stockholders in the target company receive in exchange for each of their shares in the target company. Because share prices are constantly fluctuating, exchange ratios are typically negotiated in advance for a range of stock prices. The acquirer's cost is the product of the exchange ratio, the number of outstanding shares of the target company, and the value of the stock given to target shareholders. Each shareholder of the target company receives new shares based on the number of target shares he or she owns multiplied by the exchange ratio.

EXAMPLE 10-5 Stock Offering

Discount Books, a Canadian bookseller, has announced its intended acquisition of Premier Marketing Corporation, a small marketing company specializing in print media. In a press release, Discount Books outlines the terms of the merger, which specify that Premier Marketing's shareholders will each receive 0.90 shares of Discount Books for every share of Premier Marketing owned. Premier Marketing has 1 million shares outstanding. On the day of the merger announcement, Discount Books' stock closed at C\$20.00 and Premier Marketing's stock closed at C\$15.00. Catherine Willis is an individual investor who owns 500 shares of Premier Marketing, currently worth C\$7,500 ($500 \times \text{C}\15.00).

⁴In the case of a consolidation, the target company's shareholders may receive new shares in the surviving entity.

1. Based on the current share prices, what is the cost of the acquisition for Discount Books?
2. How many shares of Discount Books will Catherine Willis receive, and what is the value of those shares (based on current share prices)?

Solution to 1. Because there are 1 million shares of Premier Marketing outstanding and the exchange ratio is 0.90 shares, Discount Books will need to issue $0.90 \times 1 \text{ million} = 900,000$ shares of Discount Books stock to complete the transaction. Because the cost per share of Discount Books stock is currently C\$20.00, the cost of the transaction to Discount Books will be $\text{C\$}20.00 \times 900,000 = \text{C\$}18 \text{ million}$.

Solution to 2. Catherine Willis will turn over her 500 shares of Premier Marketing stock. As compensation, she will receive $0.90 \times 500 = 450$ shares of stock in Discount Books. With each share of Discount Books being worth C\$20.00, the value of those shares to Catherine is C\$9,000.

Note that the value of Willis's Premier Marketing shares was C\$7,500. The C\$1,500 difference in value is a premium paid by Discount Books for control of Premier Marketing. The pre-merger value of Premier Marketing was C\$15 million, but Discount Books' total cost to purchase the company was C\$18 million. The 20 percent or C\$3 million difference is the total-control premium paid by Discount Books.

A variety of factors influence a company's decision to negotiate for one method of payment versus another. As we shall explore in more detail later, the form of payment has an impact on the distribution of risk and reward between acquirer and target shareholders. In a stock offering, target company shareholders assume a portion of the reward as well as a portion of the risk related to the estimated synergies and the target company's value. Consequently, when an acquiring company's management is highly confident both in their ability to complete the merger and in the value to be created by the merger, they are more inclined to negotiate for a cash offering rather than a stock offering.

Another factor in the decision relates to the relative valuations of the companies involved in the transaction. When an acquirer's shares are considered overvalued by the market relative to the target company's shares, stock financing is more appropriate. In effect, the shares are more valuable as a currency. In fact, investors sometimes interpret an acquirer's stock offering as a signal that the company's shares may be overvalued. This effect is similar to the negative market reaction observed in seasoned equity offerings. Indeed, during the stock market bubble in the late 1990s, stock financing of mergers was quite popular.

Another important consideration when deciding on the payment method is the accompanying change in capital structure. The costs and benefits of different payment structures reflect how the offer will affect the acquirer's capital structure. For instance, on the one hand, borrowing to raise funds for a cash offering increases the acquirer's financial leverage and risk. On the other hand, issuing a significant number of new common shares for a stock offering can dilute the ownership interests of existing shareholders.

Preferences in the use of cash versus stock vary over time, but the proportions in 2005 are characteristic of the past several years. According to *Mergerstat Review 2006*, cash payment accounted for 54 percent of merger transactions in 2005, pure stock exchanges accounted

for about 19 percent, and mixed offerings represented 25 percent.⁵ A very small portion of deals, about 2 percent, were completed with other securities, such as debt, options, or warrants.

4.3. Mind-Set of Target Management

Mergers are referred to as either friendly or hostile depending on how the target company's senior managers and board of directors view the offer. The distinction is not trivial because an enormous amount of time and resources can be expended by both acquirer and target when the takeover is hostile. Whether a merger is friendly or hostile has an impact on how it is completed, what regulations must be followed, how long the transaction takes, and possibly how much value is created (or destroyed) as a result of the combination.

4.3.1. Friendly Mergers

Unless there is cause to think the target will be hostile to a merger, the acquirer will generally start the process by approaching target management directly. The target could approach the acquirer, although this method is much less common. If both management teams are amenable to a potential deal, then the two companies enter into merger discussions. The negotiations revolve around the consideration to be received by the target company's shareholders and the terms of the transaction as well as other aspects, such as the post-merger management structure.

Before negotiations can culminate in a formal deal, each of the parties examines the others' books and records in a process called due diligence. The purpose of due diligence is to protect the companies' respective shareholders by attempting to confirm the accuracy of representations made during negotiations. For example, an acquirer would want to ensure that the target's assets exist and are worth approximately what was claimed by the target. Likewise, a target might want to examine an acquirer's financial records to gauge the likelihood that the acquirer has the capacity to pay for the acquisition as outlined in negotiations. Any deficiencies or problems uncovered during the due diligence process could have an impact on negotiations, resulting in adjustments to the terms or price of the deal. If the issue is large enough, the business combination might be called off entirely.

Once due diligence and negotiations have been completed, the companies enter into a definitive merger agreement. The **definitive merger agreement** is a contract written by both companies' attorneys and is ultimately signed by each party to the transaction. The agreement contains the details of the transaction, including the terms, warranties, conditions, termination details, and the rights of all parties.

Common industry practice has evolved such that companies typically discuss potential transactions in private and maintain secrecy until the definitive merger agreement is reached. This trend may have been influenced by shifts in securities laws toward more stringent rules related to the disclosure of material developments to the public. Additionally, news of a merger can cause dramatic changes in the stock prices of the parties to the transaction. Premature announcement of a deal can cause volatile swings in the stock prices of the companies as they proceed through negotiations.

After the definitive merger agreement has been signed, the transaction is generally announced to the public through a joint press release by the companies. In a friendly merger, the target company's management endorses the merger and recommends that its stockholders

⁵*Mergerstat Review 2006*. FactSet Mergerstat, LLC (www.mergerstat.com).

approve the transaction. In cases where a shareholder vote is needed, whether it is the target shareholders approving the stock purchase or the acquirer shareholders approving the issuance of a significant number of new shares, the material facts are provided to the appropriate shareholders in a public document called a **proxy statement**, which is given to shareholders in anticipation of their vote.

After all the necessary approvals have been obtained—from shareholders as well as any other parties, such as regulatory bodies—the attorneys file the required documentation with securities regulators and the merger is officially completed. Target shareholders receive the consideration agreed upon under the terms of the transaction, and the companies are officially and legally combined.

4.3.2. Hostile Mergers

In a hostile merger, which is a merger that is opposed by the target company's management, the acquirer may decide to circumvent the target management's objections by submitting a merger proposal directly to the target company's board of directors and bypassing the CEO. This tactic is known as a **bear hug**.

Because bear hugs are not formal offers and have not been mutually agreed upon, there are no standard procedures in these cases. If the offer is high enough to warrant serious consideration, then the board may appoint a special committee to negotiate a sale of the target.

Although unlikely in practice, it is possible that target management will capitulate after a bear hug and enter into negotiations, which may ultimately lead to a friendly merger. If the bear hug is not successful, then the hopeful acquirer will attempt to appeal more directly to the target company's shareholders.

One method for taking a merger appeal directly to shareholders is through a **tender offer**, whereby the acquirer invites target shareholders to submit ("tender") their shares in return for the proposed payment.⁶ It is up to the individual shareholders to physically tender shares to the acquiring company's agent in order to receive payment. A tender offer can be made with cash, shares of the acquirer's own stock, other securities, or some combination of securities and cash. Because a cash tender offer can be completed in less time than a cash merger, some acquiring companies use this type of transaction to gain control of a target company quickly.

Another method of taking over a target company involves the use of a proxy fight. In a **proxy fight**, a company or individual seeks to take control of a company through a shareholder vote. Proxy solicitation is approved by regulators and then mailed directly to target company shareholders. The shareholders are asked to vote for the acquirer's proposed slate of directors. If the acquirer's slate is elected to the target's board, then it is able to replace the target company's management. At this point, the transaction may evolve into a friendly merger.

Regardless of how an acquirer seeks to establish control, target managers have a variety of alternatives available for defending the company against unwanted overtures. In these cases, the target usually retains the services of law firms and investment bankers to design a defense against the unwanted takeover attempt. As we will discuss in the next section, target company managers may use a variety of legal and financial defensive maneuvers to ward off a takeover attempt.

⁶Tender offers are often associated with hostile mergers, but they also occur in a friendly context. Tender offers are considered hostile only when the offer is opposed by the target company's management and board of directors.

5. TAKEOVERS

When a target company is faced with a hostile tender offer (takeover) attempt, the target managers and board of directors face a basic choice. They can decide to negotiate and sell the company, either to the hostile bidder or a third party, or they can attempt to remain independent. Aside from the strength of the company's defenses and target management's resolve to stay independent, the premium over the market price offered by the acquirer for the target company's shares is the major driving factor in the decision to support or resist any given takeover.

If the target management decides to resist the unwanted overture, they have a variety of takeover defense mechanisms at their disposal. Once the decision has been reached, the target company generally seeks the counsel of investment bankers and lawyers to explore the fairness of the hostile offer and to advise the board of the alternatives.

A target might use defensive measures to delay, negotiate a better deal for shareholders, or attempt to keep the company independent. Defensive measures can be implemented either before or after a takeover attempt has begun. Most law firms specializing in takeovers recommend that defenses be set up before a company receives or expects any takeover activity.

5.1. Pre-Offer Takeover Defense Mechanisms

In the United States, most hostile takeover attempts result in litigation. The courts generally bless legal pre-offer defense mechanisms but tend to scrutinize post-offer defenses very closely. The target usually assumes the burden of proof in showing that the recently enacted defenses are not simply intended to perpetuate management's tenure at the target company. It is for this reason that most attorneys recommend that target companies put defenses in place prior to any takeover action. Following this policy gives the target more flexibility when defending against a takeover bid.

With different twists in takeover strategy come new innovations and variations in takeover defenses. Given the many possible variations, the following is not an exhaustive list but an overview of the more well known anti-takeover strategies. The two broad varieties of pre-offer defenses are rights-based defenses, such as poison pills and poison puts, and a variety of changes to the corporate charter (e.g., staggered boards of directors and supermajority provisions) that are sometimes collectively referred to as **shark repellents**.

5.1.1. Poison Pills

The **poison pill** is a legal device that makes it prohibitively costly for an acquirer to take control of a target without the prior approval of the target's board of directors. Most poison pills make the target company less attractive by creating rights that allow for the issuance of shares of the target company's stock at a substantial discount to market value.

There are two basic types of poison pills: the **flip-in pill** and the **flip-over pill**. When the common shareholder of the target company has the right to buy its shares at a discount, the pill is known as a flip-in. The pill is triggered when a specific level of ownership is exceeded. Because the acquiring company is generally prohibited from participating in the purchase through the pill, the acquirer is subject to a significant level of dilution. Most plans give the target's board of directors the right to redeem the pill prior to any triggering event. If the takeover becomes friendly, the board generally exercises this waiver.

In the case of a flip-over pill, the target company's common shareholders receive the right to purchase shares of the acquiring company at a significant discount from the market price,

which has the effect of causing dilution to all existing acquiring company shareholders. Again, the board of the target generally retains the right to redeem the pill should the transaction become friendly.

Another possible aspect of the poison pill is the “**dead-hand**” **provision**. This provision allows the board of the target to redeem or cancel the poison pill only by a vote of the continuing directors. Because continuing directors are generally defined as directors who were on the target company’s board prior to the takeover attempt, this provision has the effect of making it much more difficult to take over a target without prior board approval.

5.1.2. Poison Puts

Whereas poison pills grant common shareholders certain rights in a hostile takeover attempt, **poison puts** give rights to the target company’s bondholders. In the event of a takeover, poison puts allow bondholders to put the bonds to the company. In other words, if the provision is triggered by a hostile takeover attempt, then bondholders have the right to sell their bonds back to the target at a redemption price that is pre-specified in the bond indenture, typically at or above par value. The effect of a poison put defense is to require that an acquirer be prepared to refinance the target’s debt immediately after the takeover. This defense increases the need for cash and raises the cost of the acquisition.

5.1.3. Incorporation in a State with Restrictive Takeover Laws (United States)

In the United States, many states have adopted laws that specifically address unfriendly takeover attempts. These laws are designed to provide target companies with flexibility in dealing with unwanted suitors. Some states have designed their laws to give the company maximum protection and leeway in defending against an offer. As a result, companies that anticipate the possibility of a hostile takeover attempt may find it attractive to reincorporate in a jurisdiction that has enacted strict anti-takeover laws. Ohio and Pennsylvania are examples of two U.S. states that have been regarded historically as “target friendly” states; their state laws tend to give target companies the most power in defending against hostile takeover attempts.⁷

5.1.4. Staggered Board of Directors

Instead of electing the entire board of directors each year at the company’s annual meeting, a company may arrange to stagger the terms for board members so that only a portion of the board seats are due for election each year. For example, if the company has a board consisting of nine directors, members could be elected for three-year terms with only three directors coming up for election each year. The effect of this staggered board is that it would take at least two years to elect enough directors to take control of the board.

5.1.5. Restricted Voting Rights

Some target companies adopt a mechanism that restricts stockholders who have recently acquired large blocks of stock from voting their shares. Usually, there is a trigger stockholding level, such as 15 or 20 percent. Shareholders who meet or exceed this trigger point are no

⁷Delaware has historically been the most popular state for corporations to domicile their legal entities. To protect this status, the state has found it necessary to toughen its laws regarding takeover attempts. In the past, as some states adopted strict takeover laws, some corporations left Delaware and reincorporated in these “friendly” states. In order to compete, Delaware has changed its own laws to make it more difficult to take over a Delaware corporation on a hostile basis.

longer able to exercise their voting rights without the target company's board releasing the shareholder from the constraint. The possibility of owning a controlling position in the target without being able to vote the shares serves as a deterrent.

5.1.6. Supermajority Voting Provisions

Many target companies change their charter and bylaws to provide for a higher percentage approval by shareholders for mergers than normally is required. A typical provision might require a vote of 80 percent of the outstanding shares of the target company (as opposed to a simple 51 percent majority). This supermajority requirement is triggered by a hostile takeover attempt and is frequently accompanied by a provision that prevents the hostile acquirer from voting its shares. Thus, even if an acquirer is able to accumulate a substantial portion of the target's shares, it may have great difficulty accumulating enough votes to approve a merger.

5.1.7. Fair Price Amendments

Fair price amendments are changes to the corporate charter and bylaws that disallow mergers for which the offer is below some threshold. For example, a fair price amendment might require an acquirer to pay at least as much as the highest stock price at which the target has traded in the public market over a specified period. Fair price amendments protect targets against temporary declines in their share prices by setting a floor value bid. Additionally, fair price amendments protect against two-tiered tender offers where the acquirer offers a higher bid in a first step tender offer with the threat of a lower bid in a second step tender offer for those who do not tender right away.

5.1.8. Golden Parachutes

Golden parachutes are compensation agreements between the target company and its senior managers. These employment contracts allow the executives to receive lucrative payouts, usually several years worth of salary, if they leave the target company following a change in corporate control. In practice, golden parachutes do not offer much deterrent, especially for large deals where the managers' compensation is small relative to the overall takeover price. One reason they persist is that they help alleviate target management's concerns about job loss. Golden parachutes may encourage key executives to stay with the target as the takeover progresses and the target explores all options to generate shareholder value. Without a golden parachute, some contend that target company executives might be quicker to seek employment offers from other companies to secure their financial future. Whether this is actually the case and whether golden parachutes are fair and in the best interest of shareholders is the subject of considerable debate among shareholder rights activists and senior managers.

5.2. Post-Offer Takeover Defense Mechanisms

A target also has several defensive mechanisms that can be used once a takeover has already been initiated. Because they may not be as successful when used in isolation and because they have historically been subject to greater scrutiny by the courts, post-offer defenses are typically used in conjunction with pre-offer defenses.

5.2.1. "Just Say No" Defense

Probably the simplest place for a target company to start when confronted with a hostile takeover bid is to rely on pre-takeover defenses and to decline the offer. If the acquirer attempts a bear hug or tender offer, then target management typically lobbies the board of

directors and shareholders to decline and build a case for why the offering price is inadequate or why the offer is otherwise not in the shareholders' best interests. This strategy forces the hopeful acquirer to adjust its bid or further reveal its own strategy in order to advance the takeover attempt.

5.2.2. Litigation

A popular technique used by many target companies is to file a lawsuit against the acquiring company based on alleged violations of securities or antitrust laws. In the United States, these suits may be filed in either state or federal courts. Unless there is a serious antitrust violation, these suits rarely stop a takeover bid. Instead, lawsuits often serve as a delaying tactic to create additional time for target management to develop other responses to the unwanted offer. Generally, any securities law violations, even if upheld, can be corrected with additional public disclosures. In the United States, most antitrust claims that eventually prevent takeover attempts are initiated by either antitrust or securities regulators rather than by the target company.

5.2.3. Greenmail

This technique involves an agreement allowing the target to repurchase its own shares back from the acquiring company, usually at a premium to the market price. Greenmail is usually accompanied by an agreement that the acquirer will not pursue another hostile takeover attempt of the target for a set period. In effect, greenmail is the termination of a hostile takeover through a payoff to the acquirer. The shareholders of the target company do not receive any compensation for their shares. Greenmail was popular in the United States during the 1980s, but its use has been extremely restricted since 1986 when the U.S. Internal Revenue Code was amended to add a 50 percent tax on profits realized by acquirers through greenmail.

5.2.4. Share Repurchase

Rather than repurchasing only the shares held by the acquiring company, as in greenmail, a target might use a share repurchase to acquire shares from any shareholder. For example, a target may initiate a cash tender offer for its own outstanding shares. An effective repurchase can increase the potential cost for an acquirer by either increasing the stock's price outright or by causing the acquirer to increase its bid to remain competitive with the target company's tender offer for its own shares. Additionally, a share repurchase often has the effect of increasing the target company's use of leverage because borrowing is typically required to purchase the shares. This additional debt makes the target less attractive as a takeover candidate.

In some cases, a target company buys all of its shares and converts to a privately held company in a transaction called a leveraged buyout. In a **leveraged buyout (LBO)**, the management team generally partners with a private equity firm that specializes in buyouts. The new entity borrows a high proportion of the overall purchase price; the financial firm contributes a certain amount of capital; and the management team provides the management expertise to run the business. In exchange for their expertise, management generally receives a payout percentage based on the profitability and success of the company after the LBO is completed. This strategy may allow the target to defend against a hostile bid provided that the LBO provides target shareholders with a level of value that exceeds the would-be acquirer's offer.

5.2.5. Leveraged Recapitalization

A technique somewhat related to the leveraged buyout is the leveraged recapitalization. A **leveraged recapitalization** involves the assumption of a large amount of debt that is then used to finance share repurchases (but in contrast to a leveraged buyout, in a recapitalization, some shares remain in public hands). The effect is to dramatically change the company's capital structure while attempting to deliver a value to target shareholders in excess of the hostile bid.

