preferred shares, as any dividends missed must be paid before a common stock dividend can be paid.

LOS 42.f

Equity securities provide funds to the firm to buy productive assets, to buy other companies, or to offer to employees as compensation. Equity securities provide liquidity that may be important when the firm must raise additional funds.

LOS 42.g

The book value of equity is the difference between the financial statement value of the firm's assets and liabilities. Positive retained earnings increase the book value of equity. Book values reflect the firm's past operating and financing choices.

The market value of equity is the share price multiplied by the number of shares outstanding. Market value reflects investors' expectations about the timing, amount, and risk of the firm's future cash flows.

LOS 42.h

The accounting return on equity (ROE) is calculated as the firm's net income divided by the book value of common equity. ROE measures whether management is generating a return on common equity but is affected by the firm's accounting methods.

The firm's cost of equity is the minimum rate of return that investors in the firm's equity require. Investors' required rates of return are reflected in the market prices of the firm's shares.

ANSWER KEY FOR MODULE QUIZZES

Module Quiz 42.1

1. **B** Participating preferred shares can receive extra dividends if firm profits exceed a pre-specified level and a value greater than the par value if the firm is liquidated. (LOS 42.a)

2. **A** Cumulative voting allows minority shareholders to gain representation on the board because they can use all of their votes for specific board members. (LOS 42.b)

3. **C** Private equity has less liquidity because no public market for it exists. The lower liquidity of private equity would increase required returns. (LOS 42.c)

Module Quiz 42.2

1. **C** Global Depository Receipts are not listed on U.S. exchanges and are most often denominated in U.S. dollars. They are not issued in the United States. (LOS 42.d)

2. **B** Callable shares are the most risky because if the market price rises, the firm can call in the shares, limiting the investor's potential gains. Putable shares are the least risky because if the market price drops, the investor can put the shares back

to the firm at a predetermined price. The risk of non-putable, non-callable shares falls in between. (LOS 42.e)

3. **A** The primary goal of firm management is to increase the book value of equity. It increases when retained earnings are positive. The *market* value of equity reflects the collective expectations of investors about the firm's future performance. (LOS 42.g)

4. **B** Net income increasing at a faster rate than book value of equity generally would be a positive sign. If a firm issues debt to repurchase equity, this decreases the book value of equity and increases the ROE. However, now the firm becomes riskier due to the increased debt. Net income decreasing at a slower rate than book value of equity would increase ROE, but decreasing net income is not a positive sign. (LOS 42.h)

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[1] Ryan C. Fuhrmann, CFA, and Asjeet S. Lamba, CFA, *Overview of Equity Securities*, CFA Program Level I 2024 Curriculum, Volume 3 (CFA Institute, 2023).

READING 43

COMPANY ANALYSIS: PAST AND PRESENT

MODULE 43.1: COMPANY RESEARCH REPORTS

▶

Video covering this content is available online.

LOS 43.a: Describe the elements that should be covered in a thorough company research report.

A **company research report** includes an analyst's valuation and investment recommendations, based on the company's projected earnings, cash flows, and financial position.

An initial research report for external distribution (said to be "initiating coverage" of a company) is likely to be thorough, followed by subsequent reports that are less thorough. These may focus on more specific topics or serve as updates to previously issued reports. A research report that is only for internal distribution is likely to be less thorough and may even be provided verbally.

Key items typically included in an initial company research report are as follows:

- Front matter (e.g., issuer name, buy/hold/sell recommendation, target buy/sell prices, and legal disclosures)
- Rationales for the recommendation
- Company description (e.g., business model, strategy)
- Industry overview and competitive positioning (e.g., industry size, growth rate and main drivers, profitability, competitive analysis)
- Financial analysis and model (e.g., past and pro forma financial statements; analysis and projection of revenue, cost, and cash flow drivers and sources and uses of capital)
- Valuation (e.g., value vs. target price, using either or both of relative and present value methodologies)
- Environmental, social, and governance factors
- Key upside and downside risks and their valuation impact

Key items typically included in a subsequent company research report are as follows:

- Front matter
- Recommendation, including rationales for changes
- Analysis of new information (e.g., variance analysis of expected vs. actual results; updated financial statements)
- Changes to the initial valuation with supporting rationales
- Changes in risks since the initial or most recent report

LOS 43.b: Determine a company's business model.

A company's **business model** will highlight the key drivers that ultimately affect its income statement and balance sheet. The business model is the foundation for determining the analyst's expectations.

The business model considers the following items that describe its operations: (1) products and services, (2) customers, (3) sales channels, (4) pricing and payment terms, and (5) suppliers and other key relationships. Analysts should inquire into what and to whom the company is selling, its methods of obtaining customers, its methods of distributing its products or providing its services, its price setting, and its key supplier relationships. They should also analyze the bargaining power of customers (e.g., few or many customers) and the bargaining power of suppliers (e.g., specialized or common inputs). If a company uses a traditional business model, an analyst should highlight any ways this specific company's model differs from those used by its peers.

Analysts use four general types of information to determine a company's business model:

1. Information directly from the company (e.g., annual or quarterly regulatory filings, investor presentations, press releases, investor relations department, website)
2. Publicly available third-party information (e.g., analyst reports, government research and reports, news outlets, social media)
3. Proprietary third-party information (e.g., analyst reports, Bloomberg)
4. Proprietary primary research, performed or commissioned by the analyst (e.g., surveys, market studies)

MODULE QUIZ 43.1

1. Which of the following statements regarding company research reports subsequent to initiating coverage is *most accurate*?
   A. The report updates the recommendation in light of new information about the company.
   B. The primary audience is those who are not already knowledgeable about the company or security.
   C. The report provides information such as industry overview, competitive positioning, and ESG considerations.

2. Reports and data from Bloomberg are *best* considered to be:
   A. public third-party sources.
   B. proprietary primary research.

C. proprietary third-party sources.

MODULE 43.2: REVENUE, PROFITABILITY, AND CAPITAL

LOS 43.c: Evaluate a company's revenue and revenue drivers, including pricing power.

Revenue Drivers

After analyzing a company's business model, and before financial forecasting that leads to an eventual valuation of a company, an analyst must examine the company's past and current financial statements. Financial statement analysis most commonly begins with the income statement—specifically, revenues. The focus is on **revenue drivers**, which can be analyzed on a bottom-up or top-down basis. In a bottom-up analysis, revenue is broken down into specific drivers such as price and volume, business segments, or geography. In a top-down analysis, macroeconomic variables such as market share or GDP growth serve as drivers of revenue. Analysts often use both approaches to evaluate a company.

Pricing Power

Revenues are driven by prices, and prices are limited by the company's **pricing power**, the extent to which a company can determine its selling prices without hurting sales. Recall from Economics that pricing power depends on the market structure of an industry, as well as the company's competitive position in the market.

Highly competitive markets are characterized by companies that sell virtually identical items. In such cases, companies have low pricing power, and the price is determined by supply and demand. This means that all participants are price takers (will sell at the market price). In the long run, price-taker markets usually result in returns being close to the cost of capital, so there is zero economic profit. One notable exception is a **low-cost producer**. A company that has significantly lower costs than its competitors may earn returns exceeding the cost of capital, but to sustain such profits in the long run would require the company to maintain its cost advantage permanently.

Highly competitive markets are also characterized as follows: absence of product differentiation, many substitutes, few or no barriers to entry, little or no brand loyalty, and low or no switching costs. **Commoditization** describes an industry that is evolving toward this state as more participants enter the market. In a commoditizing industry, participants tend to innovate less and imitate each other more.

Less competitive markets (monopoly, oligopoly, monopolistic competition) are characterized by greater product differentiation, few or no substitutes, high barriers to entry, high customer loyalty, and high switching costs. In such markets, companies may have some or considerable pricing power, which allows for price increases without

significant declines in sales. Strategies such as value-based pricing and price discrimination require a company to have pricing power.