5.2.6. "Crown Jewel" Defense

After a hostile takeover is announced, a target may decide to sell off a subsidiary or asset to a third party. If the acquisition of this subsidiary or asset was one of the acquirer's major motivations for the proposed merger, then this strategy could cause the acquirer to abandon its takeover effort. When a target initiates such a sale after a hostile takeover bid is announced, there is a good chance that the courts will declare this strategy illegal.

5.2.7. "Pac-Man" Defense

The target can defend itself by making a counteroffer to acquire the hostile bidder. This technique is rarely used because, in most cases, it means that a smaller company (the target) is making a bid for a larger entity. Additionally, once a target uses a Pac-Man defense, it forgoes the ability to use a number of other defensive strategies. For instance, after making a counteroffer, a target cannot very well take the acquirer to court claiming an antitrust violation.

5.2.8. White Knight Defense

Often the best outcome for target shareholders is for the target company's board to seek a third party to purchase the company in lieu of the hostile bidder. This third party is called a **white knight** because it is coming to the aid of the target. A target usually initiates this technique by seeking out another company that has a strategic fit with the target. Based on a good strategic fit, the third party can often justify a higher price for the target than what the hostile bidder is offering.

Once a white knight bid is made public, it may elicit an additional higher bid from the hostile bidder. This can help kick off a competitive bidding situation. In some cases, because of the competitive nature of the bidders, the winner's curse can prevail and the target company shareholders may receive a very good deal. **Winner's curse** is the tendency for the winner in certain competitive bidding situations to overpay, whether because of overestimation of intrinsic value, emotion, or information asymmetries.⁸

5.2.9. White Squire Defense

In the **white squire** defense, the target seeks a friendly party to buy a substantial minority stake in the target—enough to block the hostile takeover without selling the entire company. Although the white squire may pay a significant premium for a substantial number of the target's shares, these shares may be purchased directly from the target company and the target shareholders may not receive any of the proceeds.⁹

⁸The winner's curse is most likely to occur when the target company has roughly the same value to all bidders but the target's true value is hard to ascertain. The average bid in such cases may represent the best estimate of the target's intrinsic value, and the high (winning), an overestimate of its intrinsic value.

⁹For example, the white squire may purchase shares of convertible preferred stock instead of common stock.

The use of the white squire defense may carry a high litigation risk depending on the details of the transaction and local regulations. Additionally, stock exchange listing requirements sometimes require that target shareholders vote to approve these types of transactions, and shareholders may not endorse any transaction that does not provide an adequate premium to them directly.

EXAMPLE 10-6 Engelhard Takeover Defenses

On 14 December 2005, BASF, a worldwide producer of chemicals and high-performance products, offered to acquire Engelhard Corporation for \$37 cash per share. Engelhard, a manufacturer and developer of value-added technologies, determined that the \$37 offer was inadequate and decided to defend itself against the unwanted takeover attempt.

Prior to the BASF takeover offer, Engelhard had participating preferred stock purchase rights in place.¹⁰ These rights acted as a poison pill by allowing Engelhard to issue shares at a discount if triggered by a takeover that was unsupported by Engelhard's board of directors. Additionally, in advance of the takeover attempt, Engelhard restated its certificate of incorporation to include a supermajority provision. It stated that business combinations with a holder of more than 5 percent of Engelhard's outstanding shares would require an affirmative vote of both the holders of 80 percent of the outstanding shares and at least 50 percent of the outstanding shares not held by the acquirer unless the board of directors approved the business combination.

After the tender offer was commenced by BASF, Engelhard also pursued a recapitalization plan that involved the repurchase of approximately 20 percent of Engelhard's outstanding shares through a tender offer at \$45 per share, a price superior to BASF's tender offer. Together these pre- and post-offer defenses made it very difficult for BASF to succeed with its \$37 cash tender offer.

Although Engelhard did not complete the tender for its own shares, the recapitalization plan was incentive enough for BASF to increase its offer. Takeover targets frequently use their takeover defenses to negotiate a better deal for their shareholders. After much negotiation, BASF increased its tender offer and Engelhard withdrew all takeover defenses. On 30 May 2006, the companies announced a definitive merger agreement under which BASF would acquire all outstanding shares of Engelhard for \$39 per share in cash.

6. REGULATION

Even when a merger has been accepted by the target company's senior managers, the board of directors, and shareholders, the combination must still be approved by regulatory authorities. Additionally, there are a variety of rules that companies must follow when initiating and

¹⁰Shares of participating preferred stock offer the possibility of a higher dividend when the dividend on common shares reaches a prespecified threshold.

completing the merger transaction itself. This section provides an overview of the key rules and issues that arise from M&A activity.

The two major bodies of jurisprudence relating to mergers are antitrust law and securities law. Antitrust laws are intended to ensure that markets remain competitive; the securities laws we will discuss are concerned largely with maintaining both fairness in merger activities and confidence in the financial markets.

6.1. Antitrust

Most countries have antitrust laws, which prohibit mergers and acquisitions that impede competition. Antitrust legislation began in the United States with the Sherman Antitrust Act of 1890, which made contracts, combinations, and conspiracies in restraint of trade or attempts to monopolize an industry illegal. The Sherman Antitrust Act was not effective at deterring antitrust activity partly because the U.S. Department of Justice at the time lacked the resources necessary to enforce the law rigorously. Within a few years of its passage, the law was challenged in the courts and rendered unenforceable because of ambiguous aspects of its wording.

To resurrect antitrust law, the U.S. Congress passed the Clayton Antitrust Act in 1914, which clarified and strengthened the Sherman Antitrust Act by detailing the specific business practices that the U.S. Congress wished to outlaw. In order to ensure that the law could be effectively enforced, the legislature also passed the Federal Trade Commission Act of 1914, which established the Federal Trade Commission (FTC) as a regulatory agency to work in tandem with the Department of Justice to enforce antitrust law.

During the ensuing years, additional weaknesses and loopholes in antitrust legislation became apparent. For instance, the Clayton Act regulated only the acquisition of shares of stock, not the acquisition of assets. The Celler–Kefauver Act was passed in 1950 to close this loophole; the law also addressed vertical and conglomerate mergers, whereas previous legislation had focused primarily on horizontal combinations.

The last major piece of U.S. antitrust legislation was the Hart–Scott–Rodino Antitrust Improvements Act of 1976, which required that the FTC and Department of Justice have the opportunity to review and approve mergers in advance. A key benefit of the Hart–Scott–Rodino Act is that it gives regulators an opportunity to halt a merger prior to its completion rather than having to disassemble a company after a merger is later deemed to be anticompetitive.

Just as U.S. transactions are reviewed by the FTC and the Department of Justice, the European Commission (EC) has the authority to review the antitrust implications of transactions among companies that generate significant revenues within the European Union. Although the European Commission's member states have jurisdiction on mergers within their respective national borders, mergers with significant cross-border effects are subject to EC review. Similar to the requirements in the United States, pre-merger notification is required.

In addition to regulatory watchdogs, such as the FTC and the European Commission, approval may be needed from other regulatory agencies. For example, in the United States, a merger involving banks requires approvals from state banking authorities as well as the Federal Reserve Bank and possibly the Federal Deposit Insurance Corporation (FDIC). Insurance mergers require the approval of state insurance commissioners. In some cases where one of the company's businesses is deemed to be of strategic national interest, additional government approvals may be necessary. Each merger must be analyzed by legal experts to determine the specific regulatory approvals required to comply with the relevant rules and laws. This is a very specialized area and can cause significant delays in the closing of some transactions.

The situation can become further complicated when the merging companies have a global presence that falls within multiple jurisdictions of regulatory control. For example, a large trans-Atlantic merger would require approval of both the United States regulatory bodies and the European Commission. Global companies often face dozens of regulatory agencies with different standards and filing requirements. For example, Coca-Cola Company's 1999 acquisition of the Cadbury Schweppes beverage brands involved sales and production in more than 160 countries, requiring antitrust approval in more than 40 jurisdictions around the world.

Prior to 1982, the FTC and Department of Justice used market share as a measure of market power when determining potential antitrust violations among peer competitors in an industry. Using a simple measure of industry concentration and the market shares of the acquirer and the target, companies contemplating a horizontal merger could determine in advance whether the combination would likely be challenged. The transparency and predictability of the measure was advantageous, but the approach proved to be too simplistic and rigid in practice.

In 1982, the agencies shifted toward using a new measure of market power called the **Herfindahl–Hirschman Index (HHI)**. By summing the squares of the market shares for each company in an industry, the HHI does a better job of modeling market concentration while remaining relatively easy to calculate and interpret. To calculate the HHI, the market shares for competing companies are squared and then summed:

$$\text{HHI} = \sum_i^n \left(\frac{\text{Sales or output of firm } i}{\text{Total sales or output of market}} \times 100 \right)^2 \quad (10-1)$$

Regulators initially calculate the HHI based on *post-merger* market shares. If post-merger market shares results in an HHI of less than 1,000, the market is not considered to be concentrated and a challenge is unlikely unless other anticompetitive issues arise. A moderately concentrated HHI measure of between 1,000 and 1,800, or a highly concentrated measure of more than 1,800, requires a comparison of post-merger and pre-merger HHI. A merger resulting in an increase of 100 points in a moderately concentrated market or 50 points in a highly concentrated market is likely to evoke antitrust concerns; smaller increases are less likely to pose a problem.¹¹ Exhibit 10-2 summarizes HHI ranges and the corresponding probability for regulatory action:

EXHIBIT 10-2 HHI Concentration Level and Possible Government Action

HHI Concentration Level			
Post-Merger HHI	Concentration	Change in HHI	Government Action
Less than 1,000	Not concentrated	Any amount	No action
Between 1,000 and 1,800	Moderately concentrated	100 or more	Possible challenge
More than 1,800	Highly concentrated	50 or more	Challenge

¹¹See the U.S. Department of Justice and the Federal Trade Commission's Horizontal Merger Guidelines, issued 2 April 1992 and revised 8 April 1997.

EXAMPLE 10-7 Herfindahl–Hirschman Index

Given an industry with 10 competitors and the following market shares, calculate the pre-merger HHI. How would the HHI change if Companies 2 and 3 merged? How would it change if Companies 9 and 10 merged instead? Would either set of mergers be likely to evoke an antitrust challenge?

Company	1	2	3	4	5	6	7	8	9	10
Market Share (%)	25	20	10	10	10	5	5	5	5	5

Solution. To calculate the pre-merger HHI, first square the market share for each company. Then add together the squared market shares to obtain an HHI of 1,450, which indicates that this is a moderately concentrated industry. If Companies 2 and 3 were to merge, the HHI would jump 400 points to 1,850. The large change in the HHI combined with the high post-merger HHI value indicates that this merger would likely evoke antitrust objections. If Companies 9 and 10 were to merge instead of Companies 2 and 3, the HHI would climb only 50 points to 1,500. Although the post-merger HHI indicates a moderately concentrated industry, the combination is unlikely to raise antitrust concerns because the post-merger HHI is only 50 points higher than the pre-merger HHI.

Pre-Merger			Post-Merger: Companies 2 and 3			Post-Merger: Companies 9 and 10		
Company	Market Share (%)	Market Share Squared	Company	Market Share (%)	Market Share Squared	Company	Market Share (%)	Market Share Squared
1	25	625	1	25	625	1	25	625
2	20	400	2+3	30	900	2	20	400
3	10	100	4	10	100	3	10	100
4	10	100	5	10	100	4	10	100
5	10	100	6	5	25	5	10	100
6	5	25	7	5	25	6	5	25
7	5	25	8	5	25	7	5	25
8	5	25	9	5	25	8	5	25
9	5	25	10	5	25	9+10	10	100
10	5	25						
	HHI:	1,450		HHI:	1,850		HHI:	1,500
				HHI Change:	400		HHI	
Change:	50							

Although the introduction of the Herfindahl–Hirschman Index was an improvement, regulators still found it to be too mechanical and inflexible. Thus, by 1984, the Department of Justice sought to increase the flexibility of its policies through the inclusion of additional information, such as market power measured by the responsiveness of consumers to price changes, as well as qualitative information, such as the efficiency of companies in the industry, the financial viability of potential merger candidates, and the ability of U.S. companies to compete in foreign markets.¹²

When reviewing quantitative and qualitative data, one should note that merger guidelines are just that—guidelines. It is possible that under unusual circumstances the government may not challenge one merger that does violate the guidelines and may challenge another merger that does not. Each transaction must be analyzed carefully to fully explore all potential antitrust issues.

When conflicts between companies and regulators arise, it is often because of disagreements about how the markets are defined. Regulators must consider the market in terms of both geography and product. When considering the industry’s geography, regulators must decide whether the relevant competitors are global, national, regional, or local. When considering product offerings, there may be one or multiple relevant product market overlaps. In some cases the overlap may be clear, and in other transactions it may not be obvious.

Parties to the transaction are usually counseled by attorneys who have relevant experience in the antitrust area. Most companies try to complete their analyses prior to signing a merger agreement in order to avoid entering into a long period of uncertainty while the government decides whether to challenge the transaction. Not only do delays increase costs, but they may also cause the companies to lose other important strategic opportunities.

6.2. Securities Laws

As we discussed in the section covering pre-offer takeover defense mechanisms, in the United States individual states regulate M&A activities to varying degrees. But companies must also comply with federal U.S. securities regulations. In the United States, the cornerstone of securities legislation regulating merger and acquisition activities is the Williams Amendment to the Securities Exchange Act of 1934 (also known as the Williams Act), which was passed in 1968 near the end of the third merger wave.

During the 1960s, tender offers became a popular means to execute hostile takeovers. Acquirers often announced tender offers that expired in short time frames or threatened lower bids and less desirable terms for those shareholders who waited to tender. In addition to giving shareholders little time to evaluate the fairness of an offer, it gave target management little time to respond. The Williams Act sought to remedy these problems in two keys ways: disclosure requirements and a formal process for tender offers.

Section 13(d) of the Williams Act requires public disclosure whenever a party acquires 5 percent or more of a target’s outstanding common stock. As part of this disclosure, the company acquiring the stake must provide a variety of details, including self-identification, the purpose of the transaction, and the source of the funds used to finance the stock purchases. This disclosure requirement calls target managers’ and shareholders’ attention to large share purchases, which keeps acquirers from gaining too large a toehold before the target is aware of the acquirer’s interest.

¹²Gaughan (2002), 95.

Section 14 of the Williams Act creates a tender offer process by setting forth various rules and restrictions that companies must observe. For example, as part of initiating a tender offer, an acquirer must file a public statement that contains the details of the offer and information about the acquirer. Target management must then respond through a formal statement containing their opinion and advice to accept or reject the offer; target management can abstain from offering an opinion as long as they provide the reasons for doing so.

Other important provisions of Section 14 are that the tender offer period be at least 20 business days, that the acquirer must accept all shares tendered, that all tendered shares must receive the same price, and that target shareholders can withdraw tendered shares during the offer period. These provisions ensure that target shareholders receive equitable treatment and that they have adequate time to investigate and evaluate a tender offer without the risk of receiving a lower price. Section 14 also gives target management the time and opportunity to adequately respond to a hostile tender offer.

7. MERGER ANALYSIS

In this section, we will examine the analysis of merger activity from two perspectives. First, we will discuss valuation of the target company, something of key importance for analysts on both sides of the deal as well as for shareholders as they all grapple to determine the fairness and adequacy of an offer. Then, we will discuss the analysis of the bid. Analysts can estimate the distribution of benefits in a merger based on expected synergies relative to the premium paid for the target in excess of its intrinsic value.

7.1. Target Company Valuation

The three basic valuation techniques that companies and their advisers use to value companies in an M&A context are discounted cash flow analysis, comparable company analysis, and comparable transaction analysis. An analyst is likely to use some combination of these primary techniques, and possibly others, when gauging a company's fair value.

7.1.1. Discounted Cash Flow Analysis

Discounted cash flow (DCF) analysis, as it is generally applied in this context, discounts the company's expected future free cash flows to the present in order to derive an estimate for the value of the company. **Free cash flow (FCF)** is the relevant measure in this context because it represents the actual cash that would be available to the company's investors after making all investments necessary to maintain the company as an ongoing enterprise.¹³ Free cash flows are the internally generated funds that can be distributed to the company's investors (e.g., shareholders and bondholders) without impairing the value of the company.

There are several variations to the models an analyst might use to estimate and discount free cash flows. In the following, we will develop an approximation to free cash flow and illustrate its use in valuation using a two-stage model.¹⁴ Estimating a company's free cash

¹³Free cash flow as used here is also called **free cash flow to the firm**, particularly when a distinction is being made between free cash flows accruing to all providers of capital and those accruing only to equityholders (**free cash flow to equity**).

¹⁴See Pinto, Henry, Robinson, and Stowe (2010) for details of estimating free cash flow (free cash flow to the firm) more precisely.

flows begins with the creation of pro forma financial statements. The first step is to select an appropriate time horizon for the first stage. The first stage should include only those years over which the analyst feels capable of generating reasonably accurate estimates of the company's free cash flows. These free cash flow estimates are then discounted to their present value.

To incorporate value deriving from years beyond the first stage, the analyst estimates the value of expected second-stage free cash flows as of the end of the first stage. The result is the so-called terminal value (or continuing value) of the company. The analyst then discounts the terminal value back to the present. The sum of the two pieces (the present value of first-stage expected free cash flows plus the present value of the company's terminal value) is the estimated value of the company.

There is no standard approach for creating pro forma financial statements. The art of financial analysis involves an ability to use the appropriate tools and to exercise good judgment in order to produce the best possible estimates for each financial statement item. In the process, analysts make adjustments to their prior projections based on proposed synergies and the announced plans for the merged company. For example, duplicated resources might result in the sale of one of the target's divisions. Or, the operating costs might be adjusted downward in anticipation of economies of scale. These adjustments are easier to estimate in friendly mergers where the analyst has access to detailed financial data about the target than in hostile mergers. But even in a hostile merger scenario, an analyst with experience in the appropriate industry can still make reasonably good estimates.

Once pro forma financial statements have been generated, the analyst can begin the conversion from pro forma net income to pro forma free cash flow for each year of the first stage. To demonstrate this process, we will use the pro forma financial statements and FCF calculations provided in Exhibit 10-3. The perspective is that of a valuation being done at the beginning of 2007.

The calculation of FCF involves first making adjustments to net income to convert it to **net operating profit less adjusted taxes (NOPLAT)**. This adjustment is made so that the resulting estimate of FCF represents the after-tax cash flows available to all providers of capital to the company. The first step in this process is to add net interest after tax to net income. This step removes the tax shield from interest payments and puts the cash flows on common footing with other cash flows that are available to all capital providers of the company.¹⁵ This is referred to as unlevered net income.¹⁶ For the year 2007 in Exhibit 10-3, pro forma net income for the year is \$2.296 million. There is no reported interest income, so net interest expense is simply \$642,000. The company's estimated tax rate is 35 percent, found by dividing the previous year's income tax by the company's earnings before tax.

$$\text{Step 1 : Unlevered net income} = \text{Net income} + \text{Net interest after tax} \quad (10-2)$$

$$\text{Net interest after tax} = (\text{Interest expense} - \text{Interest income}) \times (1 - \text{tax rate})$$

$$\text{For 2007, Unlevered net income} = \$2,296 + 642(1 - 0.35) = \$2,713 = \$2.713 \text{ million}$$

¹⁵The tax deductibility of interest will be accounted for later in the calculation when we discount free cash flows by the weighted average cost of capital (WACC).

¹⁶It is also possible to calculate unlevered net income as earnings before interest and taxes (EBIT) \times (1-tax rate).

EXHIBIT 10-3 Sample Pro Forma Financial Statements and FCF Calculations

	Historical	Pro Forma				
	2006	2007	2008	2009	2010	2011
<i>Income Statement (thousands of dollars)</i>						
Revenues	\$14,451	\$15,752	\$17,327	\$19,060	\$20,966	\$23,063
Cost of goods sold	7,948	8,664	9,530	10,483	11,531	12,685
Gross profit	\$6,503	\$7,088	\$7,797	\$8,577	\$9,435	\$10,378
Selling, general, and administrative expenses	2,168	2,363	2,599	2,859	3,145	3,459
Depreciation	506	551	606	667	734	807
Earnings before interest and taxes	\$3,829	\$4,174	\$4,592	\$5,051	\$5,556	\$6,112
Net interest expense	674	642	616	583	543	495
Earnings before taxes	\$3,155	\$3,532	\$3,976	\$4,468	\$5,013	\$5,617
Income tax	1,104	1,236	1,392	1,564	1,755	1,966
Net income	\$2,051	\$2,296	\$2,584	\$2,904	\$3,258	\$3,651
<i>Balance Sheet (thousands of dollars)</i>						
Current assets	\$8,671	\$9,451	\$10,396	\$11,436	\$12,580	\$13,838
Net property, plant, and equipment	10,116	11,026	12,129	13,342	14,676	16,144
Total assets	\$18,787	\$20,477	\$22,525	\$24,778	\$27,256	\$29,982
Current liabilities	\$3,613	\$3,938	\$4,332	\$4,765	\$5,242	\$5,766
Deferred income taxes	92	111	132	155	181	209
Long-term debt	7,924	7,548	7,243	6,862	6,394	5,830
Total liabilities	\$11,629	\$11,597	\$11,707	\$11,782	\$11,817	\$11,805
Common stock and paid-in capital	1,200	1,200	1,200	1,200	1,200	1,200
Retained earnings	5,958	7,680	9,618	11,796	14,239	16,977
Shareholders' equity	\$7,158	\$8,880	\$10,818	\$12,996	\$15,439	\$18,177
Total liabilities and shareholders' equity	\$18,787	\$20,477	\$22,525	\$24,778	\$27,256	\$29,982
<i>Selected Pro Forma Cash Flow Data (thousands of dollars)</i>						
Change in net working capital		\$455	\$551	\$607	\$667	\$734
Capital expenditures		\$1,461	\$1,709	\$1,880	\$2,068	\$2,275

FCF Calculations	Pro Forma				
	2007	2008	2009	2010	2011
Net income	\$2,296	\$2,584	\$2,904	\$3,258	\$3,651
Plus: Net interest after tax	417	400	379	353	322
Unlevered net income	\$2,713	\$2,984	\$3,283	\$3,611	\$3,973
Plus: Change in deferred taxes	19	21	23	26	28
Net op profit less adj. taxes (NOPLAT)	\$2,732	\$3,005	\$3,306	\$3,637	\$4,001
Plus: Depreciation	551	606	667	734	807
Less: Change in net working capital	455	551	607	667	734
Less: Capital expenditures	1,461	1,709	1,880	2,068	2,275
Free cash flow	\$1,367	\$1,351	\$1,486	\$1,636	\$1,799
Valuation Calculations					
WACC	9.41%				
PV of FCF		\$5,802			
Terminal growth rate	6.0%				
Terminal value, 2011	\$55,922				
Terminal value, 2006		\$35,670			
Enterprise Value, 2006		\$41,471			

To convert unlevered net income to NOPLAT, we must account for differences in depreciation for financial reporting purposes versus depreciation for tax purposes, which has an impact on cash flows. Companies typically report depreciation for property, plant, and equipment at a faster rate for tax purposes (higher depreciation shields more income from taxes) than for financial reporting purposes (lower depreciation results in higher net income). The differences in depreciation result in different taxes. This difference is accounted for as a liability on the balance sheet—deferred income taxes. To account for this impact on cash flow, we add the change in deferred taxes to unlevered net income (an increase in deferred taxes increases cash flow; a decrease in deferred taxes reduces cash flow).¹⁷

$$\text{Step 2 : } NOPLAT = \text{Unlevered net income} + \text{Change in deferred taxes} \quad (10-3)$$

$$\text{For 2007, } NOPLAT = \$2,713 + (111 - 92) = \$2,732 = \$2.732 \text{ million}$$

¹⁷Some analysts also estimate and subtract the value of after-tax nonoperating income to obtain an estimate more closely reflecting operating results only. See Copeland, Koller, Murrin (2000), Chapter 9, for more details on NOPLAT.

At this point, NOPLAT is adjusted to add back net noncash charges (NCC), which prominently include depreciation (of tangible assets) and amortization and impairment (of intangible assets); noncash charges affect net income but do not represent cash expenditures. To estimate free cash flow, we then subtract the value of necessary or otherwise planned investments in working capital and property, plant, and equipment.¹⁸ They are recorded as the change in net working capital and capital expenditures (capex), respectively.

$$\text{Step 3 : } FCF = NOPLAT + NCC - \text{Change in net working capital} - \text{Capex} \quad (10-4)$$

$$\text{For 2007, } FCF = \$2,732 + 551 - 455 - 1,461 = \$1,367 = \$1.367 \text{ million}$$

(The only NCC in this example is depreciation)

Summarizing, FCF is approximated by:

	Net income
+	<u>Net interest after tax</u>
	Unlevered net income
+	<u>Change in deferred taxes</u>
	Net operating profit less adjusted taxes (NOPLAT)
+	Net noncash charges
–	Change in net working capital
–	Capital expenditures (capex)
	Free cash flow (FCF)

Once free cash flow has been estimated for each year in the first stage (2007–2011 in Exhibit 10-3), the free cash flows are discounted back to present at the company's weighted average cost of capital (WACC).¹⁹ When evaluating the target from a noncontrol perspective, we would use the target's WACC, which reflects that company's existing business risk and operating environment. In anticipation of a merger, however, we would adjust that WACC to reflect any anticipated changes in the target's risk from such actions as a redeployment of assets or change in capital structure.

For the company in Exhibit 10-3, we will assume that the appropriate discount rate is 9.41 percent. Discounting free cash flow for the years 2007 through 2011 at 9.41 percent results in a present value of \$5.802 million. That is the portion of the company's current value that can be attributed to the free cash flows that occur over the first stage. Next, we must determine the portion of the present value attributable to the company's terminal value, which arises from those cash flows occurring from the end of the first stage to perpetuity.

There are two standard methods for calculating a terminal value. The first method makes use of the constant growth formula. To apply the constant growth formula, an analyst must select a terminal growth rate, which is the long-term equilibrium growth rate that the company can expect to achieve in perpetuity, accounting for both inflation and real growth.

¹⁸Working capital is defined in this use as current assets (excluding cash and equivalents) minus current liabilities (excluding short-term debt).

¹⁹For details on the estimation of WACC, see Chapter 3 on Cost of Capital.

The terminal growth rate is often lower than the growth rate applied during the first stage because any advantages from synergies, new opportunities, or cost reductions are transitory as competitors adjust and the industry evolves over time. The constant growth formula can be applied whenever the terminal growth rate is less than the WACC.

$$\text{Terminal value}_T = \frac{FCF_T(1+g)}{(WACC-g)} \quad (10-5)$$

where

FCF_T = free cash flow produced during the final year of the first stage

g = terminal growth rate

For the company in Exhibit 10-3, we will assume a terminal growth rate of 6.0 percent:

$$\text{Terminal value}_{2011} = \frac{\$1,799(1+0.06)}{(0.0941-0.06)} = \$55,922 = \$55.922 \text{ million}$$

A second method for estimating the terminal value involves applying a multiple at which the analyst expects the average company to sell at the end of the first stage. The analyst might use a free cash flow or other multiple that reflects the expected risk, growth, and economic conditions in the terminal year. Market multiples are rules of thumb applied by analysts, investment bankers, and venture capitalists to produce rough estimates of a company's value. Multiples tend to vary by industry. They can be based on anything applicable to the industry and correlated with market prices. Some service industries tend to be priced as multiples of EBITDA (earnings before interest, taxes, depreciation, and amortization). In contrast, retail stores in some industries might be priced based on multiples applied to floor space. In these cases, the respective multiples can be used directly to produce a terminal value, or they can be incorporated into a pro forma analysis to convert the multiple into a consistent value for free cash flow.

If the company in Exhibit 10-3 is in an industry where the typical company sells for about 20 times its free cash flow, then the company's terminal value estimate would be:

$$\text{Terminal value}_{2011} = 20 \times \$1,799 = \$35,980 = \$36.0 \text{ million}$$

Having established an estimate for the terminal value, the analyst must discount it back from the end of the estimate horizon to present. The discount rate used is the same WACC estimate that was previously applied to discount the free cash flows. If we decide that the terminal value found using the constant growth method is more accurate than a market multiple, we would discount that value back five years (2011 back to the present):

$$\text{Terminal value}_{2006} = \frac{\$55,922}{(1+0.0941)^5} = \$35,670 = \$35.670 \text{ million}$$

Adding the present value of the free cash flows (\$5.802 million) to the present value of the terminal value (\$35.670 million), we can estimate the value of the company to be \$41.471 million.²⁰ Note that a large proportion of the company's value is attributable to its terminal value (more than 85 percent in our example). The assumed terminal growth rate and WACC

²⁰The estimate differs slightly from the sum due to rounding.

estimate can have a dramatic impact on the terminal value calculation: The final estimate of the company's value will only be as accurate as the estimates used in the model.

Advantages of Using Discounted Cash Flow Analysis

- Expected changes in the target company's cash flows (e.g., from operating synergies and cost structure changes) can be readily modeled.
- An estimate of intrinsic value based on forecast fundamentals is provided by the model.
- Changes in assumptions and estimates can be incorporated by customizing and modifying the model.

Disadvantages of Using Discounted Cash Flow Analysis

- It is difficult to apply when free cash flows do not align with profitability within the first stage. For example, a rapidly expanding company may be profitable but have negative free cash flows because of heavy capital expenditures to the horizon that can be forecast with confidence. The free cash flow value of the company will then derive from a later and harder to estimate period when free cash flow turns positive.
- Estimating cash flows and earnings far into the future is not an exact science. There is a great deal of uncertainty in estimates even for the following year, much less in perpetuity.
- Estimates of discount rates can change over time because of capital market developments or changes that specifically affect the companies in question. These changes can also significantly affect acquisition estimates.
- Terminal value estimates often subject the acquisition value calculations to a disproportionate degree of estimate error. The estimate of terminal value can differ depending on the specific technique used. Additionally, the range of estimates can be affected dramatically by small changes in the assumed growth and WACC estimates.

7.1.2. Comparable Company Analysis

A second approach that investment bankers use to estimate acquisition values is called "comparable company analysis." In this approach, the analyst first defines a set of other companies that are similar to the target company under review. This set may include companies within the target's primary industry as well as companies in similar industries. The sample should be formed to include as many companies as possible that have similar size and capital structure to the target.

Once a set of comparable companies is defined, the next step is to calculate various relative value measures based on the current market prices of the comparable companies in the sample. Such valuation is often based on enterprise multiples. A company's enterprise value is the market value of its debt and equity minus the value of its cash and investments. Examples include enterprise value to free cash flow, enterprise value to EBITDA, enterprise value to EBIT, and enterprise value to sales. Because the denominator in such ratios is pre-interest, they may be preferred when the companies being compared have differences in leverage. The equity can also be valued directly using equity multiples, such as price to cash flow per share (P/CF), price to sales per share (P/S), price to earnings per share (P/E), and price to book value per share (P/BV).

The specific ratios that the analyst selects are determined by the industry under observation. Often, in addition to common market multiples, analysts will include industry-specific

multiples. For instance, in the oil and gas industry, in addition to looking at price paid to earnings and cash flow ratios, many analysts evaluate the price paid per barrel of oil or per thousand cubic feet of natural gas reserves.

Analysts typically review the mean, median, and range for whichever metrics are chosen, and then they apply those values to corresponding estimates for the target to develop an estimated company value. This is quite similar to the approach we discussed earlier for using multiples to produce a terminal value estimate. In this case, however, we are calculating various relative value metrics rather than using an industry rule of thumb.

Each metric (P/E, P/CF, etc.) is likely to produce a different estimate for the target's value. Analysts hope that these values converge because that increases confidence in the overall estimate. To the extent that they diverge, analysts must apply judgment and experience to decide which estimates are producing the most accurate market values.

It should be noted that the value determined up to this point in the process yields an estimate of where the target company should trade as a stock in the marketplace relative to the companies in the sample. In order to calculate an acquisition value, the analyst must also estimate a takeover premium. The **takeover premium** is the amount by which the takeover price for each share of stock must exceed the current stock price in order to entice shareholders to relinquish control of the company to an acquirer. This premium is usually expressed as a percentage of the stock price and is calculated as:

$$PRM = \frac{(DP - SP)}{SP} \quad (10-6)$$

where

PRM = takeover premium (as a percentage of stock price)

DP = deal price per share of the target company

SP = stock price of the target company²¹

To calculate the relevant takeover premium for a transaction, analysts usually compile a list of the takeover premiums paid for companies similar to the target. Preferably, the calculations will be from the recent past because acquisition values and premiums tend to vary over time and economic cycles.

EXAMPLE 10-8 Comparable Company Analysis

Sam Jones, an investment banker, has been retained by the Big Box Company to estimate the price that should be paid to acquire New Life Books, Inc. Jones decides to use comparable company analysis to find a fair value for New Life, and has gathered the following information about three comparable companies:

²¹The analyst must be careful to note any pre-deal jump in the price that may have occurred because of takeover speculation in the market. In these cases, the analyst should apply the takeover premium to a selected representative price from before any speculative influences on the stock price.

Valuation Variables	Company 1	Company 2	Company 3
Current stock price (\$)	20.00	32.00	16.00
Earnings per share (\$)	1.00	1.82	0.93
Cash flow per share (\$)	2.55	3.90	2.25
Book value per share (\$)	6.87	12.80	5.35
Sales per share (\$)	12.62	18.82	7.62

First, Jones calculates valuation metrics using the data he gathered. For each metric, he also calculates the mean.

Relative Valuation Ratio	Company 1	Company 2	Company 3	Mean
P/E	20.00	17.58	17.20	18.26
P/CF	7.84	8.21	7.11	7.72
P/BV	2.91	2.50	2.99	2.80
P/S	1.58	1.70	2.10	1.79

Jones then applies the mean relative valuation ratios to the corresponding data for New Life Books to estimate the comparable *stock* price. Because the four valuation metrics produce estimates that are all relatively close, he decides he is comfortable using an average of the four estimates to produce the estimated stock value.

Target Company Valuation Variables	Target Company (a)	Comparable Companies' Valuation Variables	Mean Multiples for Comparable Companies (b)	Estimated Stock Value Based on Comparables (a × b)
Earnings per share	1.95	P/E	18.26	\$35.61
Cash flow per share	4.12	P/CF	7.72	\$31.81
Book value per share	12.15	P/BV	2.80	\$34.02
Sales per share	18.11	P/S	1.79	\$32.42
Estimated stock value				Mean: \$33.47

To determine the proper acquisition or takeover value, Jones must now estimate the relevant takeover premium. Using five of the most recent takeovers of companies that are similar to the target, he has compiled the following estimates:

Target Company	Stock Price Prior to Takeover	Takeover Price	Takeover Premium
Target 1	\$23.00	\$28.50	23.9%
Target 2	\$17.25	\$22.65	31.3%
Target 3	\$86.75	\$102.00	17.6%
Target 4	\$45.00	\$53.75	19.4%
Target 5	\$36.75	\$45.00	<u>22.4%</u>
Mean premium			22.9%

After examining the data, Jones decides that the mean estimated premium is reasonable. His next step is to apply the takeover premium to his mean estimate of the stock price for New Life Books:

Target's estimated stock value	\$33.47
Estimated takeover premium	22.9%
Estimated takeover price of target	$(\$33.47)(1.229) = \41.14

From all the calculations and estimates above, Jones concludes that a fair takeover price for the Big Box Company to pay for each share of New Life Books would be \$41.14.²²

Advantages of Using Comparable Company Analysis

- This method provides a reasonable approximation of a target company's value relative to similar companies in the market. This assumes that "like" assets should be valued on a similar basis in the market.
- With this method, most of the required data are readily available.
- The estimates of value are derived directly from the market. This is unlike the discounted cash flow method where the takeover value is determined based on many assumptions and estimates.

Disadvantages of Using Comparable Company Analysis

- The method is sensitive to market mispricing. To illustrate the issue, suppose that the comparable companies are overvalued. A valuation relative to those companies may suggest a value that is too high in the sense that values would be revised downward when the market corrects.

²²As we shall discuss in the section covering bid evaluation, the analysis in Example 10-8 is not quite complete because the acquirer must evaluate the estimated takeover price relative to any expected synergies.

- Using this approach yields a market-estimated fair *stock* price for the target company. In order to estimate a fair *takeover* price, analysts must additionally estimate a fair takeover premium and use that information to adjust the estimated stock price.
- The analysis may be inaccurate because it is difficult for the analyst to incorporate any specific plans for the target (e.g., changing capital structure or eliminating duplicate resources) in the analysis.
- The data available for past premiums may not be timely or accurate for the particular target company under consideration.

7.1.3. Comparable Transaction Analysis

A third common approach to value target companies is known as “comparable transaction analysis.” This approach is closely related to comparable company analysis except that the analyst uses details from recent takeover transactions for comparable companies to make direct estimates of the target company’s takeover value.

The first step in comparable transaction analysis is to collect a relevant sample of recent takeover transactions. The sample should be as broad as possible but limited to companies in the same industry as the target, or at least closely related. Once the transactions are identified, the analyst can look at the same types of relative value multiples that were used in comparable company analysis (P/E, P/CF, other industry-specific multiples, etc.). In this case, however, we are not comparing the target against market multiples. For this approach we compare the multiples actually paid for similar companies in other M&A deals. As before, analysts typically look at descriptive statistics, such as the mean, median, and range for the multiples, and apply judgment and experience when applying that information to estimate the target’s value.

EXAMPLE 10-9 Comparable Transaction Analysis

Joel Hofer, an analyst with an investment banking firm, has been asked to estimate a fair price for the General Health Company’s proposed acquisition of Medical Services, Inc. He has already taken the initial step and assembled a sample containing companies involved in acquisitions within the same industry in which Medical Services operates. These companies have all been acquired in the past two years. Details on the acquisition prices and relevant pricing variables are shown below.

Valuation Variables	Acquired Company 1	Acquired Company 2	Acquired Company 3
Acquisition share price (\$)	35.00	16.50	87.00
Earnings per share (\$)	2.12	0.89	4.37
Cash flow per share (\$)	3.06	1.98	7.95
Book value per share (\$)	9.62	4.90	21.62
Sales per share (\$)	15.26	7.61	32.66

The next step in the process is for Hofer to calculate the multiples at which each company was acquired:

Relative Valuation Ratio	Comparable Company 1	Comparable Company 2	Comparable Company 3	Mean
P/E	16.5	18.5	19.9	18.3
P/CF	11.4	8.3	10.9	10.2
P/BV	3.6	3.4	4.0	3.7
P/S	2.3	2.2	2.7	2.4

After reviewing the distribution of the various values around their respective means, Hofer is confident about using the mean value for each ratio because the range in values above and below the mean is reasonably small. Based on his experience with this particular industry, Hofer believes that cash flows are a particularly important predictor of value for these types of companies. Consequently, instead of finding an equally weighted average, Hofer has decided to apply the weights shown below for calculating a weighted average estimated price.