Profit margins can be an indicator of pricing power. When prices rise more than costs over time, this demonstrates the ability of a company to transfer those costs to its customers through higher prices without losing sales. This is more likely in a market that exhibits high switching costs or for a product that does not have good substitutes.

Macro Factors

A top-down approach considers how external (macro) factors affect revenue, including market size and the company's market share. **Market size** refers to the total revenue of all the companies in the market. **Market share** is the ratio of the company's revenue to the market size. Tracking market share over time provides insights as to how favorably the company is viewed by customers.

Computing market size can be problematic. For example, should it include only sales of identical products, or should it include sales of similar or substitute products? Analysts typically include identical and similar products but exclude substitute products, but that is not always appropriate.

LOS 43.d: Evaluate a company's operating profitability and working capital using key measures.

Operating Costs

Company financial statements reflect three types of costs: operating costs, investing costs (e.g., purchase of capital and intangible assets), and financing costs (e.g., interest expense). Here we focus on operating costs, which are those a company incurs in generating current period revenue. An analyst might not necessarily regard a company's costs the same way IFRS and U.S. GAAP treat them. For example, research and development costs would logically be considered investing costs, but the accounting standards treat them as operating costs.

Operating costs are driven by business model and company size. We can categorize operating costs in the following three ways:

- By their relationship with output (fixed or variable)
- By nature (e.g., work in process, utilities, promotion)
- By function (e.g., selling, advertising, travel, income tax)

Analyzing Costs by Relationship With Output

We can state operating profit in terms of fixed and variable costs, as follows:

$$\text{operating profit} = [Q \times (P - VC)] - FC$$

where:
Q = number of units sold
P = price per unit
VC = variable costs per unit, those that change with the level of output
    (e.g., materials, direct labor)
FC = fixed costs in total, those that do not change within a specific range of
    output (e.g., rent, management salaries)

The term (P – VC) in this equation is known as the **contribution margin (CM)** per unit. A company will earn profits when the CM per unit is positive and Q is large enough that the total contribution margin is greater than fixed costs.

Operating leverage results from the fixed portion of a company's operating costs. The larger the proportion of a company's costs that are fixed, the more rapidly operating profits will increase with a given increase in quantity sold (and the faster they will decrease with a given decrease in quantity). We can express operating leverage using a metric called **degree of operating leverage (DOL)**:

$$\text{DOL} = \%\Delta \text{ operating profit} / \%\Delta \text{ sales}$$

Analyzing Costs by Nature or Function

In looking at costs from an accounting perspective, a functional classification is usually the norm. The result is consistency among companies in how they present income statement line items that refer to specific functions (e.g., "cost of sales" and "selling, general, and administrative").

Common metrics used for operating profitability include gross profit; earnings before interest, taxes, depreciation, and amortization (EBITDA); and earnings before interest and taxes (EBIT). EBIT is often referred to as operating profit.

- Gross profit = revenue – cost of sales
- EBITDA = gross profit – operating expenses
- EBIT = EBITDA – depreciation and amortization

We may divide each of these measures by revenue to produce the ratios gross margin, EBITDA margin, and EBIT margin (or operating margin).

Although functional cost classifications are not the same as classifying based on fixed and variable costs, the concepts overlap. For many companies the cost of sales is highly variable, so that gross margin and contribution margin are often similar amounts. Many operating expenses reported as separate line items on the income statement, such as rent, promotion, and management salaries, are mainly fixed in nature.

Operating costs are largely driven by the level of output. That is obvious for variable costs, but it is also true in the long run for fixed costs because increases in output eventually require cash outlays such as the purchase of more productive equipment.

Because companies within a particular industry earn the same types of revenues and incur similar input costs, it is competition among the companies that determines industry profitability. For example, in a highly competitive industry, if one company decreases its prices, then other companies are likely to follow. The end result may be

reduced industry profitability. Analysts should consider individual company profitability in the context of overall industry profitability.

Economies of scale occur when increasing output decreases unit costs. The basic idea is that the company's fixed costs are being allocated over a greater amount of output. However, even a company with a high proportion of variable costs can experience economies of scale if it becomes large enough to exert greater bargaining power over its suppliers and reduce its variable costs over time.

Economies of scope occur when adding divisions or product lines results in decreasing unit costs. This can result if multiple divisions or product lines share costs and reduce redundancies. For example, each division would need its own human resources department if it were a stand-alone company, but as divisions of a larger firm they can use the same human resources department.

Working Capital

Recall from Corporate Issuers that analysts can evaluate a company's working capital management in terms of its cash conversion cycle. The longer the cash conversion cycle, the more need a company has to finance working capital.

Another key measure is the ratio of net working capital to sales. When net working capital is positive, the company can finance its working capital needs from internal sources. When net working capital is negative, financing is being provided by external sources (e.g., suppliers).

LOS 43.e: Evaluate a company's capital investments and capital structure.

A company's sources of capital include cash flows from operations, proceeds from debt and share issuances, and proceeds from asset sales. Uses of capital include liquidity in the form of cash and marketable securities; purchases of tangible and intangible assets; debt repayment; dividend payments; and share repurchases.

Evaluating a company's capital investments involves determining whether the company has earned at least the required rate of return in the long run, and therefore created economic value from the investors' capital. Evaluating its capital structure involves determining whether its opportunities exceed the risks.

In assessing capital structure risks, analysts use measures such as leverage ratios, coverage ratios, and the **degree of financial leverage (DFL)**.

$$DFL = \%\Delta \text{ net income} / \%\Delta \text{ operating income}$$

DFL increases when a company adds fixed interest expense by borrowing.

Unlevered returns are expressed as return on assets (ROA) or return on invested capital (ROIC). Financial leverage is reflected in return on equity (ROE). Recall from Financial Statement Analysis that ROE can be decomposed using DuPont analysis to highlight the factors that affect it, including financial leverage.

MODULE QUIZ 43.2

1. A pet food company earned $500 million in revenue in the current year. Based on an estimated market share of 10%, what is the market size for pet food?
   A. $50.0 million.
   B. $4.5 billion.
   C. $5.0 billion.

2. Jayco, Inc., sells 10,000 units at a price of $5 per unit. Jayco's fixed costs are $8,000, interest expense is $2,000, variable costs are $3 per unit, and EBIT is $12,000. Disregarding taxes, the degree of operating leverage (DOL) and degree of financial leverage (DFL) are *closest* to:
   A. 2.50 DOL and 1.00 DFL.
   B. 1.67 DOL and 2.00 DFL.
   C. 1.67 DOL and 1.20 DFL.

KEY CONCEPTS

LOS 43.a

Key items typically included in an initial company research report are as follows:

- Front matter
- Recommendation, including rationales behind the recommendation
- Company description
- Industry overview and competitive positioning
- Financial analysis
- Valuation
- ESG factors
- Risks and their valuation impact

Key items typically included in a subsequent company research report are as follows:

- Front matter
- Changes in recommendation with rationales
- Analysis of new information
- Changes in valuation and risks

LOS 43.b

A business model considers a company's products and services, customers, sales channels, pricing and payment terms, and reliance on key suppliers.

LOS 43.c

Revenue drivers can be analyzed bottom-up based on financial statements or top-down based on economic and industry factors.

Pricing power is a function of market structure and a company's competitive position in the market. Companies in highly competitive markets have low pricing power. Pricing power for companies in less competitive markets may result from greater

product differentiation, lack of good substitutes, high barriers to entry, high customer loyalty, and high switching costs.

Operating profit = [Q × (P − VC)] − FC

Contribution margin per unit = (P − VC)

Degree of operating leverage = %Δ operating profit / %Δ sales

Economies of scale occur when increases in output decrease unit costs. Economies of scope occur adding divisions or product lines decreases unit costs.