Target Company Valuation Variables	Target Company (a)	Comparable Companies' Valuation Multiples	Mean Multiple Paid for Comparable Companies(b)	Estimated Takeover Value Based on Comparables (c = a × b)	Weight (d)	Weighted Estimates (e = c × d)
Earnings per share	\$2.62	P/E	18.3	\$47.95	20%	\$9.59
Cash flow per share	\$4.33	P/CF	10.2	\$44.17	40%	\$17.67
Book value per share	\$12.65	P/BV	3.7	\$46.81	20%	\$9.36
Sales per share	\$22.98	P/S	2.4	\$55.15	20%	<u>\$11.03</u>
Weighted average estimate						\$47.65

In sum, Hofer multiplied each valuation multiple by the corresponding variable for the target company to produce an estimated takeover value based on each comparable. He then decided to overweight cash flow per share and calculated a weighted average to determine an overall takeover value estimate of \$47.65 per share for Medical Services. The same procedure could be repeated using the median, high, and low valuations for each of the valuation variables. This would generate a range of takeover values for Medical Services.

Advantages of Comparable Transaction Approach

- It is not necessary to separately estimate a takeover premium. The takeover premium is derived directly from the comparable transactions.
- The takeover value estimates come directly from values that were recently established in the market. This is unlike the discounted cash flow method where the takeover value is determined based on many assumptions and estimates.
- The use of prices established through other recent transactions reduces litigation risk for both companies' board of directors and managers regarding the merger transaction's pricing.

Disadvantages of Comparable Transaction Approach

- Because the value estimates assume that the M&A market has properly determined the intrinsic value of the target companies, there is a risk that the real takeover values in past transactions were not accurate. If true, these inaccurate takeover values are imputed in the estimates based on them.
- There may not be any, or an adequate number of, comparable transactions to use for calculating the takeover value. In these cases, analysts may try to use data from related industries. These derived values may not be accurate for the specific industry under study.
- The analysis may be inaccurate because it is difficult for the analyst to incorporate any specific plans for the target (e.g., changing capital structure or eliminating duplicate resources) in the analysis.

7.2. Bid Evaluation

Assessing the target's value is important, but it is insufficient for an assessment of the deal. Even if both the acquirer and the target separately agree on the target company's underlying value, the acquirer will obviously want to pay the lowest price possible while the target will negotiate for the highest price possible. Both the price and form of payment in a merger will determine the distribution of risks and benefits between the counterparties to the deal.

Acquirers must typically pay a premium to induce the owners of the target company to relinquish control. In an M&A transaction, the premium is the portion of the compensation received by the target company's shareholders that is in excess of the pre-merger market value of their shares. The target company's managers will attempt to negotiate the highest possible premium relative to the value of the target company.²³

$$\text{Target shareholders' gain} = \text{Premium} = P_T - V_T \quad (10-7)$$

where

P_T = price paid for the target company

V_T = pre-merger value of the target company

²³A burst of speculative stock activity typically accompanies merger negotiations. This activity typically results in a higher share price for the target company in anticipation of a takeover premium. When conducting a bid evaluation, the analyst should use some combination of an assessment of the company's intrinsic value and a representative stock price from before any merger speculation.

The acquirer is willing to pay in excess of the target company's value in anticipation of reaping its own gains. The acquirer's gains are derived from the synergies generated by the transaction—usually from some combination of cost reductions and revenue enhancements. All else constant, synergies increase the value of the acquiring company by the value of the synergies minus the premium paid to target shareholders:

$$\text{Acquirer's gain} = \text{Synergies} - \text{Premium} = S - (P_T - V_T) \quad (10-8)$$

where

S = synergies created by the business combination

The post-merger value of the combined company is a function of the pre-merger values of the two companies, the synergies created by the merger, and any cash paid to the target shareholders as part of the transaction:

$$V_{A^*} = V_A + V_T + S - C \quad (10-9)$$

where

V_{A^*} = post-merger value of the combined companies

V_A = pre-merger value of the acquirer

C = cash paid to target shareholders

When evaluating a bid, the pre-merger value of the target company is the absolute minimum bid that target shareholders should accept. Individual shareholders could sell their shares in the open market for that much instead of tendering their shares for a lower bid. At the other extreme, unless there are mitigating circumstances or other economic justifications, the acquirer's shareholders would not want to pay more than the pre-merger value of the target company plus the value of any expected synergies. If the acquirer were to pay more than that, then the acquirer's post-merger value would be lower than its pre-merger value—therefore, a reduction in shareholder value.

Bidding should thus generally be confined to a range dictated by the synergies expected from the transaction, with each side of the transaction negotiating to capture as much of the synergies as possible. Consequently, analysis of a merger depends not only on an assessment of the target company's value but also on estimates of the value of any synergies that the merged company is expected to attain.

Confidence in synergy estimates will have implications not only for the bid price but also for the method of payment. The reason for this is that different methods of payment for the merger—cash offer, stock offer, or mixed offer—inherently provide varying degrees of risk shifting with respect to misestimating the value of merger synergies. To see why this is the case, we will first walk through the evaluation of an offer for each method of payment.

EXAMPLE 10-10 Adagio Software Offer

Adagio Software, Inc., and Tantalus Software Solutions, Inc., are negotiating a friendly acquisition of Tantalus by Adagio. The management teams at both companies have informally agreed upon a transaction value of about €12.00 per share of Tantalus

Software Solutions stock but are presently negotiating alternative forms of payment. Sunil Agrawal, CFA, works for Tantalus Software Solutions' investment banking team and is evaluating three alternative offers presented by Adagio Software:

1. Cash offer: Adagio will pay €12.00 per share of Tantalus stock.
2. Stock offer: Adagio will give Tantalus shareholders 0.80 shares of Adagio stock per share of Tantalus stock.
3. Mixed offer: Adagio will pay €6.00 plus 0.40 shares of Adagio stock per share of Tantalus stock.

Agrawal estimates that the merger of the two companies will result in economies of scale with a net present value of €90 million. To aid in the analysis, Agrawal has also compiled the following data:

	Adagio	Tantalus
Pre-merger stock price	€15.00	€10.00
Number of shares outstanding (millions)	75	30
Pre-merger market value (millions)	€1,125	€300

Based only on the information given, which of the three offers should Agrawal recommend to the Tantalus Software Solutions management team?

Solution.

Alternative 1: Cash offer of €12.00 per share of Tantalus stock

A cash offer is the most straightforward and easiest to evaluate. The price paid for the target company, P_T , is equal to cash price per share times the number of target shares: $€12.00 \times 30 \text{ million} = €360 \text{ million}$. Because Tantalus' value, V_T , is €300 million, the premium is the difference between the two: $€360 \text{ million} - €300 \text{ million} = €60 \text{ million}$.

Adagio's gain in this transaction is €30 million, which equals the value of the synergies minus the premium paid to Tantalus shareholders. A longer way to get to the same conclusion is to remember that the value of the post-merger combined company equals the pre-merger values of both companies plus the value of created synergies less the cash paid to target shareholders: $V_A^* = V_A + V_T + S - C = €1,125 + 300 + 90 - 360 = €1,155 \text{ million}$. Adagio's pre-merger market value was €1,125 million, and Adagio's gain from the transaction is thus $€1,155 - 1,125 = €30 \text{ million}$. Agrawal can divide the post-merger market value of €1,155 by the number of shares outstanding to determine Adagio's post-merger stock price. Under a cash offer, Adagio will not issue additional shares of stock, so Agrawal divides €1,155 by 75 million shares to see that, all else constant, Adagio's stock price after the merger should rise to €15.40.

In an all cash offer, Tantalus shareholders receive €60 million—the premium. Adagio's gain from the transaction equals the expected synergies (€90 million) less the premium paid to Tantalus shareholders (€60 million), which equals €30 million.

Alternative 2: Stock offer of 0.80 shares of Adagio stock per share of Tantalus stock

A stock offer of 0.80 shares might seem at first glance to be equivalent to a cash offer of €12.00 because Adagio's share price is €15.00 ($0.80 \times €15 = €12$). The results are actually slightly different, however, because Agrawal must account for the dilution that

occurs when Adagio issues new shares to Tantalus stockholders. Because there are 30 million shares of the target outstanding, Adagio must issue: $30 \text{ million} \times 0.80 = 24 \text{ million shares}$.

To calculate the price paid for Tantalus, Agrawal starts by ascertaining the post-merger value of the combined company. Agrawal uses the same formula as before while using a value of zero for C because this is a stock offer and no cash is changing hands: $V_{A^*} = V_A + V_T + S - C = €1,125 + 300 + 90 - 0 = €1,515 \text{ million}$. Next, Agrawal divides Adagio's post-merger value by the post-merger number of shares outstanding. Because Adagio issued 24 million shares to complete the transaction, Agrawal adds 24 million to the original 75 million shares outstanding and arrive at 99 million. Dividing the post-merger market value by the post-merger number of shares outstanding, Agrawal determines that the value of each share given to Tantalus shareholders is actually worth $€1,515 \text{ million} / 99 \text{ million} = €15.30$ and that the total value paid to Tantalus shareholders is $€15.30 \times 24 \text{ million} = €367 \text{ million}$.

The premium is thus $€367 - 300 = €67 \text{ million}$, which is €7 million higher than it was for the cash offer. Because the target shareholders receive €7 million more than in the cash offer, the acquirer's gain is correspondingly less. Because the synergies are valued at €90 million and the premium is €67 million, the acquirer's gain under a stock transaction with these terms is €23 million.

Alternative 3: Mixed offer of €6.00 plus 0.40 shares of Adagio stock per share of Tantalus stock

A mixed offer will still result in some dilution, although not as much as a pure stock offer. Agrawal begins by calculating Adagio's post-merger value. Agrawal inserts €180 million for C because the company is paying €6 per share for 30 million shares: $V_{A^*} = V_A + V_T + S - C = €1,125 + 300 + 90 - 180 = €1,335 \text{ million}$.

Next, Agrawal determines that Adagio must issue 12 million shares to complete the transaction: $0.40 \times 30 \text{ million} = 12 \text{ million}$. Combined with the original 75 million shares outstanding, Adagio's post-merger number of shares outstanding will be 87 million. Agrawal divides €1,335 million by 87 million and find that each share given to the Tantalus shareholders is worth €15.35.

The total value paid to Tantalus shareholders includes a cash component, $€6.00 \times 30 \text{ million} = €180 \text{ million}$, and a stock component, 12 million shares issued with a value of €15.35 each equaling €184 million. Added together, the total value is $€180 + 184 = €364 \text{ million}$, and the premium is therefore $€364 \text{ million} - 300 \text{ million} = €64 \text{ million}$. The acquirer's gain is \$26 million.

Conclusion: Agrawal should recommend that the Tantalus Software Solutions management team opt for the all stock offer because that alternative provides Tantalus shareholders the most value (the highest premium).

In Example 10-10, Adagio's gain ranged from €30 million in the pure cash offer to €26 million in the mixed offer and €23 million in the pure stock offer. If the dilution of a stock offer reduces the acquirer's gains from the transaction, why would an acquirer ever pay stock in a merger? The answer brings us back to the beginning of the section where we pointed out

that the price and form of payment in a merger determine the distribution of risks and benefits. The choice of payment method is influenced by both parties' confidence in the estimated synergies and the relative value of the acquirer's shares.

The more confident the managers are that the estimated synergies will be realized, the more the acquiring managers will prefer to pay with cash and the more the target managers will prefer to receive stock. And the more the merger is paid for with the acquirer's stock, the more that the risks and benefits of realizing synergies will be passed on to the target shareholders. For example, in the cash offer we analyzed in Example 10-10, if the synergies later turned out to be worth €60 million rather than the originally estimated €90 million, then the Tantalus shareholders' premium would be unaffected but Adagio's gain would completely evaporate. In contrast, if the synergies were greater than estimated, then Tantalus shareholders' premium would still be unchanged but Adagio's gain would increase.

When stock is used as payment, the target shareholders become part owners of the acquiring company. In the Adagio stock offer, Tantalus shareholders would receive 24 million shares and thus own 24/99 (24.2 percent) of the post-merger acquirer. Thus, Tantalus shareholders would participate by that proportion in any deviation of synergies from pre-merger estimates. If synergies were worth only €60 million, Adagio would lose its €23 million gain and Tantalus shareholders' gain from the transaction would fall by €7 million.

The other factor affecting the method of payment decision relates to the counterparties' confidence in the companies relative values. The more confident managers are in estimates of the target company's value, the more the acquirer would prefer cash and the more the target would prefer stock. For example, what if Adagio estimates that Tantalus is worth more than €10 per share and consequently offers €12.50 per share in cash instead of €12.00? In that case, Tantalus shareholders would receive a premium that is €15 million higher and Adagio's gain from the transaction would be reduced by €15 million to €15 million.

8. WHO BENEFITS FROM MERGERS?

What does the empirical evidence say about who actually gains in business combinations? Studies on the performance of mergers fall into two categories: short-term performance studies, which examine stock returns surrounding merger announcement dates, and long-term performance studies of post-merger companies. The empirical evidence suggests that merger transactions create value for target company shareholders in the short run. On average, target shareholders reap 30 percent premiums over the stock's pre-announcement market price, and the acquirer's stock price falls, on average, between 1 and 3 percent.²⁴ Moreover, on average, both the acquirer and target tend to see higher stock returns surrounding cash acquisition offers than around share offers.²⁵

The high average premiums paid to target shareholders may be attributed, at least partly, to the winner's curse—the tendency for competitive bidding to result in overpayment. Even if the average bidding company accurately estimates the target company's value, some bidders will overestimate the target's value and other potential buyers will underestimate its value. Unless the winner can exploit some strong synergies that are not available to other bidders, the winning bidder is likely to be the one who most overestimates the value.

²⁴See Weston and Weaver (2001), 93–116.

²⁵Bruner (2005), 33.

Roll argues that high takeover bids may stem from hubris, from “the overbearing presumption of bidders that their valuations are correct.”²⁶ Implied in this behavior is that these executives are somehow smarter than everyone else and can see value where others cannot. Even if there were no synergies from a merger, managerial hubris would still lead to higher-than-market bids and a transfer of wealth from the acquiring company’s shareholders to the target’s shareholders. The empirical evidence is consistent with Roll’s hubris hypothesis.

When examining a longer period, empirical evidence shows that acquirers tend to underperform comparable companies during the three years following an acquisition. This implies a general post-merger operational failure to capture synergies. Average returns to acquiring companies subsequent to merger transactions are negative 4.3 percent with about 61 percent of acquirers lagging their industry peers.²⁷ This finding suggests that financial analysts would be well served to thoroughly scrutinize estimates of synergy and post-merger value creation.

Analysts must attempt to distinguish those deals that create value and those that do not. Too often, companies with surplus cash but few new investment opportunities are prone to make acquisitions rather than distribute excess cash to shareholders. When distinguishing value-creating deals, analysts must examine the operational strengths possessed by the acquirer and the target to discern the likelihood that post-merger synergies will be achieved.

Based on past empirical results, the following are characteristics of M&A deals that create value²⁸:

- **The buyer is strong.** Acquirers whose earnings and share prices grow at a rate above the industry average for three years before the acquisition earn statistically significant positive returns on announcement.
- **The transaction premiums are relatively low.** Acquirers earn negative returns on announcement when paying a high premium.
- **The number of bidders is low.** Acquirer stock returns are negatively related to the number of bidders.
- **The initial market reaction is favorable.** Initial market reaction is an important barometer for the value investors place on the gains from merging as well as an indication of future returns. If the acquiring company’s stock price falls when the deal is announced, investors are sending a message that the merger benefits are doubtful or that the acquirer is paying too much.

9. CORPORATE RESTRUCTURING

Just as mergers and acquisitions are a means by which companies get bigger, a corporate restructuring is usually used in reference to ways that companies get smaller—by selling, splitting off, or otherwise shedding operating assets. When a company decides to sell, liquidate, or spin off a division or a subsidiary, it is referred to as a **divestiture**.

Given, as we have discussed, that many companies have great difficulty actually achieving the planned synergies of a business combination, it is not surprising that many companies seek to undo previous mergers. Indeed, periods of intense merger activity are often followed by periods of heightened restructuring activity. Of course, previous mergers that did not work

²⁶See Roll (1986), 176–216.

²⁷Koller, Goedhart, and Wessels (2005), 439, footnotes 3 and 4.

²⁸Weston and Weaver (2001), Chapter 5.

out as planned are not the only reason companies may choose to divest assets. Some of the common reasons for restructuring follow:

- **Change in strategic focus.** Either through acquisitions or other investments over time, companies often become engaged in multiple markets. Management may hope to improve performance by eliminating divisions or subsidiaries that are outside the company's core strategic focus.
- **Poor fit.** Sometimes a company will decide that a particular division is a poor fit within the overall company. For example, the company may not have the expertise or resources to fully exploit opportunities pursued by the division and may decide to sell the segment to another company that does have the necessary resources. Or, the division might simply not be profitable enough to justify continued investment based on the company's cost of capital.
- **Reverse synergy.** Managers may feel that a segment of the company is undervalued by the market, sometimes because of poor performance of the overall company or because the division is not a good strategic fit. In these cases, it is possible that the division and the company will be worth more separately than combined.
- **Financial or cash flow needs.** If times are tough, managers may decide to sell off portions of the company as a means by which to raise cash or cut expenses.

Restructuring can take many forms, but the three basic ways that a company divests assets are a sale to another company, a spin-off to shareholders, or liquidation. As part of a sale to another company, a company might offer to sell the assets of a division or may offer an equity carve-out. An **equity carve-out** involves the creation of a new legal entity and sales of equity in it to outsiders.

In a **spin-off**, shareholders of the parent company receive a proportional number of shares in a new, separate entity. Whereas the sale of a division results in an inflow of cash to the parent company, a spin-off does not. A spin-off simply results in shareholders owning stock in two different companies where there used to be one. A similar type of transaction is called a **split-off**, where some of the parent company's shareholders are given shares in a newly created entity in exchange for their shares of the parent company. **Liquidation** involves breaking up a company, division, or subsidiary and selling off its assets piecemeal. For a company, liquidation is typically associated with bankruptcy.

10. SUMMARY

Mergers and acquisitions are complex transactions. The process often involves not only the acquiring and target companies but also a variety of other stakeholders, including securities antitrust regulatory agencies. To fully evaluate a merger, analysts must ask two fundamental questions: First, will the transaction create value; and second, does the acquisition price outweigh the potential benefit? This chapter has made the following important points.

- An acquisition is the purchase of some portion of one company by another. A merger represents the absorption of one company by another such that only one entity survives following the transaction.
- Mergers can be categorized by the form of integration. In a statutory merger, one company is merged into another; in a subsidiary merger, the target becomes a subsidiary of the acquirer; and in a consolidation, both the acquirer and target become part of a newly formed company.

- Horizontal mergers occur among peer companies engaged in the same kind of business. Vertical mergers occur among companies along a given value chain. Conglomerates are formed by companies in unrelated businesses.
- Merger activity has historically occurred in waves. These waves have typically coincided with a strong economy and buoyant stock market activity. Merger activity tends to be concentrated in a few industries, usually those undergoing changes, such as deregulation or technological advancement.
- The motives for M&A activity include synergy, growth, market power, the acquisition of unique capabilities and resources, diversification, increased earnings, management's personal incentives, tax considerations, and the possibilities of uncovering hidden value. Cross-border motivations may involve technology transfer, product differentiation, government policy, and the opportunities to serve existing clients abroad.
- A merger transaction may take the form of a stock purchase (when the acquirer gives the target company's shareholders some combination of cash or securities in exchange for shares of the target company's stock) or an asset purchase (when the acquirer purchases the target company's assets and payment is made directly to the target company). The decision of which approach to take will affect other aspects of the transaction, such as how approval is obtained, which laws apply, how the liabilities are treated, and how the shareholders and the company are taxed.
- The method of payment for a merger can be cash, securities, or a mixed offering with some of both. The exchange ratio in a stock or mixed offering determines the number of shares that stockholders in the target company will receive in exchange for each of their shares in the target company.
- Hostile transactions are those opposed by target managers, whereas friendly transactions are endorsed by the target company's managers. There are a variety of both pre- and post-offer defenses a target can use to ward off an unwanted takeover bid.
- Examples of pre-offer defense mechanisms include poison pills and puts, incorporation in a jurisdiction with restrictive takeover laws, staggered boards of directors, restricted voting rights, supermajority voting provisions, fair price amendments, and golden parachutes.
- Examples of post-offer defenses include "just say no" defense, litigation, greenmail, share repurchases, leveraged recapitalization, "crown jewel" defense, "Pac-Man" defense, or finding a white knight or a white squire.
- Antitrust legislation prohibits mergers and acquisitions that impede competition. Major U.S. antitrust legislation includes the Sherman Antitrust Act, the Clayton Act, the Celler-Kefauver Act, and the Hart-Scott-Rodino Act.
- The Federal Trade Commission and Department of Justice review mergers for antitrust concerns in the United States. The European Commission reviews transactions in the European Union.
- The Herfindahl-Hirschman Index (HHI) is a measure of market power based on the sum of the squared market shares for each company in an industry. Higher index values or combinations that result in a large jump in the index are more likely to meet regulatory challenges.
- The Williams Act is the cornerstone of securities legislation for M&A activities in the United States. The Williams Act ensures a fair tender offer process through the establishment of disclosure requirements and formal tender offer procedures.
- Three major tools for valuing a target company are discounted cash flow analysis (which involves discounting free cash flows estimated with pro forma financial statements), comparable company analysis (which estimates a company's intrinsic value based on relative valuation metrics for similar companies), and comparable transaction analysis (which derives valuation from details of recent takeover transactions for comparable companies).

- In a merger bid, the gain to target shareholders is measured as the control premium, which equals the price paid for the target company in excess of its value. The acquirer gains equal the value of any synergies created by the merger minus the premium paid to target shareholders. Together, the bid and the method of payment determine the distribution of risks and returns among acquirer and target shareholders with regard to realization of synergies as well as correct estimation of the target company's value.
- The empirical evidence suggests that merger transactions create value for target company shareholders. Acquirers, in contrast, tend to accrue value in the years following a merger. This finding suggests that synergies are often overestimated or difficult to achieve.
- When a company decides to sell, liquidate, or spin off a division or a subsidiary, it is referred to as a divestiture. Companies may divest assets for a variety of reasons, including a change in strategic focus, poor fit of the asset within the corporation, reverse synergy, or cash flow needs.
- The three basic ways that a company divests assets are a sale to another company, a spin-off to shareholders, and liquidation.

PROBLEMS

The following information relates to Questions 1–6.

Modern Auto, an automobile parts supplier, has made an offer to acquire Sky Systems, creator of software for the airline industry. The offer is to pay Sky Systems' shareholders the current market value of their stock in Modern Auto's stock. The relevant information it used in those calculations is given below:

	Modern Auto	Sky Systems
Share price	\$40	\$25
Number of outstanding shares (millions)	40	15
Earnings (millions)	\$100	\$30

Although the total earnings of the combined company will not increase and are estimated to be \$130 million, Charles Wilhelm (treasurer of Modern Auto) argues that there are two attractive reasons to merge. First, Wilhelm says, "The merger of Modern Auto and Sky Systems will result in lower risk for our shareholders because of the diversification effect." Second, Wilhelm also says, "If our EPS increases, our stock price will increase in line with the EPS increase because our P/E will stay the same."

Sky Systems' managers are not interested in the offer by Modern Auto. The managers, instead, approach HiFly, Inc., which is in the same industry as Sky Systems, to see if it would be interested in acquiring Sky Systems. HiFly is interested, and both companies believe there will be synergies from this acquisition. If HiFly were to acquire Sky Systems, it would do so by paying \$400 million in cash.

HiFly is somewhat concerned whether antitrust regulators would consider the acquisition of Sky Systems an antitrust violation. The market in which the two companies operate consists of eight competitors. The largest company has a 25 percent market share. HiFly has the second-largest market share of 20 percent. Five companies, including Sky Systems, each have a market share of 10 percent. The smallest company has a 5 percent market share.

1. The acquisition of Sky Systems by Modern Auto and the acquisition of Sky Systems by HiFly, respectively, would be examples of a:
 - A. vertical merger and a horizontal merger.
 - B. conglomerate merger and a vertical merger.
 - C. conglomerate merger and a horizontal merger.
2. If Sky Systems were to be acquired by Modern Auto under the terms of the original offer, the post-merger EPS of the new company would be *closest* to:
 - A. \$2.00.
 - B. \$2.32.
 - C. \$2.63.
3. Are Wilhelm’s two statements about his shareholders benefiting from the diversification effect of the merger and about the increase in the stock price, respectively, correct?

	The Merger Will Result in Lower Risk for Shareholders	Stock Price Will Increase in Line with the EPS Increase
A.	No	No
B.	No	Yes
C.	Yes	No

4. Which of the following defenses *best* describes the role of HiFly in the acquisition scenario?
 - A. Crown jewel.
 - B. Pac-Man.
 - C. White knight.
5. Suppose HiFly acquires Sky Systems for the stated terms. The gain to Sky Systems shareholders resulting from the merger transaction would be *closest* to:
 - A. \$25 million.
 - B. \$160 million.
 - C. \$375 million.
6. If HiFly and Sky Systems attempt to merge, the increase in the Herfindahl–Hirschman Index (HHI) and the probable action by the Department of Justice and the FTC, respectively, in response to the merger announcement are:

	Increase in the HHI	Probable Response of Department of Justice and FTC
A.	290	To challenge the merger
B.	290	To investigate the merger
C.	400	To challenge the merger

The following information relates to Questions 7–12.

Kinetic Corporation is considering acquiring High Tech Systems. Jim Smith, the vice president of finance at Kinetic, has been assigned the task of estimating a fair acquisition price for High Tech. Smith is aware of several approaches that could be used for this purpose. He plans to estimate the acquisition price based on each of these approaches, and has collected or estimated the necessary financial data.

High Tech has 10 million shares of common stock outstanding and no debt. Smith has estimated that the post-merger free cash flows from High Tech, in millions of dollars, would be 15, 17, 20, and 23 at the end of the following four years. After Year 4, he projects the free cash flow to grow at a constant rate of 6.5 percent a year. He determines that the appropriate rate for discounting these estimated cash flows is 11 percent. He also estimates that after four years High Tech would be worth 23 times its free cash flow at the end of the fourth year.

Smith has determined that three companies—Alpha, Neutron, and Techno—are comparable to High Tech. He has also identified three recent takeover transactions—Quadrant, ProTech, and Automator—that are similar to the takeover of High Tech under consideration. He believes that price-to-earnings, price-to-sales, and price-to-book value per share of these companies could be used to estimate the value of High Tech. The relevant data for the three comparable companies and for High Tech are as follows:

Valuation Variables	Alpha	Neutron	Techno	High Tech
Current stock price (\$)	44.00	23.00	51.00	31.00
Earnings/share (\$)	3.01	1.68	2.52	1.98
Sales/share (\$)	20.16	14.22	18.15	17.23
Book value/share (\$)	15.16	7.18	11.15	10.02

The relevant data for the three recently acquired companies are given below:

Valuation Variables	Quadrant	ProTech	Automator
Stock price pre-takeover (\$)	24.90	43.20	29.00
Acquisition stock price (\$)	28.00	52.00	34.50
Earnings/share (\$)	1.40	2.10	2.35
Sales/share (\$)	10.58	20.41	15.93
Book value/share (\$)	8.29	10.14	9.17

While discussing his analysis with a colleague, Smith makes two comments. Smith's first comment is: "If there were a pre-announcement run-up in Quadrant's price because of speculation, the takeover premium should be computed based on the price prior to the run-up." His second comment is: "Because the comparable transaction approach is based on the acquisition price, the takeover premium is implicitly recognized in this approach."

7. What is the present value per share of High Tech stock using the discounted cash flow approach if the terminal value of High Tech is based on using the constant growth model to determine terminal value?
 - A. \$39.38.
 - B. \$40.56.
 - C. \$41.57.
8. What is the value per share of High Tech stock using the discounted cash flow approach if the terminal value of High Tech is based on using the cash flow multiple method to determine terminal value?
 - A. \$35.22.
 - B. \$40.56.
 - C. \$41.57.
9. The average stock price of High Tech for the three relative valuation ratios (if it is traded at the mean of the three valuations) is *closest* to:
 - A. \$35.21.
 - B. \$39.38.
 - C. \$40.56.
10. Taking into account the mean takeover premium on recent comparable takeovers, what would be the estimate of the fair acquisition price of High Tech based on the comparable company approach?
 - A. \$35.22.
 - B. \$40.83.
 - C. \$41.29.
11. The fair acquisition price of High Tech using the comparable transaction approach is *closest* to:
 - A. \$35.22.
 - B. \$40.86.
 - C. \$41.31.
12. Are Smith's two comments about his analysis correct?
 - A. Both of his comments are correct.
 - B. Both of his comments are incorrect.
 - C. His first comment is correct, and his second comment is incorrect.

The following information relates to Questions 13–18 and is based on “Corporate Governance” and “Mergers and Acquisitions.”

Mark Zin and Stella Lee are CEO and CFO, respectively, of Moonbase Corporation. They are concerned that Moonbase is undervalued and subject to a hostile takeover bid. To assess the value of their own firm, they are reviewing current financial data for Jupiter PLC, Saturn Corporation, and Voyager Corporation, three firms they believe are comparable to Moonbase.

Relative Valuation Ratio	Jupiter	Saturn	Voyager
P/E	23.00	19.50	21.50
P/B	4.24	5.25	4.91
P/CF	12.60	11.40	13.30

Zin believes Moonbase should trade at similar multiples to these firms and that each valuation ratio measure is equally valid. Moonbase has a current stock price of \$34.00 per share, earnings of \$1.75 per share, book value of \$8.50 per share, and cash flow of \$3.20 per share. Using the average of each of the three multiples for the three comparable firms, Zin finds that Moonbase is undervalued.

Lee states that the low valuation reflects current poor performance of a subsidiary of Moonbase. She recommends that the board of directors consider divesting the subsidiary in a manner that would provide cash inflow to Moonbase.

Zin proposes that some action should be taken before a hostile takeover bid is made. He asks Lee if changes can be made to the corporate governance structure in order to make it more difficult for an unwanted suitor to succeed.

In response, Lee makes two comments of actions that would make a hostile takeover more difficult. Lee's first comment is: "Moonbase can institute a poison pill that allows our shareholders, other than the hostile bidder, to purchase shares at a substantial discount to current market value." Lee's second comment is: "Moonbase can instead institute a poison put. The put allows shareholders the opportunity to redeem their shares at a substantial premium to current market value."

Zin is also concerned about the general attitude of outside investors with the governance of Moonbase. He has read brokerage reports indicating that the Moonbase governance ratings are generally low. Zin believes the following statements describe characteristics that should provide Moonbase with a strong governance rating.

- Statement 1:* Moonbase's directors obtain advice from the corporate counsel to aid them in assessing the firm's compliance with regulatory requirements.
- Statement 2:* Five of the ten members of the board of directors are not employed by Moonbase and are considered independent. Though not employed by the company, two of the independent directors are former executives of the company and thus can contribute useful expertise relevant for the business.
- Statement 3:* The audit committee of the board is organized so as to have sufficient resources to carry out its task, with an internal staff that reports routinely and directly to the audit committee.

Zin is particularly proud of the fact that Moonbase has begun drafting a "Statement of Corporate Governance" (SCG) that would be available on the company website for viewing by shareholders, investment analysts, and any interested stakeholders. In particular, the SCG pays special attention to policies that ensure effective contributions from the board of directors. These policies include:

- Policy #1:* Training is provided to directors prior to joining the board and periodically thereafter.
- Policy #2:* Statements are provided of management's assessment of the board's performance of its fiduciary responsibilities.
- Policy #3:* Statements are provided of directors' responsibilities regarding oversight and monitoring of the firm's risk management and compliance functions.

Zin concludes the discussion by announcing that Johann Steris, a highly regarded ex-CFO of a major corporation, is under consideration as a member of an expanded board of directors. Zin states that Steris meets all the requirements as an independent director including the fact that he will not violate the interlocking directorship requirement. Steris also will bring experience as a member of the compensation committee of the board of another firm. He also comments that Steris desires to serve on either the audit or compensation committee of the Moonbase board and that good governance practice suggests that Steris would not be prohibited from serving on either committee.

13. The value the CEO estimated based on comparable company analysis is *closest* to:
 - A. \$37.33.
 - B. \$39.30.
 - C. \$40.80.
14. The divestiture technique that Lee is recommending is *most likely*:
 - A. a spin-off.
 - B. a split-off.
 - C. an equity carve-out.
15. With regard to poison pills and puts, Lee's comments are:
 - A. correct.
 - B. incorrect with regard to the poison put.
 - C. incorrect with regard to the poison pill.
16. Which statement by Zin provides the *most* support for a strong governance rating?
 - A. Statement 1.
 - B. Statement 2.
 - C. Statement 3.
17. Which policy of the Statement of Corporate Governance is *least likely* to ensure effective contributions from the board of directors?
 - A. Policy #1.
 - B. Policy #2.
 - C. Policy #3.
18. Is Zin's comment that good governance practice does not preclude Steris from serving on either of the two committees of the Moonbase board correct?
 - A. Yes.
 - B. No, good governance practice precludes Steris from serving on the audit committee.
 - C. No, good governance practice precludes Steris from serving on the compensation committee.

The following information relates to Questions 19–24.

Josh Logan is a buy-side equity analyst who follows Durtech. Logan’s supervisor believes that Durtech is a likely takeover candidate and has asked Logan to estimate the company’s value per share in the event of an “all stock” takeover bid. Logan plans to estimate Durtech’s value per share using three approaches: discounted cash flow, comparable company analysis, and comparable transaction analysis.

Durtech has 1.2 million common shares outstanding and no outstanding long-term debt or preferred stock. Logan estimates that Durtech’s free cash flows at the end of the next three years will be \$5.0 million, \$6.0 million, and \$7.0 million, respectively. After Year 3, he projects that free cash flow will grow at five percent per year. He determines the appropriate discount rate for this free cash flow stream is 15 percent per year.

Applying discounted cash flow analysis to the preceding information, Logan determines that Durtech’s fair enterprise value is \$61.8 million. In a separate analysis based on ratios, Logan estimates that at the end of the third year, Durtech will be worth ten times its year-three free cash flow.

Logan’s supervisor is troubled by the sensitivity of his enterprise value calculation to the terminal growth rate assumption. She asks Logan:

“What is the percentage change in your fair enterprise value of \$61.8 million if you use a terminal growth rate of zero percent rather than five percent?”

Logan gathers data on two companies comparable to Durtech: Alphatech and Betatech. He believes that price-to-earnings, price-to-sales, and price-to-book-value per share of these companies should be used to value Durtech. The relevant data for the three companies are given in Exhibit A.

EXHIBIT A Valuation Variables for Durtech and Comparable Companies

Valuation Variables	Alphatech	Betatech	Durtech
Current stock price (\$)	72.00	45.00	24.00
Earnings per share (\$)	2.00	1.50	1.00
Sales per share (\$)	32.00	22.50	16.00
Book value per share (\$)	18.00	10.00	8.00

Logan also identifies one recent takeover transaction and analyzes its takeover premium (the amount by which its takeover price per share exceeds its current stock price). Omegatech is comparable to the possible transaction on Durtech. Omegatech had a stock price of \$44.40 per share prior to a newspaper report of a takeover rumor. After the takeover rumor was reported, the price rose immediately to \$60.30 per share. Eventually, the takeover offer was accepted by Omegatech’s shareholders for \$55.00 per share. One-year trailing earnings per share for Omegatech immediately prior to the takeover were \$1.25 per share.

In order to evaluate the risk of government antitrust action, Logan computes the Herfindahl–Hirschman Index (HHI) for the industry group that includes Durtech. He computes the pre-merger value of the HHI to be 1400. As shown in Exhibit B, Logan also computes the post-merger industry HHI assuming three possible merger scenarios with Durtech.

EXHIBIT B Post-Merger Industry HHI (assuming merger with Durtech)

Durtech Merger Partner	Post-Merger Industry HHI
Alphatech	1500
Betatech	1510
Gammatech	1520

Based on this analysis, Logan concludes that the industry is moderately concentrated and that a merger of Durtech (with any of the companies listed in Exhibit B) will face a possible government challenge.

19. Using the discounted cash flow approach and assuming that Durtech's terminal value is based on the cash flow multiple method, Logan's best estimate of Durtech's current value per share is *closest* to:
 - A. \$49.60.
 - B. \$51.50.
 - C. \$53.51.
20. Logan's best response to the supervisor's question concerning the sensitivity of the enterprise value to the terminal growth rate assumption is *closest* to:
 - A. -36.5%.
 - B. -28.5%.
 - C. -24.8%.
21. Based on Exhibit A and the mean of each of the valuation ratios, Logan's estimate of Durtech's value per share should be *closest* to:
 - A. \$30.44.
 - B. \$33.67.
 - C. \$34.67.
22. Based on the premium on a recent comparable transaction, Logan's best estimate of the takeover premium for Durtech is *closest* to:
 - A. 19.9%.
 - B. 23.9%.
 - C. 35.8%.
23. Using comparable transaction analysis, Logan's estimate of the fair acquisition value per share for Durtech is *closest* to:
 - A. \$35.52.
 - B. \$42.59.
 - C. \$44.00.
24. The *best* justification for Logan's conclusion concerning possible government antitrust action is that:
 - A. the post- and pre-merger HHI are both between 1000 and 1800.
 - B. the change in the HHI is 100 or more and the post-merger HHI is between 1000 and 1800.
 - C. the change in the HHI is 100 or more and the pre-merger HHI is between 1000 and 1800.

GLOSSARY

- Abandonment option** The ability to terminate a project at some future time if the financial results are disappointing.
- Accounts receivable turnover** Ratio of sales on credit to the average balance in accounts receivable.
- Acid test ratio** *See* Quick ratio.
- Acquiring company or acquirer** The company in a merger or acquisition that is acquiring the target.
- Acquisition** The purchase of some portion of one company by another; the purchase may be for assets, a definable segment of another entity, or the purchase of an entire company.
- Active strategy** In reference to short-term cash management, an investment strategy characterized by monitoring and attempting to capitalize on market conditions to optimize the risk and return relationship of short-term investments.
- Activity ratios** Measure how efficiently a company performs day-to-day tasks, such as the collection of receivables and management of inventory.
- Agency costs** Costs associated with the conflict of interest present when a company is managed by nonowners. Agency costs result from the inherent conflicts of interest between managers and equity owners.
- Agency costs of equity** The smaller the stake that managers have in the company, the less is their share in bearing the cost of excessive perquisite consumption or not giving their best efforts in running the company.
- Agency problem** A conflict of interest that arises when the agent in an agency relationship has goals and incentives that differ from the principal to whom the agent owes a fiduciary duty.
- Agency relationships** An arrangement whereby someone, an agent, acts on behalf of another person, the principal.
- Aging schedule** A breakdown of accounts into categories of days outstanding.
- Anticipation stock** Excess inventory that is held in anticipation of increased demand, often because of seasonal patterns of demand.
- Asset beta** The unlevered beta; reflects the business risk of the assets; the asset's systematic risk.
- Asset purchase** An acquisition in which the acquirer purchases the target company's assets and payment is made directly to the target company.
- Asset-based loan** A loan that is secured with company assets.
- Assignment of accounts receivable** The use of accounts receivable as collateral for a loan.
- Asymmetric information** The differential of information between corporate insiders and outsiders regarding the company's performance and prospects. Managers typically have more information about the company's performance and prospects than owners and creditors.
- Automated Clearing House (ACH)** An electronic payment network available to businesses, individuals, and financial institutions in the United States, U.S. Territories, and Canada.
- Average day's payables** *See* Number of days of payables.
- Average inventory period** *See* Number of days of inventory.
- Backward integration** A merger involving the purchase of a target ahead of the acquirer in the value or production chain; for example, to acquire a supplier.
- Basic earnings per share** Net income, minus preferred dividends, divided by the weighted average number of common shares outstanding.