A long (short) conversion cycle indicates greater (less) need for external financing.

In assessing capital structure risks, the degree of financial leverage (DFL) is often used.

$$\text{DFL} = \%\Delta \text{ net income} / \%\Delta \text{ operating income}$$

Unlevered returns are expressed as return on assets (ROA) or return on invested capital (ROIC). Levered returns are expressed as return on equity (ROE).

ANSWER KEY FOR MODULE QUIZZES

Module Quiz 43.1

1. **A** Subsequent research reports update the recommendation and rationale from an initial research report. The primary audience for an *initial* company report is those who are not already knowledgeable about the issuer or security. (LOS 43.a)

2. **C** Reports and data from platforms such as Bloomberg and FactSet are classified as proprietary third-party sources, available for a fee. They are not publicly available for free (e.g., general news, social media), and the information provided is not primary research. (LOS 43.b)

Module Quiz 43.2

1. **C** Market share = revenue / market size = 0.10 = $500 million / market size. So, market size = $5 billion. (LOS 43.c)

2. **C** Jayco's operating income is $12,000. If its sales increase by 1%, its operating income will increase to 1.01(10,000)($5 − $3) − $8,000 = $12,200, which is an increase of $200 / $12,000 = 0.0167 or 1.67%. Therefore Jayco's DOL is 1.67% / 1% = 1.67.

   Jayco's net income is $12,000 − $2,000 = $10,000. If its operating income increases by 1% to 1.01($12,000) = $12,120, its net income will increase to $12,120 − $2,000 = $10,120, which is an increase of $120 / $10,000 = 0.012 or 1.2%. Therefore Jayco's DFL is 1.20% / 1% = 1.20.

   (LOS 43.d, 43.e)

READING 44

INDUSTRY AND COMPETITIVE ANALYSIS

MODULE 44.1: INDUSTRY ANALYSIS

LOS 44.a: Describe the purposes of, and steps involved in, industry and competitive analysis.

Industry and competitive analysis is a macro approach to analyzing what drives industry size, profits, and market share, as well as determining a company's position within its industry.

Different industries have different long-run levels of profitability that depend on the opportunities they have and the risks to which they are exposed. Whether a company can sustain economic profits over time depends largely on its industry. Competition tends to drive company profitability toward an industry base rate over time.

Within a given industry, differences in profitability among the participants result from differences in business model, company size, and competitive strategy. While industry factors function as a limit on companies' profitability, company-specific factors have tended to be more to blame when firms underperform their industries.

The role of industry and competitive analysis is to determine an industry's base rate of profitability and what factors affect that rate. Based on this, an analyst can project the future profitability of the industry and assess companies' positions in relation to the industry median or mean.

Industry analysis is useful for improving financial forecasts by examining industry drivers and compiling industry-wide data. For an analyst, it is important not to underestimate the impact of macro factors and to remember that company-specific factors alone have a limited impact on a company's success.

Industry analysis is also useful for finding desirable investments that may have been overlooked without analyzing the overall industry and its participants. From a portfolio perspective, investors may desire more industry-specific risk and less company-specific risk. This can be achieved through smaller investments in multiple companies within a targeted industry.

Industry and competitive analysis involves five steps:

1. *Define the industry*. This involves some subjectivity as to what factors define an industry (such as product similarity or geographical region) and how to treat companies that operate in multiple industries. Classification systems produced by third parties can be useful.

2. *Survey the industry* in terms of its size, growth rate, profitability, and trends in the market shares of its participants.

3. *Analyze the industry structure* using a framework such as Porter's five forces and determine which forces are key for the industry's profitability.

4. *Examine external influences* on the industry, such as political, economic, social, technological, legal, and environmental impacts (PESTLE).

5. *Analyze companies' competitive strategies* in terms of how each company fits within the industry and what competitive advantages each company has.

LOS 44.b: Describe industry classification methods and compare methods by which companies can be grouped.

Many problems exist in properly defining an industry. Initially, there were government-created classification systems that were production based (e.g., manufacturing, distribution, retail) and infrequently updated with new companies. With the rise of global markets and evolving technology, such national classification systems eventually become obsolete. As a result, third-party firms developed more global industry classification systems that are more useful to analysts. Classifying firms by industry provides a method of examining trends and firm valuations. It also allows analysts to compare firms in different countries.

Commercial Classifications

One way to group companies into an industry is by the *products and services* they offer. For example, firms that produce automobiles constitute the auto industry. A **sector** is a group of similar industries. Hospitals, doctors, pharmaceutical firms, and other industries are included in the health care sector. Systems that are grouped by products and services usually classify firms by their principal business activity (largest source of sales or earnings).

Commercial industry classifications include the Global Industry Classification Standard (GICS), which was developed by S&P Dow Jones Indices and MSCI, and the Industry Classification Benchmark (ICB), which was developed by FTSE Russell for public companies. The Refinitiv Business Classification (TRBC) includes public companies, private companies, not-for-profits, and government entities.

The hierarchical structures (four or five tiers) for these classification systems are as follows:

- GICS: sector, industry groups, industries, subindustries
- ICB: industries, supersectors, sectors, subsectors
- TRBC: economic sectors, business sectors, industry groups, industries, activities

While their nomenclature may differ, the top level for all three systems consists of 11 common sectors or industries as follows:

1. Energy
2. Financials
3. Basic materials
4. Information technology
5. Industrials
6. Telecommunications services
7. Consumer discretionary/cyclicals
8. Utilities
9. Consumer staples/noncyclicals
10. Real estate
11. Health care

The process these providers use to classify firms may be summarized as follows:

- A firm with one business line is classified in that business line.
- A firm with multiple business lines is classified in the one that comprises more than 60% of total revenue.
- If no business line meets the 60% test, classify the firm by a business line that accounts for more than 50% of total revenue, profits, or assets.
- If no business line meets the 50% test, use judgment to select the most appropriate business line, or classify the firm as a conglomerate.

Potential Limitations of Classification Systems

Inappropriate Groupings

Some of the industry groupings may be either too wide or too narrow for an analyst's specific needs. When this occurs, an analyst might choose to use different classification tiers and possibly alter the groupings on a subjective basis. In some instances, firms may be classified in the same group when an analyst would prefer to separate them. For example, "computer software" could range from accounting and bookkeeping software to nutrition management software. An analyst might want to focus on a smaller group that produces directly competing products. In other instances, companies that sell a wide variety of products (such as large retailers like Costco or Walmart) might be classified in different industries or subindustries, even if an analyst might consider them competitors.

Companies Selling Multiple Products

Given the nature of the classification systems, a single company with multiple divisions in differing industries is assigned to one group only. This creates comparability issues if a given division of a company is not in the same industry as the one assigned to the overall company. A prominent example would be Amazon being assigned to the

"consumer discretionary retailer" industry, even though most of its profits come from its activities in IT service management.

Geography

For services such as health care or insurance that companies largely cannot offer on a global basis, it makes sense to analyze them in terms of local or national markets. The reverse is true for media companies that were local in nature in the pre-internet age, but can now compete on a global level by offering their services to virtually anyone in any place.

Grouping Changes

To recognize natural business changes over time, classification system providers update their groupings periodically. This can disrupt the continuity of industry-level statistics, and it may be necessary to revise historical data to be consistent with current grouping systems. For example, some existing sectors may be further subdivided with new sectors established, which means the historical results of the subdivided sector will be difficult to compare with future results. New companies being established and companies going out of business change the constituents of groupings and can impair comparability. Over long periods, industry data may exhibit survivorship bias.

Other Ways to Group Companies

Companies can be grouped in ways other than by product or service. These ways are often useful for constructing indexes and performing investment attribution analysis.