- Bear hug** A tactic used by acquirers to circumvent target management's objections to a proposed merger by submitting the proposal directly to the target company's board of directors.
- Bill-to-bill** Credit terms that require that each prior bill must be paid before new shipments are possible.
- Blanket lien** A lien that gives a creditor the right to seize nearly all types of collateral and assets in the event of nonpayment by the debtor.
- Bond equivalent yield** A calculation of yield that is annualized using the ratio of 365 to the number of days to maturity. Bond equivalent yield allows for the restatement and comparison of securities with different compounding periods.
- Bond yield plus risk premium approach** An estimate of the cost of common equity that is produced by summing the before-tax cost of debt and a risk premium that captures the additional yield on a company's stock relative to its bonds. The additional yield is often estimated using historical spreads between bond yields and stock yields.
- Bonding costs** Costs borne by management to assure owners that they are working in the owners' best interest (e.g., implicit cost of non compete agreements).
- Book value equity per share** The amount of book value (also called carrying value) of common equity per share of common stock, calculated by dividing the book value of shareholders' equity by the number of shares of common stock outstanding.
- Bootstrapping earnings** An increase in a company's earnings that results as a consequence of the idiosyncrasies of a merger transaction itself rather than because of resulting economic benefits of the combination.
- Break point** In the context of the weighted average cost of capital (WACC), a break point is the amount of capital at which the cost of one or more of the sources of capital changes, leading to a change in the WACC.
- Breakeven point** The number of units produced and sold at which the company's net income is zero (revenues = total costs).
- Breakup value** The value that can be achieved if a company's assets are divided and sold separately.
- Business risk** The risk associated with operating earnings. Operating earnings are uncertain because total revenues and many of the expenditures contributed to produce those revenues are uncertain.
- Buyback** See Share repurchase.
- Cannibalization** Cannibalization occurs when an investment takes customers and sales away from another part of the company.
- Capital rationing** A capital rationing environment assumes that the company has a fixed amount of funds to invest.
- Capital structure** The mix of debt and equity that a company uses to finance its business.
- Captive finance subsidiary** A wholly owned subsidiary of a company that is established to provide financing of the sales of the parent company.
- Cash before delivery (CBD)** Credit terms that require payment in advance of delivery.
- Cash flow coverage ratio** Measure of solvency that indicates a company's ability to meet its obligations using operating cash flows.
- Cash offering** A merger or acquisition that is to be paid for with cash; the cash for the merger might come from the acquiring company's existing assets or from a debt issue.
- Cash on delivery (COD)** Credit terms that require payment at delivery. If payment is not made, delivery does not occur.
- Cash ratio** A measure of a company's ability to meet its current obligations with just the cash and cash equivalents on hand.
- Clientele effect** The preference some investors have for shares that exhibit certain characteristics.
- Commitment fee** A fee charged by lenders for unused credit in a line of credit or to guarantee a future loan. Typically it is a fractional percent (e.g., 1/2 percent) of the full amount or the unused amount of the line, depending on bank-company negotiations.
- Committed lines of credit** A bank commitment to extend credit up to a pre-specified amount; the commitment is considered a short-term liability and is usually in effect for 364 days (one day short of a full year).

- Common-size analysis** The restatement of financial statement items using a common denominator or reference item that allows one to identify trends and major differences.
- Comparable company** A company that has similar business risk, usually in the same industry and preferably with a single line of business.
- Component cost of capital** The rate of return required by suppliers of capital for an individual source of a company's funding, such as debt or equity.
- Conglomerate merger** A merger involving companies that are in unrelated businesses.
- Consolidation** A merger in which both companies terminate their previous legal existence and become part of a newly formed company.
- Contribution margin** The amount available for fixed costs and profit after paying variable costs; revenue minus variable costs.
- Conventional cash flow** A conventional cash flow pattern is one with an initial outflow followed by a series of inflows.
- Corporate governance** The system of principles, policies, procedures, and clearly defined responsibilities and accountabilities used by stakeholders to overcome the conflicts of interest inherent in the corporate form.
- Corporate raider** A person or organization seeking to profit by acquiring a company and reselling it, or seeking to profit from the takeover attempt itself (e.g., greenmail).
- Corporation** A legal entity with rights similar to those of a person. The chief officers, executives, or top managers act as agents for the firm and are legally entitled to authorize corporate activities and to enter into contracts on behalf of the business.
- Cost of capital** The rate of return that suppliers of capital require as compensation for their contribution of capital.
- Cost of debt** The cost of debt financing to a company, such as when it issues a bond or takes out a bank loan.
- Cost of preferred stock** The cost to a company of issuing preferred stock; the dividend yield that a company must commit to pay preferred stockholders.
- Cost structure** The mix of a company's variable costs and fixed costs.
- Country equity premium** *See* Country spread.
- Country spread, or country equity premium** An adjustment to the market risk premium to account for the additional risk posed to projects conducted in other countries. The country spread is also referred to as a country equity premium.
- Credit insurance** Used to insure payment of credit extended. Reduces the risk of bad debts and shifts some of the evaluation of creditworthiness to the insurer.
- Credit scoring model** A statistical model used to classify borrowers according to creditworthiness.
- Creditworthiness** The perceived ability of the borrower to pay what is owed on the borrowing in a timely manner; it represents the ability of a company to withstand adverse impacts on its cash flows.
- Current assets, or liquid assets** Assets that may be converted into cash in a short period of time.
- Current liabilities** Short-term obligations, such as accounts payable, wages payable, or accrued liabilities.
- Current ratio** The ratio of current assets to current liabilities.
- Days in receivables** *See* Number of days of receivables.
- Day's payables outstanding** *See* Number of days of payables.
- Day's sales in ending inventory** *See* Number of days of inventory.
- Day's sales outstanding** *See* Number of days of receivables.
- Dead-hand provision** A poison pill provision that allows for the redemption or cancellation of a poison pill provision only by a vote of continuing directors (generally directors who were on the target company's board prior to the takeover attempt).
- Debt incurrence test** A financial covenant made in conjunction with existing debt that restricts a company's ability to incur additional debt at the same seniority based on one or more financial tests or conditions.

- Debt-rating approach** A method for estimating a company's before-tax cost of debt based upon the yield on comparably rated bonds for maturities that closely match that of the company's existing debt.
- Debt ratings** An objective measure of the quality and safety of a company's debt based upon an analysis of the company's ability to pay the promised cash flows, as well as an analysis of any indentures.
- Debt-to-assets ratio** A measure of the proportion of assets that is financed with debt.
- Declaration date** The day that the corporation issues a statement declaring a specific dividend.
- Definitive merger agreement** A contract signed by both parties to a merger that clarifies the details of the transaction, including the terms, warranties, conditions, termination details, and the rights of all parties.
- Degree of financial leverage (DFL)** The ratio of the percentage change in net income to the percentage change in operating income; the sensitivity of the cash flows available to owners when operating income changes.
- Degree of operating leverage (DOL)** The ratio of the percentage change in operating income to the percentage change in units sold; the sensitivity of operating income to changes in units sold.
- Degree of total leverage (DTL)** The ratio of the percentage change in net income to the percentage change in units sold; the sensitivity of the cash flows to owners to changes in the number of units produced and sold.
- Diluted earnings per share** Net income, minus preferred dividends, divided by the number of shares outstanding considering all dilutive securities (e.g., convertible debt and options).
- Direct debit program** An arrangement whereby a customer authorizes a debit to a demand account; typically used by companies to collect routine payments for services.
- Disbursement float** The amount of time between check issuance and a check's clearing back against the company's account.
- Discount interest** The implicit interest provided by discount securities; the difference between the purchase price and the face value.
- Discounted cash flow (DCF) analysis** In the context of merger analysis, it is an estimate of a target company's value found by discounting the company's expected future free cash flows to the present.
- Divestiture** The sale, liquidation, or spin-off of a division or subsidiary.
- Dividend** A distribution paid to shareholders based on the number of shares owned.
- Dividend discount model based approach** An approach for estimating a country's equity risk premium. The market rate of return is estimated as the sum of the dividend yield and the growth rate in dividends for a market index. Subtracting the risk-free rate of return from the estimated market return produces an estimate for the equity risk premium.
- Dividend policy** The strategy a company follows with regard to the amount and timing of dividend payments.
- Dividend payout ratio** The ratio of cash dividends paid to earnings for a period.
- Dividend yield** Annual dividends per share divided by share price.
- Dividends per share (DPS)** The dollar amount of cash dividends paid during a period per share of common stock.
- Double taxation** Corporate earnings are taxed twice when paid out as dividends. First, corporate earnings are taxed regardless of whether they will be distributed as dividends or retained at the corporate level, and second, dividends are taxed again at the individual shareholder level.
- Drag on liquidity** When receipts lag, creating pressure from the decreased available funds.
- Earnings per share (EPS)** The amount of income earned during a period per share of common stock.
- Economic order quantity–reorder point (EOQ–ROP)** An approach to managing inventory based on expected demand and the predictability of demand; the ordering point for new inventory is determined based on the costs of ordering and carrying inventory, such that the total cost associated with inventory is minimized.
- Economies of scale** In reference to mergers, this is the savings achieved through the consolidation of operations and elimination of duplicate resources.

- Elasticity** A measure of sensitivity; the incremental change in one variable with respect to an incremental change in another variable.
- Electronic funds transfer (EFT)** The use of computer networks to conduct financial transactions electronically.
- Equity carve-out** A form of restructuring that involves the creation of a new legal entity and the sale of equity in it to outsiders.
- Equity risk premium (ERP)** The expected return on equities minus the risk-free rate; the premium that investors demand for investing in equities.
- Exchange ratio** The number of shares that target stockholders are to receive in exchange for each of their shares in the target company.
- Ex-dividend** Trading ex-dividend refers to shares that no longer carry the right to the next dividend payment.
- Ex-dividend date or ex-date** The first date that a share trades without (i.e., “ex”) the dividend.
- Ex-dividend price** The share price at the time the share first trades without the right to receive an upcoming dividend.
- External growth** Company growth in output or sales that is achieved by buying the necessary resources externally (i.e., achieved through mergers and acquisitions).
- Externality** The effect of an investment on other things besides the investment itself.
- Extra or special dividend** A dividend paid by a company that does not pay dividends on a regular schedule, or a dividend that supplements regular cash dividends with an extra payment.
- Financial analysis** The process of selecting, evaluating, and interpreting financial data in order to formulate an assessment of a company’s present and future financial condition and performance.
- Financial distress** Heightened uncertainty regarding a company’s ability to meet its various obligations because of lower or negative earnings.
- Financial risk** The risk that environmental, social, or governance risk factors will result in significant costs or other losses to a company and its shareholders; the risk associated with how a company finances its operations (e.g., debt, equity).
- Fixed costs** Costs that remain at the same level regardless of a company’s level of production and sales.
- Fixed price tender offer** Offer made by a company to repurchase a specific number of shares at a fixed price that is typically at a premium to the current market price.
- Fixed rate perpetual preferred stock** Nonconvertible, noncallable preferred stock that has a fixed dividend rate and no maturity date.
- Flip-in pill** A poison pill takeover defense that dilutes an acquirer’s ownership in a target by giving other existing target company shareholders the right to buy additional target company shares at a discount.
- Flip-over pill** A poison pill takeover defense that gives target company shareholders the right to purchase shares of the acquirer at a significant discount to the market price, which as the effect of causing dilution to all existing acquiring company shareholders.
- Float** In the context of customer receipts, the amount of money that is in transit between payments made by customers and the funds that are usable by the company.
- Float factor** An estimate of the average number of days it takes deposited checks to clear; average daily float divided by average daily deposit.
- Flotation cost** Fees charged to companies by investment bankers and other costs associated with raising new capital.
- Forward integration** A merger involving the purchase of a target that is farther along the value or production chain; for example, to acquire a distributor.
- Free cash flow (FCF)** The actual cash that would be available to the company’s investors after making all investments necessary to maintain the company as an ongoing enterprise (also referred to as free cash flow to the firm); the internally generated funds that can be distributed to the company’s investors (e.g., shareholders and bondholders) without impairing the value of the company.

- Free cash flow hypothesis** The hypothesis that higher debt levels discipline managers by forcing them to make fixed debt service payments and by reducing the company's free cash flow.
- Free cash flow to equity (FCFE)** The cash flow available to a company's common shareholders after all operating expenses, interest, and principal payments have been made, and necessary investments in working and fixed capital have been made.
- Free cash flow to the firm (FCFF)** The cash flow available to the company's suppliers of capital after all operating expenses have been paid and necessary investments in working capital and fixed capital have been made.
- Friendly transaction** A potential business combination that is endorsed by the managers of both companies.
- Giro system** An electronic payment system used widely in Europe and Japan.
- Greenmail** The purchase of the accumulated shares of a hostile investor by a company that is targeted for takeover by that investor, usually at a substantial premium over market price.
- Gross profit margin** The ratio of gross profit to revenues.
- Growth option or expansion option** The ability to make additional investments in a project at some future time if the financial results are strong.
- Herfindahl–Hirschman Index (HHI)** A measure of market concentration that is calculated by summing the squared market shares for competing companies in an industry; high HHI readings or mergers that would result in large HHI increases are more likely to result in regulatory challenges.
- Historical equity risk premium approach** An estimate of a country's equity risk premium that is based upon the historical averages of the risk-free rate and the rate of return on the market portfolio.
- Holder-of-record date** The date that a shareholder listed on the corporation's books will be deemed to have ownership of the shares for purposes of receiving an upcoming dividend; two business days after the ex-dividend date.
- Horizontal common-size analysis** A form of common-size analysis in which the accounts in a given period are used as the benchmark or base period, and every account is restated in subsequent periods as a percentage of the base period's same account.
- Horizontal merger** A merger involving companies in the same line of business, usually as competitors.
- Hostile transaction** An attempt to acquire a company against the wishes of the target's managers.
- Impairment of capital rule** A legal restriction that dividends cannot exceed retained earnings.
- Implied risk premium approach** See Number of days of receivables.
- Imputation** In reference to corporate taxes, a system that imputes, or attributes, taxes at only one level of taxation. For countries using an imputation tax system, taxes on dividends are effectively levied only at the shareholder rate. Taxes are paid at the corporate level but they are *attributed* to the shareholder. Shareholders deduct from their tax bill their portion of taxes paid by the company.
- Incremental cash flow** The cash flow that is realized because of a decision; the cash flow with a decision minus the cash flow without that decision.
- Indenture** A written contract between a lender and borrower that specifies the terms of the loan, such as interest rate, interest payment schedule, maturity, and so on.
- Independent projects** Independent projects are projects whose cash flows are independent of each other.
- Interest coverage ratio** Measures the number of times a company's operating earnings can cover its interest payments.
- Inventory blanket lien** The use of inventory as collateral for a loan. Though the lender has claim to some or all of the company's inventory, the company may still sell or use the inventory in the ordinary course of business.
- Inventory holding period** See Number of days of inventory.
- Inventory turnover** The ratio of cost of goods sold to inventory.
- Investment opportunity schedule (IOS)** A graphical depiction of a company's investment opportunities ordered from highest to lowest expected return. A company's optimal capital budget is found where the investment opportunity schedule intersects with the company's marginal cost of capital.

- Just-in-time (JIT) method** Method of managing inventory that minimizes in-process inventory stocks.
- Laddering strategy** A form of active strategy that entails scheduling maturities on a systematic basis within the investment portfolio such that investments are spread out equally over the term of the ladder.
- Legal risk** The risk that failures by company managers to effectively manage a company's environmental, social, and governance risk exposures will lead to lawsuits and other judicial remedies, resulting in potentially catastrophic losses for the company.
- Legislative and regulatory risk** The risk that governmental laws and regulations directly or indirectly affecting a company's operations will change with potentially severe adverse effects on the company's continued profitability and even its long-term sustainability.
- Leverage** In the context of corporate finance, leverage refers to the use of fixed costs within a company's cost structure. Fixed costs that are operating costs (such as depreciation or rent) create operating leverage. Fixed costs that are financial costs (such as interest expense) create financial leverage.
- Leveraged buyout (LBO)** A transaction whereby the target company management team converts the target to a privately held company by using heavy borrowing to financing the purchase the target company's outstanding shares.
- Leveraged recapitalization** A post-offer takeover defense mechanism that involves the assumption of a large amount of debt that is then used to finance share repurchases; the effect is to dramatically change the company's capital structure while attempting to deliver a value to target shareholders in excess of a hostile bid.
- Liquidating dividend** A dividend that is a return of capital rather than a distribution from earnings or retained earnings.
- Liquidation** To sell the assets of a company, division, or subsidiary piecemeal, typically because of bankruptcy; the form of bankruptcy that allows for the orderly satisfaction of creditors' claims after which the company ceases to exist.
- Liquidity** A company's ability to satisfy its short-term obligations using assets that are most readily converted into cash.
- Liquidity ratios** A form of liquidity analysis that focuses on the relationship between current assets and current liabilities and the rapidity with which receivables and inventory can be converted into cash during normal business operations.
- Lockbox system** A payment system in which customer payments are mailed to a post office box and the banking institution retrieves and deposits these payments several times a day, enabling the company to have use of the fund sooner than in a centralized system in which customer payments are sent to the company.
- London Interbank Offered Rate (LIBOR)** The Eurodollar rate at which London banks lend dollars to other London banks; considered to be the best representative rate on a dollar borrowed by a private, high-quality borrower.
- Long-term debt-to-assets ratio** The proportion of a company's assets that is financed with long-term debt.
- Managerialism theories** Theories that posit that corporate executives are motivated to engage in mergers to maximize the size of their companies rather than shareholder value.
- Marginal cost of capital (MCC)** The marginal cost of capital (MCC) is the cost of raising one additional unit of capital.
- Marginal investor** An investor who is likely to be part of the next trade in a share and who is therefore important in setting price.
- Matching strategy** An active investment strategy that includes intentional matching of the timing of cash outflows with investment maturities.
- Materials or manufacturing resource planning (MRP)** The incorporation of production planning into inventory management. A MRP analysis provides both a materials acquisition schedule and a production schedule.