Geography

Companies can be grouped by countries, which in turn can be assigned categories such as developed, emerging, or frontier economies. The country is most often where a company is headquartered or listed on an exchange, even if it does most of its business elsewhere. For example, Toyota is considered a Japanese company but generates most of its revenues in North America.

Business Cycle Sensitivity

We can describe companies' sensitivity to business cycles on a range from defensive to cyclical. A **defensive company** produces goods and services for which demand is relatively stable over the business cycle. Examples of defensive sectors include health care, utilities, telecommunications, and consumer staples. Those are items required for day-to-day living, for which demand is not affected significantly by the business cycle stage.

A **cyclical company** is one whose earnings are highly dependent on the stage of the business cycle. Such firms have high earnings volatility and typically high operating leverage. Their products are often materials or equipment sold to other producers, or high-unit-value items whose purchase can be delayed until the economy improves. Examples of cyclical industries include basic materials and processing, consumer

discretionary, energy, financial services, industrial and producer durables, and technology.

Financial Measures

Groupings may occur based on company size (e.g., market capitalization) or other financial measures such as valuation and profitability ratios or growth rates of earnings or sales. Groupings based on financial measures demonstrate more turnover in their composition than groupings based on country or product, because a company's financial measures are much likelier to change than its country or industry. Alternatively, statistical methods like cluster analysis can be used. This method groups firms that historically have had highly correlated returns. The resulting groups should then have lower returns correlations with each other.

Environmental, Social, and Governance (ESG)

ESG factors such as the level of personnel diversity or use of "green" production methods can be quantified and reported as standardized ESG scores.

LOS 44.c: Determine an industry's size, growth characteristics, profitability, and market share trends.

Industry Size

Industry size is total annual sales of the product, which is not always the same as total annual sales of all the companies in the industry. Because some of the companies included in the industry operate in multiple product lines, only a fraction of a company's total annual sales might be relevant for a given industry.

In some industries, the overall size may include a significant percentage of sales from private companies and unincorporated businesses, which creates problems in gathering relevant data. In these cases, industry size is usually approximated using alternative data, such as government economic indicators or independent third-party data.

Industry Growth Characteristics

An industry growth rate can be calculated as an annual rate each year or as a compound annual growth rate over several years. Analysts classify industry groups broadly as growth industries or mature industries.

Growth industries are those with product markets that have considerable growth potential, which is often related to new technology. Drivers of success in growth industries tend to be independent of the general economy. Analysts must judge the persistence of the high growth rates and estimate when they will begin to decline. This is more problematic when growth is based on an emerging technology.

In contrast, **mature industries** have little or no growth potential remaining in their markets. Industry growth rates are likely in line with the general economy, or may be declining if the industry faces threats from substitute products. Analysts should focus

on any significant changes in the intensity of competition among industry participants as well as any signs that the industry might be declining overall.

Business cycle sensitivity also needs to be considered. Cyclical industries experience more volatility in returns, but varying perceptions of the duration and severity of business cycles can result in a wide range of valuations.

A style box can be used to classify industries based on business cycle sensitivity (cyclical vs. defensive) and growth rate (mature vs. growth). For example, utilities can be classified as a defensive and mature industry; crude oil production as cyclical and mature; biotechnology as defensive and growth; and digital advertising as cyclical and growth.

This sort of analysis has some drawbacks. A broad economic recession will probably hurt all companies, so classification as cyclical or defensive is a matter of degree. It is also possible to have growth firms in a cyclical industry that are relatively unaffected by a recession as their product gains increasing acceptance with the public.

Industry Profitability

Ideally, industry profitability should be based on return on invested capital (ROIC), which is an after-tax metric independent of capital structure. Companies can be segmented in deciles or percentiles, for example, to observe a company's relative profitability over time. Unfortunately, it is often impractical to estimate ROIC for private companies that do not have publicly available financial statements. Instead, analysts may use the returns of publicly traded companies and assume they are similar for private companies, based on publicly available market prices for the end products and production costs, or using data provided by the government or a third-party researcher.

The goal is to determine if there are any clear trends—increasing, decreasing, or stable industry profits over time.

Market Share

Market share is a company's annual revenues divided by the industry size. Because measuring industry size is problematic, market shares are estimates rather than exact data. The trend in a company's market share over time is crucial for determining whether its products are viewed favorably by customers.

Acquiring a competitor automatically increases a company's market share. Closer investigation is needed to determine if a company is increasing its market share net of acquisitions.

Industry concentration is often expressed numerically through the Herfindahl-Hirschman Index (HHI). The HHI is the sum of the squares of the market shares of all participants. For example, a market consisting of five firms each with shares of 35, 25, 20, 10, and 10 would have an HHI of $35^2 + 25^2 + 20^2 + 10^2 + 10^2 = 2{,}450$. An industry with an HHI less than 1,500 is considered to have low concentration; HHI between

1,500 and 2,500 is considered moderate concentration; and an HHI greater than 2,500 indicates high concentration.

In general (with notable exceptions in the case of local industries and highly differentiated products), low or decreasing concentration implies higher competitive intensity, less pricing power, and lower profitability; while high or increasing concentration implies lower competitive intensity, more pricing power, and greater profitability.

MODULE QUIZ 44.1

1. Industry classification systems from commercial index providers typically classify firms by:
    A. statistical methods.
    B. products and services.
    C. business cycle sensitivity.

2. Firms and industries are *most appropriately* classified as cyclical or non-cyclical based on:
    A. their stock price fluctuations relative to the market.
    B. the sensitivity of their earnings to the business cycle.
    C. the volatility of their earnings relative to their competitors.

MODULE 44.2: INDUSTRY STRUCTURE AND COMPETITIVE POSITIONING

Video covering this content is available online.

LOS 44.d: Analyze an industry's structure and external influences using Porter's Five Forces and PESTLE frameworks.

Porter's Five Forces

One component of an analyst's industry analysis should be industry structure analysis, which examines how an industry's competitive environment influences a firm's strategy. The analysis framework developed by Michael Porter[1] delineates five forces that determine industry competition—and ultimately, the industry's long-run profitability. Of the five forces described next, if some or all of them are strong, then firms will likely earn zero or close to zero economic profits (return on invested capital minus cost).

1. *Rivalry among existing competitors.* Rivalry increases when many firms of relatively equal size compete within an industry. Slow growth leads to competition as firms fight for market share, and high fixed costs lead to price decreases as firms try to operate at full capacity. For example, the high fixed costs in the auto industry from capital investments and labor contracts force firms to produce a large number of vehicles that they can only sell at low margins. Industries with products that are undifferentiated or have barriers (are costly) to exit tend to have high levels of competition.

2. *Threat of entry.* Industries that have significant barriers to entry (e.g., large capital outlays for facilities) will find it easier to maintain premium pricing. It is costly to

enter the steel or oil production industries. Those industries have high barriers to entry and thus less competition from newcomers. An analyst should identify factors that discourage new entrants, such as economies of scale.

3. *Threat of substitutes*. Substitute products limit the profit potential of an industry because they limit the prices firms can charge by increasing the elasticity of demand. Commodity-like products have high levels of competition and low profit margins. The more differentiated the products are within an industry, the less price competition there will be. For example, in the pharmaceutical industry, patents protect a producer from competition in the markets for patented drugs.

4. *Power of buyers*. Buyers' ability to bargain for lower prices or higher quality influences industry profitability. Bargaining by governments and ever-larger health care providers have put downward pressure even on patented drugs.

5. *Power of suppliers*. Suppliers' ability to raise prices or limit supply influences industry profitability. Suppliers are more powerful if there are just a few of them and their products are scarce. For example, Microsoft is one of the few suppliers of operating system software and thus has pricing power.

The first two forces deserve further attention because almost all firms must be concerned about the threat of new entrants and competition that would erode profits. Studying these forces also helps the analyst better understand the subject firm's competitors and prospects. The following summary describes how these two factors influence the competitive environment in an industry:

- Higher barriers to entry reduce competition.
- Greater concentration (a small number of firms control a large part of the market) reduces competition, whereas market fragmentation (a large number of firms, each with a small market share) increases competition.
- Unused capacity in an industry, especially if prolonged, results in intense price competition. For example, underutilized capacity in the auto industry has resulted in very competitive pricing.
- Stability in market share reduces competition. For example, loyalty of a firm's customers tends to stabilize market share and profits.
- More price sensitivity in customer buying decisions results in greater competition.
- Greater maturity of an industry results in slowing growth.

An example of an analysis using Porter's five forces is provided next.

EXAMPLE: Porter's five forces analysis for U.S. retail[2]

Threat of New Entrants: Very High

Opening a retailer, especially an ecommerce retailer that uses third-party merchant services, is relatively easy and common. In the United States, retailers are the most common type of business formed—by a wide margin, with over 40,000 new firms filing formation papers each month (the next-most common is transportation and warehousing, with around half the number of retailer formations). Customers can easily switch retailers, as most do not have an ongoing relationship such as a subscription fee or contract, and there are minimal regulatory barriers such as licenses and patents.

Threat of Substitutes: Low

Broadly speaking, the substitute for retail is consumer services (e.g., restaurants, travel, health care), which also includes digital services (e.g., streaming video subscriptions and gaming). Most categories of goods, however, are not easily replaceable with services (e.g., apparel and home decor), or they enjoy a cost advantage because of lower labor intensity (e.g., fresh food). There have been periods when services grew faster than goods, but as shown in an earlier exhibit, retail sales have grown essentially in line with U.S. nominal output/income. Retail is arguably one of the oldest industries, and while it has evolved over time, it has yet to be replaced.

Bargaining Power of Customers: Moderate

Retail customers are highly fragmented, with each consumer representing a distinct decision maker, as there are generally no group purchasing organizations. However, many products are sold by many retailers, and the internet has enabled easy comparison shopping at retailers. Customers are price sensitive, with respect to identical products sold by different retailers.

Bargaining Power of Suppliers: Low to Moderate

Key suppliers for retailers include manufacturers of goods, employees, and lessors of retail or fulfillment space. In most cases, numerous options are available. However, branded goods are sold exclusively by a sole manufacturer that may impose high prices and other economic terms, like shelf space and visibility, and may want to sell only to certain retailers (e.g., makers of luxury goods may not sell to discount retailers to maintain exclusivity).

Rivalry Among Existing Competitors: High

Given the sheer number of similarly sized firms selling similar or identical products, retailers compete fiercely, often with price promotions and discounts. Price is one of the few ways that they can lure customers away from competitors.

PESTLE Analysis

While Porter's five forces are crucial for internal analysis of an industry, an analyst must also consider the external factors that may affect it. In that regard, a **PESTLE analysis** considers political, economic, social, technological, legal, and environmental factors. Because the nature of external factors is that they tend to evolve gradually, a PESTLE analysis does not need to be performed as frequently as an analysis of competitive forces. Not all of the influences might be key for a specific industry; analysis should focus on only the key influences.

Political influences have an important and widespread effect on businesses through various channels, including taxes and regulation. Three sectors that are most notably exposed to political influences are energy, health care, and defense.

The energy sector must consider three specific political influences:

1. Governments desire low and stable energy prices to maintain their popularity with the general public, who would otherwise have to bear most of the burden of rising energy prices.
2. Climate agreements and regulations, which are aimed at reducing emissions, conflict with the desire for low prices for nonrenewable energy sources (mainly fossil fuels). If governments remain focused on reducing fossil fuel use in the future, higher energy prices are unavoidable.
3. The Organization of the Petroleum Exporting Countries (OPEC) has significant influence on energy prices. It is likely that as a group, the OPEC members desire to maintain low energy prices to lengthen the move to renewable energy sources.

The influence of governments is substantial for the health care sector because governments are the largest purchasers of health care products and services. For political reasons, governments may increase the amount of public health care provided (by purchasing more products and services from the providers), or may implement price controls or ration services.

For the defense sector, governments are usually the only buyers. The amount of defense spending depends on the level of geopolitical threats and military commitments among allied nations. Defense spending is also constrained by competing fiscal spending priorities, including health care.

Economic influences can be cyclical trends (economic output as measured by GDP or some other measure) or structural trends such as productivity improvements and the size of the labor force. Interest rates affect financing costs for firms and individuals, as well as financial institution profitability. Credit availability affects consumer and business expenditures and funding. Inflation affects costs, prices, interest rates, and business and consumer confidence. Economic influences are key for cyclical sectors.

Social influences relate to trends in how people work, play, spend their money, and conduct their lives. These factors are particularly important for industries that sell directly to individuals. For example, the increased presence of social media and "influencers" has increased the demand for high-quality beauty products. Some companies are bowing to pressures to use sustainable inputs and to ensure that production processes are ethical and observe human rights.

Technological influences can change an industry dramatically through the introduction of new or improved products, which can make some existing products redundant. We can categorize technological innovations as sustaining or disruptive. **Sustaining innovation** refers to improvements in a product over time that do not fundamentally change its nature. In contrast, **disruptive innovation** creates a new market, or enters an existing market and creates value in a new way. An example of a business that experienced disruptive innovation is photography, which has largely moved from film to digital media. Disruptive innovation typically comes from new entrants to an industry. Existing firms may continue to succeed during the time it takes for customers to accept a new innovation, but to maintain market share in the long term, it is necessary to become part of the disruptive innovation, even though it will cannibalize their existing business.

Legal influences consider changes in laws and regulations that present both business risks and opportunities. Consider the tobacco industry, which has faced declining revenues due to laws implemented in many jurisdictions over the past few decades, such as prohibiting smoking in public places and requiring extensive disclosures on cigarette packages. In contrast, consider the relatively new cannabis industry that has developed in jurisdictions that have legalized its sale and use.

Environmental influences, such as climate change and concerns about environmental sustainability of some industries, continue to gain importance as a factor in industry growth and profitability.

LOS 44.e: Evaluate the competitive strategy and position of a company.

Every company can be said to have a competitive strategy, whether intentionally or not. Intentional strategies are carefully planned and follow repeated cycles of execution and evaluation to refine. Unintentional strategies are haphazard, with little or no coordination and an emphasis on following past or industry practices. Much of the time, unintentional strategies do not provide optimal results, although there have been some notable exceptions—particularly in the pharmaceutical industry, where many new drugs were developed by smaller companies following a more informal and less organized approach.

Effective competitive strategies are known with hindsight by producing consistent and positive economic profits over the long run. On a forward-looking basis, competitive strategies can be evaluated by considering whether the strategy can respond appropriately to the relevant forces, whether the strategy is neutral to or benefits from relevant external influences, and whether the firm is able to execute the strategy properly.

Porter has identified three types of competitive strategies: a cost leadership (low-cost) strategy, a product or service differentiation strategy, and a focus strategy. According to Porter, a firm must choose one of these to compete effectively.

In a **cost leadership strategy**, the firm seeks to have the lowest costs of production in its industry, offer the lowest prices, and generate enough volume to make a superior return. The strategy can be used defensively to protect market share, or offensively to gain market share. A cost leadership firm should have managerial incentives that are geared toward improving operating efficiency.

In a **differentiation strategy**, the firm's products and services should be distinctive in terms of type, quality, or delivery. For success, the firm's cost of differentiation must be less than the price premium that buyers are willing to pay for it. The price premium should also be sustainable over time. Successful differentiators will have outstanding marketing research teams (to allow for premium pricing), strong production personnel (to allow for superior quality), and creative advertising personnel (to promote unique product features).