- Matrix pricing** In the fixed income markets, to price a security on the basis of valuation-relevant characteristics (e.g., debt-rating approach).
- Merger** The absorption of one company by another; that is, two companies become one entity and one or both of the pre-merger companies ceases to exist as a separate entity.
- Mismatching strategy** An active investment strategy whereby the timing of cash outflows is not matched with investment maturities.
- Mixed offering** A merger or acquisition that is to be paid for with cash, securities, or some combination of the two.
- Money market yield** Yield on short-term debt securities; typically annualized using the ratio of 360 to the number of days to maturity.
- Monitoring costs** Costs borne by owners to monitor the management of the company (e.g., board of director expenses).
- Monthly billing** Credit terms that require monthly payment.
- Mutually exclusive projects** Mutually exclusive projects compete directly with each other. For example, if Projects A and B are mutually exclusive, you can choose A or B, but you cannot choose both.
- Net current assets** Current assets minus current liabilities.
- Net operating cycle** (also **cash conversion cycle**) An estimate of the average time that elapses between paying suppliers for materials and collecting cash from the subsequent sale of goods produced.
- Net operating profit less adjusted taxes (NOPLAT)** A company's operating profit with adjustments to normalize the effects of capital structure.
- Net present value (NPV)** For a project, the present value of the project inflows minus the present value of the project outflows.
- Net profit margin** The ratio of net income to revenues; indicates how much of each dollar of revenues is left after all costs and expenses.
- New-issue DRP** Dividend reinvestment plan in which the company meets the need for additional shares by issuing them instead of purchasing them.
- Nominal rate** A rate of interest based on the security's face value.
- Nonconventional cash flow** In a nonconventional cash flow pattern, the initial outflow is not followed by inflows only, but the cash flows can flip from positive (inflows) to negative (outflows) again (or even change signs several times).
- Number of days of inventory** The average length of time that inventory remains within the company.
- Number of days of payables** (also **average age of payables**) Estimate of the average number of days it takes the company to pay its own suppliers.
- Number of days of receivables** Estimate of the average number of days it takes to collect on credit accounts.
- Open-market DRP** Dividend reinvestment plan in which the company purchases shares in the open market to acquire the additional shares credited to plan participants.
- Operating breakeven point** The number of units produced and sold at which the company's operating profit is zero (revenues = operating costs).
- Operating cycle** A measure of the time needed to convert raw materials into cash from a sale; it consists of the number of days of inventory and the number of days of receivables.
- Operating profit margin** The ratio of operating income (i.e., income before interest and taxes) to revenues.
- Operating return on assets** The ratio of operating earnings to assets.
- Operating risk** The risk attributed to the operating cost structure, in particular the use of fixed costs in operations; the risk arising from the mix of fixed and variable costs; the risk that a company's operations may be severely affected by environmental, social, and governance risk factors.
- Operational risk** The risk of loss from failures in a company's systems and procedures or from external events.
- Opportunity cost** What a resource is worth in its next-best use.
- Optimal capital structure** The capital structure at which the value of the company is maximized.

- Ordinary terms** Credit terms that set forth expected payment in a standard format that denotes when payment is due and what discounts are available for early payment.
- Organic growth** Company growth in output or sales that is achieved by making investments internally (i.e., excludes growth achieved through mergers and acquisitions).
- Partnership** A business owned and operated by more than one individual.
- Passive strategy** In reference to short-term cash management, it is an investment strategy characterized by simple decision rules for making daily investments.
- Payment date** The day that the company actually mails out (or electronically transfers) a dividend payment.
- Payout** Cash dividends and the value of shares repurchased in any given year.
- Payout policy** A company's set of principles guiding payouts.
- Payout ratio** The percentage of total earnings paid out in dividends in any given year (in per-share terms, DPS/EPS).
- Pecking order theory** The theory that managers take into account how their actions might be interpreted by outsiders and thus order their preferences for various forms of corporate financing. Forms of financing that are least visible to outsiders (e.g., internally generated funds) are most preferable to managers and those that are most visible (e.g., equity) are least preferable.
- Per unit contribution margin** The amount that each unit sold contributes to covering fixed costs—that is, the difference between the price per unit and the variable cost per unit.
- Perfect capital markets** An assumption of the Modigliani and Merton model in which there are no transactions costs, no taxes, no bankruptcy costs, and everyone has the same information. In a perfect capital market, any two investments with identical cash flow streams and risk must trade for the same price.
- Pet projects** Projects in which influential managers want the corporation to invest. Often, unfortunately, pet projects are selected without undergoing normal capital budgeting analysis.
- Point of sale (POS)** Systems that capture transaction data at the physical location in which the sale is made.
- Poison pill** A pre-offer takeover defense mechanism that makes it prohibitively costly for an acquirer to take control of a target without the prior approval of the target's board of directors.
- Poison puts** A pre-offer takeover defense mechanism that gives target company bondholders the right to sell their bonds back to the target at a pre-specified redemption price, typically at or above par value; this defense increases the need for cash and raises the cost of the acquisition.
- Precautionary stocks** A level of inventory beyond anticipated needs that provides a cushion in the event that it takes longer to replenish inventory than expected or in the case of greater than expected demand.
- Pretax profit margin** A company's earnings before taxes expressed as a percentage of revenues.
- Priced risk** Risk for which investors demand compensation for bearing (e.g., equity risk, company-specific factors, macroeconomic factors).
- Price-setting option** The operational flexibility to adjust prices when demand varies from forecast. For example, when demand exceeds capacity, the company could benefit from the excess demand by increasing prices.
- Principal-agent problem.** See Agency problem.
- Production-flexibility** The operational flexibility to alter production when demand varies from forecast. For example, if demand is strong, a company may profit from employees working overtime or from adding additional shifts.
- Profitability ratios** Measure a company's ability to generate profitable sales from its resources (assets).
- Project sequencing** To defer the decision to invest in a future project until the outcome of some or all of a current project is known. Projects are sequenced through time, so that investing in a project creates the option to invest in future projects.
- Proxy fight** An attempt to take control of a company through a shareholder vote.
- Proxy statement** A public document that provides the material facts concerning matters on which shareholders will vote.

- Pull on liquidity** When disbursements are paid too quickly or trade credit availability is limited, requiring companies to expend funds before they receive funds from sales that could cover the liability.
- Pure-play method** A method for estimating the beta for a company or project; it requires using a comparable company's beta and adjusting it for financial leverage differences.
- Quick assets** Assets that can be most readily converted to cash (e.g., cash, short-term marketable investments, receivables).
- Quick ratio, or acid test ratio** A stringent measure of liquidity that indicates a company's ability to satisfy current liabilities with its most liquid assets.
- Receivables turnover** The ratio of total revenue to average accounts receivable.
- Reorganization** Agreements made by a company in bankruptcy under which a company's capital structure is altered and/or alternative arrangements are made for debt repayment; U.S. Chapter 11 bankruptcy. The company emerges from bankruptcy as a going concern.
- Reputational risk** The risk that a company will suffer an extended diminution in market value relative to other companies in the same industry due to a demonstrated lack of concern for environmental, social, and governance risk factors.
- Residual dividend policy** A dividend payout policy under which earnings in excess of the funds necessary to finance the equity portion of company's capital budget are paid out in dividends.
- Residual loss** Agency costs that are incurred despite adequate monitoring and bonding of management.
- Return on assets** The ratio of net income to assets; indicates a company's net profit generated per dollar invested in total assets.
- Return on common equity** The ratio of net income available to common shareholders to common shareholders' equity; the profit generated per dollar of common shareholders' investment.
- Return on equity (ROE)** The ratio of net income to shareholders' equity; represents the profit generated per dollar of shareholders' investment.
- Return on total capital** A profitability ratio calculated as EBIT divided by the sum of short- and long-term debt and equity.
- Reverse stock split** A reduction in the number of shares outstanding with a corresponding increase in share price, but no change to the company's underlying fundamentals.
- Revolving credit agreements** (also **revolvers**) The strongest form of short-term bank borrowing facilities; they are in effect for multiple years (e.g., 3–5 years) and may have optional medium-term loan features.
- Safety stock** A level of inventory beyond anticipated needs that provides a cushion in the event that it takes longer to replenish inventory than expected or in the case of greater than expected demand.
- Sales risk** Uncertainty with respect to the quantity of goods and services that a company is able to sell and the price it is able to achieve; the risk related to the uncertainty of revenues.
- Securities offering** A merger or acquisition in which target shareholders are to receive shares of the acquirer's common stock as compensation.
- Share repurchase or buyback** A transaction in which a company buys back its own shares. Unlike stock dividends and stock splits, share repurchases use corporate cash.
- Shark repellents** A pre-offer takeover defense mechanism involving the corporate charter (e.g., staggered boards of directors and supermajority provisions).
- Sole proprietorship** A business owned and operated by a single person.
- Solvency ratios** Measure a company's ability to meet long-term obligations. Subsets of these ratios are also known as "leverage" and "long-term debt" ratios.
- Sovereign yield spread** An estimate of the country spread (country equity premium) for a developing nation that is based on a comparison of bonds yields in country being analyzed and a developed country. The sovereign yield spread is the difference between a government bond yield in the country being analyzed, denominated in the currency of the developed country, and the Treasury bond yield on a similar maturity bond in the developed country.
- Spin-off** A form of restructuring in which shareholders of the parent company receive a proportional number of shares in a new, separate entity; shareholders end up owning stock in two different companies where there used to be one.

- Split-off** A form of restructuring in which shareholders of the parent company are given shares in a newly created entity in exchange for their shares of the parent company.
- Split-rate** In reference to corporate taxes, a split-rate system taxes earnings to be distributed as dividends at a different rate than earnings to be retained. Corporate profits distributed as dividends are taxed at a lower rate than those retained in the business.
- Static trade-off theory of capital structure** A theory pertaining to a company's optimal capital structure; the optimal level of debt is found at the point where additional debt would cause the costs of financial distress to increase by a greater amount than the benefit of the additional tax shield.
- Statutory merger** A merger in which one company ceases to exist as an identifiable entity and all its assets and liabilities become part of a purchasing company.
- Stock dividend** (also **bonus issue of shares**) A type of dividend in which a company distributes additional shares of its common stock to shareholders instead of cash.
- Stock purchase** An acquisition in which the acquirer gives the target company's shareholders some combination of cash and securities in exchange for shares of the target company's stock.
- Stock-out losses** Profits lost from not having sufficient inventory on hand to satisfy demand.
- Stretching payables** To postpone payment of payables.
- Subsidiary merger** A merger in which the company being purchased becomes a subsidiary of the purchaser.
- Sunk cost** A cost that has already been incurred.
- Survey approach** An estimate of the equity risk premium that is based upon estimates provided by a panel of finance experts.
- Sustainable growth rate** The rate of dividend (and earnings) growth that can be sustained over time for a given level of return on equity, keeping the capital structure constant and without issuing additional common stock.
- Takeover** A merger; the term may be applied to any transaction, but is often used in reference to hostile transactions.
- Takeover premium** The amount by which the takeover price for each share of stock must exceed the current stock price in order to entice shareholders to relinquish control of the company to an acquirer.
- Target balance** A minimum level of cash to be held available—estimated in advance and adjusted for known funds transfers, seasonality, or other factors.
- Target capital structure** A company's chosen proportions of debt and equity.
- Target company, or target** The company in a merger or acquisition that is being acquired.
- Target payout ratio** A strategic corporate goal representing the long-term proportion of earnings that the company intends to distribute to shareholders as dividends.
- Tender offer** A public offer whereby the acquirer invites target shareholders to submit ("tender") their shares in return for the proposed payment.
- Times-interest-earned ratio** *See* Interest coverage ratio.
- Total asset turnover** The ratio of revenues to total assets.
- Trade credit** A spontaneous form of credit in which a purchaser of the goods or service is financing its purchase by delaying the date on which payment is made.
- Trailing P/E** A calculation of the P/E ratio that uses earnings from previous periods as opposed to forecasted earnings.
- Transactions motive** In the context of inventory management, the need for inventory as part of the routine production–sales cycle.
- Treasury shares (treasury stock)** Shares that were issued and subsequently repurchased by the company.
- Trust receipt arrangement** The use of inventory as collateral for a loan. The inventory is segregated and held in trust, and the proceeds of any sale must be remitted to the lender immediately.
- Uncommitted lines of credit** A line of credit for which the bank reserves the right to refuse to honor any request for use of the line.
- Unlimited funds** An unlimited funds environment assumes that the company can raise the funds it wants for all profitable projects simply by paying the required rate of return.

Variable costs Costs that fluctuate with the level of production and sales.

Vertical common-size analysis The most common type of common-size analysis, in which the accounts in a given period are compared to a benchmark item in that same year.

Vertical merger A merger involving companies at different positions of the same production chain; for example, a supplier or a distributor.

Warehouse receipt arrangement The use of inventory as collateral for a loan; similar to a trust receipt arrangement except there is a third party (i.e., a warehouse company) that supervises the inventory.

Weighted average cost of capital (WACC) The required rate of return that investors demand for the average-risk investment of a company and the cost that a company incurs for additional capital. Found as the average of the company's component costs of capital, weighted by their proportions in the company's capital structure.

White knight A third party that is sought out by the target company's board to purchase the target in lieu of a hostile bidder.

White squire A third party that is sought out by the target company's board to purchase a substantial minority stake in the target—enough to block a hostile takeover without selling the entire company.

Winner's curse The tendency for the winner in certain competitive bidding situations to overpay, whether because of overestimation of intrinsic value, emotion, or information asymmetries.

Working capital The difference between current assets and current liabilities.

Working capital management Corporate finance activities that ensure a company has adequate ready access to the funds necessary for day-to-day operating expenses, while at the same time making sure that the company's assets are invested in the most productive way.

Working capital turnover A comparison of revenues with working capital to produce a measure that shows how efficiently working capital is employed.

Yield The actual return on a debt security if it is held to maturity.

Yield to maturity (YTM) The annual return that an investor earns on a bond if the investor purchases the bond today and holds it until maturity.

REFERENCES

- Amendments to Rules Governing the Investment Company Act of 1940, 17 CFR Part 270, July 2004.
- American Management Association. 1960. "Executive Committee Control Charts." *AMA Management Bulletin*, No. 6: 22.
- Anderson, Miranda, and David Gardiner. 2006. *Climate Risk and Energy in the Auto Sector: Guidance for Investors and Analysts on Key Off-Balance Sheet Drivers*. Thousand Oaks, CA: Ceres.
- Armitage, Seth. 2000. "The Direct Costs of UK Rights Issues and Open Offers." *European Financial Management*, Vol. 6, No. 1: 57–68.
- Baker, Malcolm, and Jeffrey Wurgler. 2004. "A Catering Theory of Dividends." *Journal of Finance*, Vol. 59, No. 3: 1125–1165.
- Bancel, Franck, and Usha Mittoo. 2004. "The Determinants of Capital Structure Choice: A Survey of European Firms." *Financial Management*, Vol. 44, No. 4.
- Bauer, Rod, and Nadja Guenster. 2003. "Good Corporate Governance Pays Off!: Well-Governed Companies Perform Better on the Stock Market." Working paper.
- Blume, Marshall. 1971. "On the Assessment of Risk." *Journal of Finance*, Vol. 26, No. 1: 1–10.
- Brav, Alon, John Graham, Campbell Harvey, and Roni Michaely. 2005. "Payout Policy in the 21st Century." *Journal of Financial Economics*, Vol. 77, No. 3: 483–527.
- Brealey, Richard, Stewart Myers, and Alan Marcus. 2007. *Fundamentals of Corporate Finance*. New York: McGraw-Hill Irwin.
- Brounen, Dirk, Abe de Jong, and Kees Koedijk. 2004. "Corporate Finance in Europe: Confronting Theory with Practice." *Financial Management*, Vol. 33, No. 4: 71–101.
- Brown, Lawrence D., and Marcus Caylor. 2004. "Corporate Governance Study: The Correlation Between Corporate Governance and Company Performance." Institutional Shareholder Services. www.tkyd.org/files/downloads/corporate_governance_study_104.pdf (accessed February 1, 2008).
- Bruner, Robert F. 2005. *Deals from Hell: M&A Lessons That Rise above the Ashes*. Hoboken, NJ: John Wiley & Sons.
- Bruner, Robert F., Robert M. Conroy, Wei Li, Elizabeth O'Halloran, and Miquel Palacios Lleras. 2003. *Investing in Emerging Markets*. Charlottesville, VA: AIMR Research Foundation.
- Bühner, Thomas, and Christoph Kaserer. 2002. "External Financing Costs and Economies of Scale in Investment Banking: The Case of Seasoned Equity Offerings in Germany." *European Financial Management*, Vol. 9, No. 2: 249–253.
- Chance, Don M. 2003. *Analysis of Derivatives for the CFA Program*. Charlottesville, VA: Association for Investment Management and Research.
- Chetty, Raj, and Emmanuel Saez. 2004. "Do Dividends Respond to Taxes? Preliminary Evidence from the 2003 Dividend Tax Cut." National Bureau of Economic Research, working paper 10572.
- Claessens, Stijn, Simeon Djankov, and Titiana Nenova. 2001. "Corporate Risk around the World." In *Financial Crises in Emerging Markets*. Reuven Glick, Ramon Moreno, and Mark Spiegel, editors. New York: Cambridge University Press.
- Copeland, Thomas E., J. Fred Weston, and Kuldeep Shastri. 2005. *Financial Theory and Corporate Policy*, 4th edition. Old Tappan, NJ: Pearson/Addison Wesley.
- Copeland, Tom, Tim Koller, and Jack Murrin. 2000. *Valuation: Measuring and Managing the Value of Companies*, 3rd edition. New York: John Wiley & Sons.

- Cornell, Bradford. 2009. "Stock Repurchases and Dividends: Trade-Offs and Trends." *Dividends and Dividend Policy*. H. Kent Baker, editor. Hoboken, NJ: John Wiley & Sons.
- Corporate Governance of Listed Companies: A Manual for Investors, The*. 2005. Charlottesville, VA: CFA Institute Centre for Financial Market Integrity.
- Damodaran, Aswath. 1999. "Estimating Equity Risk Premiums." New York University working paper.
- Damodaran, Aswath. 2001. *Corporate Finance*. New York: John Wiley & Sons.
- Damodaran, Aswath. 2003. "Measuring Company Exposure to Country Risk: Theory and Practice." New York University working paper.
- Daves, Phillip R., Michael C. Ehrhardt, and Robert A. Kunkel. 2000. "Estimating Systematic Risk: The Choice of Return Interval and Estimation Period." *Journal of Financial and Strategic Decisions*, Vol. 13, No. 1: 7–13.
- DeAngelo, Harry, Linda DeAngelo, and Douglas Skinner. 1986. "Reversal of Fortune: Dividend Signals and the Disappearance of Sustained Earnings Growth." *Journal of Financial Economics*, Vol. 40, No. 3: 341–371.
- DeAngelo, Harry, Linda DeAngelo, and Douglas Skinner. 2004. "Are Dividends Disappearing? Dividend Concentration and the Consolidation of Earnings." *Journal of Financial Economics*, Vol. 72, No. 3: 425–456.
- Demirguc-Kunt, Asli, and Voljislav Maksimovic. 1998. "Law, Finance, and Company Growth." *Journal of Finance*, Vol. 53, No. 6: 2107–2137.
- Demirguc-Kunt, Asli and Voljislav Maksimovic. 1999. "Institutions, Financial Markets, and Company Debt Maturity." *Journal of Financial Economics*, Vol. 54, No. 3: 295–336.
- Dimson, Elroy, Paul Marsh, and Mike Staunton. 2003. "Global Evidence on the Equity Risk Premium." *Journal of Applied Corporate Finance* (Fall): 27–38.
- Domowitz, Ian, Jack Glen, and Ananth Madhavan. 2000. "International Evidence on Aggregate Corporate Financing Decisions." Pennsylvania State University working paper.
- Edmondson, Gail. 2004. "How Parmalat Went Sour." *BusinessWeek* (July 12).
- Edwards, Edgar O., and Philip W. Bell. 1961. *The Theory and Measurement of Business Income*. Berkeley: University of California Press.
- Elton, Edward, and Martin Gruber. 1970. "Marginal Tax Rates and the Clientele Effect." *Review of Economics and Statistics*, Vol. 52, No. 1: 68–74.
- Erb, Claude, Campbell R. Harvey, and Tadas Viskanta. 1996. "Expected Returns and Volatility in 135 Countries." *Journal of Portfolio Management*.
- Ezzell, John R., and R. Burr Porter. 1976. "Flotation Costs and the Weighted Average Cost of Capital." *Journal of Financial and Quantitative Analysis*, Vol. 11, No. 3: 403–413.
- Fabozzi, Frank. 2004. *Fixed Income Analysis for the Chartered Financial Analyst[®] Program*, 2nd edition. Charlottesville, VA: CFA Institute.
- Fama, Eugene, and Kenneth French. 1992. "The Cross-Section of Expected Stock Returns." *Journal of Finance*, Vol. 47, No. 2: 427–465.
- Fama, Eugene, and Kenneth French. 2001. "Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay?" *Journal of Financial Economics*, Vol. 60, No. 1: 3–43.
- Fama, Eugene, and Kenneth French. 2004. "The Capital Asset Pricing Model: Theory and Evidence." *Journal of Economic Perspectives*, Vol. 18, No. 3: 25–46.
- Fan, J. P. H., Sheridan Titman, and Garry J. Twite. 2004. "An International Comparison of Capital Structure and Debt Maturity Choices." European Finance Association 2003 Annual Conference Paper No. 769.
- Ferris, Stephen, Narayanan Jayaraman, and Sanjiv Sabherwal. 2009. "Catering Effects in Corporate Dividend Policy: The International Evidence." *Journal of Banking and Finance*, Vol. 33, No. 9: 1730–1738.
- Ferris, Stephen, Nilanjan Sen, and Emre Unlu. 2009. "An International Analysis of Dividend Payment Behavior." *Journal of Business Finance & Accounting*, Vol. 36, Nos. 3–4: 496–522.
- Filbeck, Greg. 2009. "Asymmetric Information and Signaling Theory." *Dividends and Dividend Policy*. H. Kent Baker, editor. Hoboken, NJ: John Wiley & Sons.