A **focus strategy** refers to targeting a niche market. Executing a focus strategy can include aspects of both cost leadership and differentiation.

Figure 44.1 summarizes the three generic competitive strategies.

Figure 44.1: Generic Competitive Strategies[3]

	Cost Leadership	Differentiation	Focus
Means of executing strategy	■ Economies of scale from fixed costs ■ Favorable access to raw materials ■ Culture of strict cost control ■ Aggressive pricing to gain high volume ■ Low-cost distribution ■ Economies of scope	■ Investments in advertising, brand, customer service, proprietary distribution channels ■ Protection using trademarks, copyright, patents ■ Superior quality, unique features ■ Culture of strong customer experience ■ Premium pricing ■ Integration of services, software, and hardware	■ Proximity to customers and strong understanding of their needs ■ May incorporate elements of strategy from both cost leadership and differentiation, but focused on particular group
Which of the Five Forces it defends against (why it works)	■ Threat of new entrants: Capital requirements and scale advantages deter entrants ■ Bargaining power of customers: Customers can only bring prices down to the costs of the marginal producer, leaving margin for the cost leaders ■ Industry rivalry: Rivals may not be able to compete on price with cost leaders	■ Threat of new entrants and of substitutions: Customer loyalty to unique product can deter switching, protect market share ■ Bargaining power of customers: Customers may be unable to unwilling to comparison shop or switch ■ Bargaining power of suppliers: The company may have the ability to pass along price increases to customers and/or margin to absorb cost increases	■ Threat of new entrants and of substitutes: Customer loyalty to unique product can deter switching, protect market share ■ Bargaining power of customers: Customers may be unable or unwilling to comparison shop or switch
Industry appropriateness	■ Capital intensive ■ Price-conscious customers ■ Customers do not value or notice product differences ■ Minimal innovation in industry	■ Price is not foremost concern for customers ■ Customers value distinctiveness ■ Innovation in industry, with products varying in features and forms	■ Difficult (or uneconomical) to serve customer group, product, or geography for other players
Risks to the strategy	■ Cost inflation, loss of discipline ■ Technological change that results in loss of cost leadership or market share ■ Desire for premiumization among customers	■ Imitation by competitors ■ Buyers become sophisticated, no longer demand level of service ■ Pricing premium becomes too high for customers to bear ■ May preclude high market share, as customers value exclusivity	■ Larger competitors outcompete on price ■ The differences in demand between the between the narrow group and industry as a whole narrow ■ Buyers become sophisticated, no longer demand level of service

MODULE QUIZ 44.2

1. Two of the five competitive forces in the Porter framework are:
    A. threat of entry and barriers to exit.
    B. power of suppliers and threat of substitutes.
    C. rivalry among competitors and power of regulators.

2. Which of the following *best* describes a cost leadership strategy?
    A. Volume sold can range from modest to high.
    B. Managerial incentives promote operational efficiency.
    C. Success depends heavily on investments in customer service and proprietary distribution channels.

KEY CONCEPTS

LOS 44.a

Industry and competitive analysis involves five steps:

1. Define the industry

2. Survey the industry's size, growth, profitability, and market share trends

3. Analyze the industry's structure

4. Analyze external influences on the industry

5. Determine industry participants' competitive strategies

LOS 44.b

The three classification systems and their hierarchical structures (four or five tiers) are as follows:

- GICS: sector, industry groups, industries, subindustries

- ICB: industries, supersectors, sectors, subsectors

- TRBC: economic sectors, business sectors, industry groups, industries, activities

Potential limitations of classification systems include inappropriate groupings, inaccurate classifications of companies selling multiple products, inability to deal with products and services offered in local or national markets only, and grouping changes over time.

Other ways to group companies are by country or region, business cycle sensitivity, financial measures, and ESG considerations.

LOS 44.c

Industry size is the total annual sales of the product, which is not always the same as total annual sales of all the companies in the industry.

Growth industries are those that have considerable growth potential, which is usually related to new technology. Mature industries have growth rates in line with the general economy or decreasing as the industry faces threats from substitute products.

Cyclical industries involve sales of less essential items for consumers, while defensive industries involve sales of more essential items.

Market share is a company's annual revenues as a percentage of the industry size. Industry concentration is often expressed numerically using the Herfindahl-Hirschman Index.

LOS 44.d

Porter's five forces that determine industry competition are as follows:

1. Threat of new entrants
2. Threat of substitutes
3. Bargaining power of customers
4. Bargaining power of suppliers
5. Rivalry among existing competitors

A PESTLE analysis consists of the following elements:

1. Political influences
2. Economic influences
3. Social influences
4. Technology influences
5. Legal influences
6. Environmental influences

LOS 44.e

In a cost leadership strategy, the firm seeks to have the lowest costs of production in its industry, offer the lowest prices, and generate enough volume to make a superior return.

In a differentiation strategy, the firm's products and services should be distinctive in terms of type, quality, or delivery.

In a focus strategy, a niche market is targeted.

ANSWER KEY FOR MODULE QUIZZES

Module Quiz 44.1

1. **B** Commercial classification systems (e.g., GICS, ICB, and TRBC) classify firms according to the product or service they produce. (LOS 44.b)

2. **B** For industry analysis, cyclical firms and industries are those with earnings that are highly dependent on the business cycle, while non-cyclical firms and industries are those with earnings that are relatively less sensitive to the business cycle. (LOS 44.c)

Module Quiz 44.2

1. **B** Porter's five forces are rivalry among existing competitors, threat of entry, threat of substitutes, bargaining power of buyers, and bargaining power of suppliers.

(LOS 44.d)

2. **B** Firms that use a cost leadership strategy should have managerial incentives to create efficient operations. In a cost leadership strategy, the firm seeks to generate a high-enough sales volume to make a superior return. Investments in customer service and proprietary distribution channels are key elements of a differentiation strategy. (LOS 44.e)

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[1] Michael Porter, "The Five Competitive Forces That Shape Strategy," *Harvard Business Review*, Volume 86, No. 1: pp. 78–93.

[2] Reprinted from the Level I CFA curriculum learning module "Industry and Competitive Analysis," with permission from CFA Institute.

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READING 45

COMPANY ANALYSIS: FORECASTING

MODULE 45.1: FORECASTING IN COMPANY ANALYSIS

LOS 45.a: Explain principles and approaches to forecasting a company's financial results and position.

Financial statement forecasts are used for both valuation and investment recommendations. Forecasts that will be distributed to external users typically emphasize key metrics such as revenue and EPS. A company's internal forecasts can be much more thorough and may span many future years.

Forecast Objects

The four key **forecast objects** include the following:

- *Financial statement lines with clear drivers.* For example, in the retail industry, an analyst might model net sales as being driven by the number of stores operating and sales per store. The primary advantages of forecasting drivers are explanatory value and forecast accuracy. A disadvantage is that a given line item could have numerous drivers that are difficult to forecast as a group.
- *Financial statement items without clear drivers.* An analyst can forecast these items directly, using estimates obtained from management or by adjusting amounts from prior years.
- *Summary measures.* Metrics such as earnings per share or free cash flow combine several financial statement line items. Forecasting summary measures is most effective when they are not subject to significant period-to-period fluctuations. Summary measures speed up the forecasting process, but the results are less transparent for users of the forecasts.
- *Ad hoc items.* An analyst might want to account for events a company's financial statements do not yet reflect. These might include contingent liabilities (e.g., regulatory change requiring future costs to comply) and potential gains or losses (e.g., windfall from an expected victory in a lawsuit).

It is best to base forecasts on information that is readily available and reasonably frequent and recurring. For example, with a company that produces multiple products or operates multiple divisions, an analyst would like the financial statements to provide details on individual product lines or divisions. If financial information is only provided on a consolidated basis, it is much more difficult to perform a more detailed forecast.

An analyst should avoid making forecasting models more complicated or detailed than necessary. Complex models require significant effort to create and to maintain and are not necessarily more accurate than simpler models. It is often beneficial to eliminate a few steps to avoid uneconomical work on items that do not materially improve a forecast.

Forecast Approaches

The following four forecast approaches can be used individually or combined:

1. Base forecasts on historical results.
2. Assume results will converge to a historical base rate.
3. Use management guidance.
4. Use other methods to make discretionary forecasts.

Historical Results

The most basic forecasting method is to use actual past results as the starting point and assume the results will continue in the future. Of course, the major drawback is that past conditions might not be the same in the future. Using historical results works best for companies and industries that are noncyclical or in the mature stage. As well, using historical results is often done to forecast objects considered immaterial.

This approach can be inappropriate for companies operating in a cyclical industry because a year-by-year comparison could see the economy in a different stage of the business cycle. A longer or multiyear forecast that accounts for the full business cycle would make more sense. Analysts should also not rely on historical results for firms that are transitioning into a new competitive strategy or significantly changing their business operations.

Historical Base Rate Convergence

An analyst might assume that a forecasting object, such as a company's growth rate, will converge to an industry average or median growth rate (or even the rate of GDP growth, if appropriate). This base rate should be computed over a sufficiently long and representative time period. The approach makes sense for established industries with many competitors that are publicly traded, and for industries where few structural changes or external disruptions are expected. It also makes sense for relatively new companies that are transitioning to become more like their larger and more established competitors.

For industries that are new or rapidly changing, determining a base rate may be difficult and assuming forecast objects will converge to it might not be appropriate. This approach is also not appropriate for cyclical industries because it is likely to

underestimate the volatility of their results. Finally, for companies that are dominant in their industry, this approach essentially becomes the historical results method because the dominant company accounts for most of the calculated industry base rate.

Management Guidance

Managers of public companies often reveal their earnings and revenue targets for the upcoming periods. The first disclosures for a coming year might occur during the fourth quarter of the current year, with quarterly updates during the year. Because management has internal and industry information that is unavailable to the public, analysts pay close attention to management's forward-looking guidance.

Guidance may be detailed, but it is rarely presented as a point estimate and much more frequently presented as a range (e.g., operating expenses are expected to increase by 1% to 3% in the coming year). Such guidance contains a significant number of assumptions by management regarding factors such as GDP growth, pricing changes, and cost increases. Analysts and investors are particularly interested in determining whether management's assumptions make sense in the current economic and operating environment. It may not always be prudent for analysts to use the midpoint of the range to gauge management expectations. Managements have been known to shade their revenue growth ranges downward and their expense growth ranges upward to give the impression that they have exceeded expectations once actual results are determined.

Using management guidance is best when management has a proven history of providing reasonable estimates. This can be verified by performing variance analyses of budget versus actual. Similar to the other approaches, using guidance may not be helpful for cyclical companies because management might be no better than the analyst at forecasting business cycles. However, management is likely to make better forecasts for items that are more in their control, such as expenses and fixed investment.

Analyst Discretionary Forecast

This is the "catch all" for any other forecasting approach than the three we have discussed. Discretionary forecasts can be derived from surveys, models, or probability distributions. They are most appropriate when the other approaches tend to fall short, such as for companies in cyclical industries, with few or no peers, that do not offer guidance, or are in a significant transition of their operations. For example, forecasting the effects on energy companies of transitioning to renewable energy sources cannot rely on historical precedent. Instead, an analyst must create a forecast using publicly available information such as regulatory changes, implementation timelines, and emission reduction targets.

Forecast Horizon

The appropriate forecast horizon for any particular analysis depends on factors such as an investor's or portfolio manager's time horizon, whether the industry is cyclical, or factors specific to a company. For cyclical industries, a forecast horizon should be at least long enough to include the midpoint of a business cycle. Specific company changes

made to improve business operations may require a long enough forecast horizon to allow the benefits of the changes to be measurable.

Top-Down Revenue Forecasts

Top-down analysis starts with expectations about a macro variable, often the expected growth rate of nominal GDP or of the market for a particular good or service.

When forecasting revenues relative to nominal GDP growth, an analyst may model the relationship between nominal GDP and company sales, or use the real GDP growth rate to forecast quantity and an inflation forecast to estimate prices. An analyst will often project that a company's growth will exceed or lag GDP growth. For example, if an analyst forecasts that nominal GDP will grow at 5% and believes a company's revenue will grow at a 20% faster rate, he will project the company's sales to increase by 5% × (1 + 0.20) = 6%. Growth or decline expectations are typically based on a company's life cycle stage and degree of cyclicality.

An alternative approach is to forecast revenues based on expected market growth and market share. To use this approach, an analyst begins with an estimate of industry sales (market growth), then estimates company revenue as a percentage of industry sales based on the company's expected market share. For example, consider a company that currently has GBP12 million in sales, a 12% share of industry sales that are GBP100 million. If an analyst expects the company to increase its market share next year to 13%, and forecasts industry sales to grow to GBP104 million, the analyst will project the company to have 13% × GBP104 million = GBP13.52 million in sales, an increase of about 12.7%.

Bottom-Up Revenue Forecasts

Bottom-up analysis starts with an individual company or its reportable segments. Revenue projections based on historical revenue growth or a company's new product introductions over the forecast horizon are considered bottom-up approaches.

Examples of bottom-up drivers include the following:

1. *Average selling prices (P) and volumes (Q)*. Forecasting P and Q separately and then multiplying them will generate a revenue forecast, assuming such information is readily available to the analyst.

2. *Product line or segment revenues*. An analyst may forecast revenues for separate products, business lines, geographic areas, or reporting segments, then combine them into a company-wide revenue forecast. This is only practical if a company provides such detailed information.

3. *Capacity-based measures*. An analyst may forecast revenue growth for a company's existing locations, and add a separate forecast for its newly opened locations.

4. *Return- or yield-based measures.* These involve forecasting balance sheet items and the return the company will earn on them. For example, interest revenue forecasts

for a bank require changes in loan balances (assets) and changes in customer deposits (liabilities).

Incorporating elements of both top-down and bottom-up approaches can highlight any inconsistencies in their assumptions. For example, if a company's forecast sales based on expected capacity are far out of line with what they should be given expected economic growth, an analyst should recheck the model's assumptions to confirm whether the forecast is reasonable.

Recurring and Nonrecurring Items

Nonrecurring items should not be included in a forecast object, but rather should be analyzed on a stand-alone basis. Nonrecurring items include those disclosed by company management and other items that an analyst believes a forecast should encompass. An analyst must be prepared to quantify both types.

Nonrecurring items disclosed by management typically focus on one-time events (e.g., large special orders, foreign exchange gains) that do not constitute sustainable or ongoing revenues. One-time items might be removed from regular revenues and disclosed on a separate line item. This makes it easier for analysts to determine the amount of revenue that is more likely to recur, assuming they believe management's judgments are reliable. If a company cites "nonrecurring" items regularly, analysts might reasonably expect this trend to continue and incorporate them into their forecasts.

Nonrecurring items that are not quantified by management require analyst insight and judgment. For example, some analysts believed the COVID-19 pandemic of 2020–21 would cause a fundamental and permanent shift in retail sales to online platforms, and that the rise in online sales would persist for many years to come. However, about 18 months into the pandemic, online sales as a percentage of total retail sales began receding back toward pre-pandemic levels. With hindsight, analysts who treated the shift to online sales as nonrecurring turned out to be correct.