- Fisher, Irving. 1930. *The Theory of Interest*. New York: Macmillan.
- Gaughan, Patrick A. 2002. *Mergers, Acquisitions, and Corporate Restructurings*, 3rd edition. Hoboken, NJ: John Wiley & Sons.
- Gill, Amar. 2001. "Corporate Governance in Emerging Markets—Saints and Sinners: Who's Got Religion?" CLSA Emerging Markets, *CG Watch* research report (April).
- Gitman, Lawrence, and V. Mercurio. 1982. "Cost of Capital Techniques Used by Major U.S. Firms: Survey and Analysis of Fortune's 1000." *Financial Management*, Vol. 14, No. 4.
- Glader, Paul, Eleanor Laise, and E. S. Browning. 2009. "GE Joins Parade of Deep Dividend Cuts." *Wall Street Journal* (28 February 2009): A1.
- Gompers, Paul A., Joy L. Ishii, and Andrew Metrick. 2003. "Corporate Governance and Equity Prices." *Quarterly Journal of Economics*, Vol. 118, No. 1: 107–155.
- Gordon, Myron J. 1962. *The Investment, Financing, and Valuation of the Corporation*. Homewood, IL: Irwin.
- Gordon, Myron. 1963. "Optimal Investment and Financing Policy." *Journal of Finance*, Vol. 18, No. 2: 264–272.
- Grace, Kerry, and Rob Curran. 2009. "Stock Buybacks Plummet." *Wall Street Journal* (27 March 2009): C9.
- Graham, Benjamin, and David L. Dodd. 1934. *Security Analysis*. New York: McGraw-Hill.
- Graham, Benjamin, David Dodd, Sidney Cottle, and Charles Tatham. 1962. *Security Analysis*, 4th edition. New York: McGraw-Hill.
- Graham, John, and Campbell Harvey. 2001. "The Theory and Practice of Corporate Finance: Evidence from the Field." *Journal of Financial Economics*, Vol. 60, Nos. 2–3: 187–243.
- Graham, John, and Campbell Harvey. 2002. "How Do CFOs Make Capital Budgeting and Capital Structure Decisions?" *Journal of Applied Corporate Finance*, Vol. 15, No. 1: 8–22.
- Grinblatt, Mark, Ronald Masulis, and Sheridan Titman. 1984. "The Valuation Effects of Stock Splits and Stock Dividends." *Journal of Financial Economics*, Vol. 13, No. 4: 461–490.
- Grullon, Gustavo, and Roni Michaely. 2002. "Dividends, Share Repurchases, and the Substitution Hypothesis." *Journal of Finance*, Vol. 57, No. 4: 1649–1684.
- Hall, Martin. 2003. "A/R Outsourcing: Coming of Age in the New Millennium." *Business Credit* (February): 1–2.
- Hamada, Robert. 1972. "The Effect of the Firm's Capital Structure on the Systematic Risk of Common Stocks." *Journal of Finance*, Vol. 27, No. 2: 435–452.
- Hansen, Robert, Raman Kumar, and Dilip Shome. 1994. "Dividend Policy and Corporate Monitoring: Evidence from the Regulated Electric Utility Industry." *Financial Management*, Vol. 23, No. 1: 16–22.
- Harvey, Campbell R. 2001. "The International Cost of Capital and Risk Calculator." Duke University working paper.
- Harvey, Campbell R., Karl V. Lins, and Andrew H. Roper. 2004. "The Effect of Capital Structure When Expected Agency Costs Are Extreme." *Journal of Financial Economics*, Vol. 74, No. 1: 3–30.
- He, Wei. 2009. "Dividend Reinvestment Plans." In *Dividends and Dividend Policy*. H. Kent Baker, editor. Hoboken, NJ: John Wiley & Sons.
- Healy, P., and K. Palepu. 1988. "Earnings Information Conveyed by Dividend Initiations and Omissions." *Journal of Financial Economics*, Vol. 21, No. 2: 149–175.
- Hirshleifer, Jack. 1958. "On the Theory of Optimal Investment Decisions." *Journal of Political Economy*, Vol. 66, No. 4: 329–352.
- Ibbotson, Roger G., Paul D. Kaplan, and James D. Peterson. 1997. "Estimates of Small Stock Betas Are Much Too Low." *Journal of Portfolio Management*, Vol. 23, No. 4: 104–111.
- Jensen, Michael C. 1969. "The Performance of Mutual Funds in the Period 1945–1964." *Journal of Finance*. Vol. 23, No. 2: 389–416.
- Jensen, Michael C. 1986. "Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers." *American Economic Review*, Vol. 76, No. 2: 323–329.
- Jensen, Michael C., and William H. Meckling. 1976. "Theory of the Company: Managerial Behavior, Agency Costs, and Ownership Structure." *Journal of Financial Economics*, Vol. 3, No. 4: 305–360.

- Kaserer, Christoph, and Fabian Steiner. 2004. "The Cost of Raising Capital—New Evidence from Seasoned Equity Offerings in Switzerland." Technische Universität München working paper (February).
- Koller, T., M. Goedhart, and D. Wessels. 2005. *Valuation: Measuring and Managing the Value of Companies*, 4th edition. Hoboken, NJ: John Wiley & Sons.
- Lease, Ronald, Kose John, Avner Kalay, Uri Loewenstein, and Oded Sarig. 2000. *Dividend Policy: Its Impact on Firm Value*. Boston, MA: Harvard Business School Press.
- Lee, Inmoo, Scott Lochhead, Jay R. Ritter, and Quanshui Zhao. 1996. "The Costs of Raising Capital." *Journal of Financial Research*, Vol. 19, No. 1: 59–74.
- Lintner, John. 1956. "Distribution of Incomes of Corporations among Dividends, Retained Earnings, and Taxes." *American Economic Review*, Vol. 46: 97–113.
- Lintner, John. 1962. "Dividends, Earnings, Leverage, Stock Prices and the Supply of Capital to Corporations." *Review of Economics and Statistics*, Vol. 44, No. 3: 243–269.
- Madden, Ian. 2008. "High Dividend Stocks: Proceed with Caution." www.kbcam.com/newsandpressdivplus.jsp.
- Maremont, Mark, and Laurie Cohen. 2002. "How Tyco's CEO Enriched Himself." *The Wall Street Journal* (August 7).
- Mariscal, Jorge O., and Rafaelina M. Lee. 1993. "The Valuation of Mexican Stocks: An Extension of the Capital Asset Pricing Model." New York: Goldman Sachs.
- Markon, Jerry, and Robert Frank. 2002. "Five Adelphia Officials Arrested on Fraud Charges." *Wall Street Journal* (July 25): A3.
- Marshall, Alfred. 1892. *Elements of Economics of Industry*, Book 2, Chapter 12, Sections 3 and 4. New York: Macmillan.
- Materiality of Social, Environmental and Corporate Governance Issues to Equity Pricing: 11 Sector Studies by Brokerage House Analysts*. 2004. New York: United Nations Environmental Programme Finance Initiative (UNEP FI), Asset Management Working Group.
- Meggison, William J. 1997. *Corporate Finance Theory*. Reading, MA: Addison-Wesley.
- Mian, Shehzad L., and Clifford W. Smith. 1992. "Accounts Receivable Management Policy: Theory and Evidence." *Journal of Finance*, Vol. 47, No. 1: 169–200.
- Miles, James A. and John R. Ezzell. 1980. "The Weighted Average Cost of Capital, Perfect Capital Markets, and Project Life: A Clarification." *Journal of Financial and Quantitative Analysis*, Vol. 15, No. 3: 719–730.
- Miller, Merton H. 1977. "Debt and Taxes." *Journal of Finance*, Vol. 32, No. 2: 261–275.
- Miller, Merton H., and Franco Modigliani. 1961. "Dividend Policy, Growth, and the Valuation of Shares." *Journal of Business*, Vol. 34, No. 4: 411–433.
- Modigliani, Franco, and Merton H. Miller. 1958. "The Cost of Capital, Corporation Finance, and the Theory of Investment." *American Economic Review*, Vol. 48, No. 3: 261–297.
- Modigliani, Franco, and Merton H. Miller. 1963. "Corporate Income Taxes and the Cost of Capital: A Correction." *American Economic Review*, Vol. 54, No. 3: 433–443.
- Mukherjee, Tarun. 2009. "Agency Costs and the Free Cash Flow Hypothesis." *Dividends and Dividend Policy*. H. Kent Baker, editor. Hoboken, NJ: John Wiley & Sons.
- Myers, Stewart, and Nicholas Majluf. 1984. "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have." *Journal of Financial Economics*, Vol. 13, No. 2: 187–221.
- New York Society of Securities Analysts. 2003. *Corporate Governance Handbook*. New York City.
- Nofsinger, John, and Kenneth Kim. 2003. *Infectious Greed*. Upper Saddle River, NJ: Prentice-Hall Financial Times.
- Oded, Jacob, and Allen Michel. 2008. "Stock Repurchases and the EPS Enhancement Fallacy." *Financial Analysts Journal*, Vol. 64, No. 4: 62–75.
- Parrino, Robert, and David Kidwell. 2009. *Fundamentals of Corporate Finance*. Hoboken, NJ: John Wiley & Sons.

- Peterson, Pamela P., and David R. Peterson. 1996. *Company Performance and Measures of Value Added*. Charlottesville, VA: The Research Foundation of the ICFA.
- Pinto, Jerald E., Elaine Henry, Thomas R. Robinson, and John D. Stowe. 2010. *Equity Asset Valuation*, 2nd edition. Hoboken, NJ: John Wiley & Sons.
- Powers, William C., Jr., Raymond S. Troubh, and Herbert S. Winokur, Jr. 2002. Report of Investigation by the Special Investigative Committee of the Board of Directors of Enron Corp. (February 1). Collingdale, PA: Diane Pub. Co.
- Rajan, Raghuram G., and Luigi Zingales. 1995. "What Do We Know about Capital Structure? Some Evidence from International Data." *Journal of Finance*, Vol. 50, No. 5: 1421–1460.
- Reilly, Frank, and Keith Brown. 2003. *Investment Analysis and Portfolio Management*, 7th edition. Mason, OH: South-Western.
- Roll, Richard. 1986. "The Hubris Hypothesis on Corporate Takeovers." *Journal of Business*, Vol. 59, No. 2: 176–216.
- Ross, Stephen. 1977. "The Determination of Financial Structure: The Incentive-Signaling Approach." *Bell Journal of Economics*, Vol. 8, No. 1: 23–40.
- Sabri, Nidal Rashid. 2003. "Using Treasury 'Repurchase' Shares to Stabilize Stock Markets." *International Journal of Business*, Vol. 8, No. 4.
- Sears, Steven M. 2009. "The Fortunes of Reversals." *Barron's* (3 August): M10.
- Shefrin, Hersh, and Meir Statman. 1984. "Explaining Investor Preference for Cash Dividends." *Journal of Financial Economics*, Vol. 13, No. 2: 253–282.
- Siegel, Jeremy J. 2005. "Perspectives on the Equity Risk Premium." *Financial Analysts Journal*, Vol. 61, No. 6: 61–73.
- Smith, Clifford, Jr., and Jerold Warner. 1979. "On Financial Contracting: An Analysis of Bond Covenants." *Journal of Financial Economics*, Vol. 7, No. 2: 117–161.
- Solnik, Bruno, and Dennis McLeavey. 2004. *International Investments*, 5th edition. Reading, MA: Addison-Wesley.
- Stewart, G. Bennett. 1991. *The Quest for Value*. New York: HarperCollins.
- Thomas, Landon, Jr. 2004a. "Regulators Said to Be Focusing on Board's Vote for Grasso Pay." *The New York Times* (March 26).
- Thomas, Landon, Jr. 2004b. "Saying Grasso Duped Big Board, Suit Seeks Return of \$100 Million." *New York Times* (May 25).
- Vermaelen, Theo. 2005. *Share Repurchases*. Hanover, MA: Now Publishers.
- Von Eije, Henk, and William L. Megginson. 2008. "Dividends and Share Repurchases in the European Union." *Journal of Financial Economics*, Vol. 89, No. 2: 347–374.
- Weston, J. Fred, and Samuel C. Weaver. 2001. *Mergers & Acquisitions*. New York: McGraw-Hill.
- Weston, J. Fred, Kwang S. Chung, and Susan E. Hoag. 1990. *Mergers, Restructuring, and Corporate Control*. Upper Saddle River, NJ: Prentice-Hall.
- White, Gerald I., Ashwinpaul C. Sondhi, and Dov Fried. 2003. *The Analysis and Use of Financial Statements*, 3rd edition. Hoboken, NJ: John Wiley & Sons.

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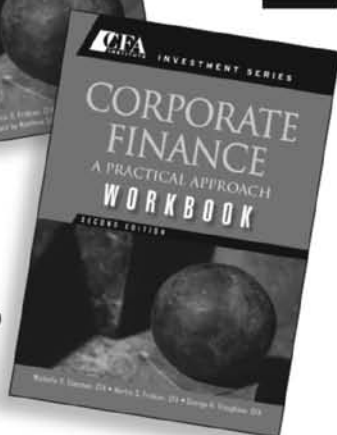
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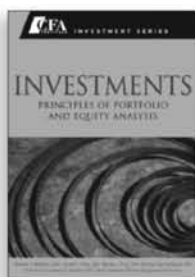
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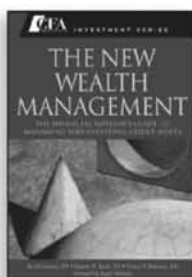
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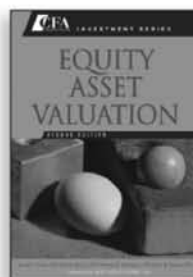
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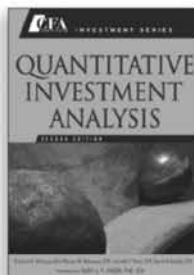
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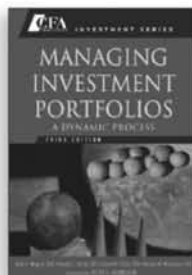
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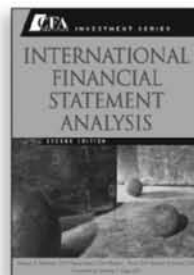
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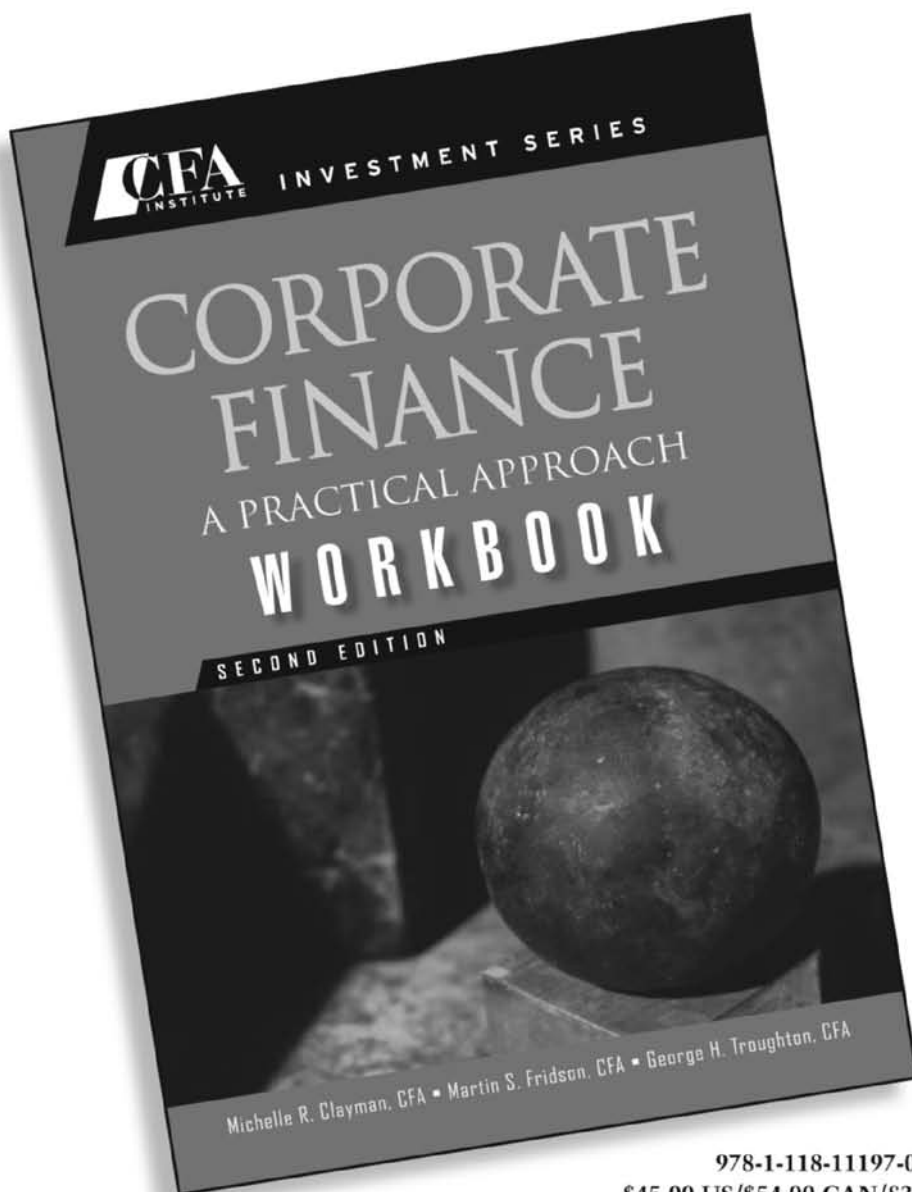


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