Forecast Approaches

When choosing among the forecast approaches we have described, analysts must account for risk factors such as competition, business cycle changes, inflation or deflation, and technological changes. Not all of them may be significant for a given company or industry, but an analyst must determine which ones are significant and account for them in forecasts. Scenario analysis is a useful approach to forecasting the effects of these kinds of risk.

Cost of Sales and Gross Margins

Because cost of sales (cost of goods sold, or COGS) is closely related to revenue, analysts typically estimate future COGS as a percentage of revenue:

- Forecast COGS = (historical COGS / revenue) × estimate of future revenue
- Forecast COGS = (1 − gross margin) × estimate of future revenue

Changes in a company's market share can signal changes in its gross margin. If a company is losing market share because cheaper and more attractive substitutes are becoming available, this should put pressure on the company's gross margins. By contrast, if a company is gaining market share by introducing a new and innovative product that does not yet have any substitutes available, this should enable it to increase its gross margin.

> **EXAMPLE: The effect of prices and costs on gross profit and margin[1]**
>
> Assume that a company's COGS as a percentage of sales equals 25% and that the quantity sold is the same in Period 2 as in Period 1. If input costs double in Period 2 and the company can pass the entire increase on to its customers through a 25% price increase, COGS as a percentage of sales will increase (to 40%) because an equal absolute amount has been added to the numerator and to the denominator.
>
> | | Period 1 | Period 2 |
> |---|---|---|
> | Sales | 100.0 | 125.0 |
> | COGS | 25.0 | 50.0 |
> | Gross profit | 75.0 | 75.0 |
> | COGS as % of sales | 25% | 40% |
> | Gross margin % | 75% | 60% |
>
> Thus, although the absolute amount of gross profit will remain constant, the gross margin will decrease (from 75% to 60%).

Because COGS is typically a large portion of a company's costs, small changes can have a significant impact on profitability forecasts. Close examination of the volume and price of a firm's inputs may improve a forecast of COGS, especially in the short run. For example, an airline's fuel costs can be volatile and will have a significant impact on its COGS, gross margin, and net margin.

Firms often hedge their future input costs using forward contracts or other derivative securities. An analyst must be aware of the proportion of future input costs hedged that way or, at a minimum, whether the firm has historically hedged those costs and over what time horizon. A hedge that protects the firm's gross margins from decreasing

when input prices rise will also "protect" its gross margins from increasing when input prices fall.

It can be worthwhile to examine the gross margins of a firm's competitors as a check of the reasonableness of gross margin estimates. In some cases, differences between firms' business models may be the underlying reason for differences in gross margins.

SG&A Expenses

Compared to COGS, selling, general, and administrative (SG&A) operating expenses are less sensitive to changes in sales volume. Their fixed cost component (e.g., research and development, corporate headquarters, management salaries) is generally larger than their variable cost component. Such costs might be modeled using a fixed growth rate that accounts for expected inflation. Selling and distribution costs may be more directly related to sales volume because a company likely needs to hire more salespeople to support higher sales.

Segment disclosures are unlikely to provide specific line items such as COGS and SG&A by segment. Therefore, an analyst creating segment forecasts can only rely on summary information such as operating margin by segment.

Working Capital

Three balance sheet items comprise working capital forecasts—accounts receivable, inventories, and accounts payable. To describe forecasting the components of working capital, we draw on concepts and ratios that we introduced in the Corporate Issuers and Financial Statement Analysis topic areas.

Accounts Receivable

Recall that days sales outstanding (DSO) are calculated as 365 / receivables turnover. We can forecast receivables turnover as forecast annual revenues / forecast average receivables, or we can forecast accounts receivable as DSO ´ (forecast revenues / 365).

Inventory

Inventory days on hand (DOH) are calculated as 365 / inventory turnover. We can forecast inventory turnover as forecast COGS / forecast average inventory, or forecast inventory as DOH ´ (forecast COGS / 365).

Accounts Payable

Days payable outstanding (DPO) are calculated as 365 / payables turnover. We can forecast payables turnover as forecast annual purchases / forecast annual payables, or we can forecast accounts payable as DPO ´ (forecast COGS / 365).

LOS 45.d: Explain approaches to forecasting a company's capital investments and capital structure.

Forecasting capital investments in tangible and intangible assets requires an analyst to use the cash flow statement to determine acquisitions and dispositions, and the income

statement to determine depreciation and amortization expense. For more accurate forecasts, capital expenditures should be divided into two categories: maintenance and growth.

Historical depreciation is usually the starting point to forecast capital spending for maintenance. An analyst should account for the expected inflation rate when estimating maintenance expenditures because replacement cost can be expected to increase with inflation. Depreciation and amortization can be forecast using net book value of property, plant, and equipment and the estimated useful life of the assets. Forecasting capital expenditures for growth requires an analyst to understand management's future business and revenue growth strategies.

Forecasting a firm's capital structure is often based on its leverage ratios (e.g., debt to assets, debt to equity). Analysts should note any borrowing requirements caused by planned capital expenditures. Company management may provide information about their target capital structure or any debt covenant ratios with which they must comply.

LOS 45.e: Describe the use of scenario analysis in forecasting.

Forecast financial statements should not simply rely on a single point estimate for forecast objects such as net income. Instead, an analyst should perform scenario analysis with multiple alternative assumptions to examine the sensitivity of net income to changes in assumptions. Those assumptions could involve changes in the economic environment, competition, and technological changes, for example. The end result is to develop a range of estimates using multiple scenarios.

MODULE QUIZ 45.1

1. Which approach is *most appropriate* for an analyst to use to forecast revenues for a company in a highly cyclical industry?

   A. Historical results.
   B. Analyst's discretionary forecast.
   C. Historical base rates and convergence.

2. Which of the following items is an example of a summary measure?

   A. Revenue.
   B. Free cash flow.
   C. Contingent liability.

3. An analyst is performing scenario analysis for a company's gross margin. Selected financial data from the current period is provided here:

Average selling price per product	$10
Quantity sold	4.5 million
Gross profit margin	60%

   For the next period, input prices are expected to increase by 15% and the analyst expects the company to increase selling prices by 12%, resulting in a 10% decrease in volume sold. The forecast decrease in gross profit margin for the company in the next period is *closest* to:

   A. 1%.
   B. 2%.

C. 3%.

LOS 45.a

Key forecast objects include the following:

- Drivers of financial statement lines
- Individual financial statement lines
- Summary measures
- Ad hoc objects

The following forecast approaches (usually combined) are used for objects:

- Historical results
- Historical base rate and convergence
- Management guidance
- Analyst discretionary forecast

The forecast horizon depends on factors such as the portfolio strategy for the security, whether the industry is cyclical and company-specific factors.

LOS 45.b

Top-down analysis models a company's sales as a function of economic growth or as a function of market growth and the company's market share.

Bottom-up analysis starts with an individual company or its reportable segments. Examples of bottom-up drivers include the following:

- Average selling prices and volumes
- Product-line or segment revenues
- Capacity-based measures
- Return- or yield-based measures

Nonrecurring items should be analyzed on a stand-alone basis.

LOS 45.c

COGS and gross margin are usually estimated as a percentage of revenue.

The fixed cost component of SG&A expenses is generally larger than its variable cost component and might be modeled using a fixed growth rate. Selling and distribution costs may be more directly related to sales volumes.

In forecasting working capital, the following measures are relevant:

- forecast accounts receivable = DSO × (forecast revenues / 365)
- forecast inventory = DOH × (forecast COGS / 365)
- forecast accounts payable = DPO × (forecast COGS / 365)

LOS 45.d

Historical depreciation is usually the starting point for forecasting capital expenditures for maintenance. Forecasting capital expenditures to grow the firm requires knowledge of the management's future business and revenue growth strategies.

Forecasting the firm's capital structure may be based on analysis of leverage ratios, while considering any borrowing requirements caused by planned capital expenditures as well as management guidance about its target capital structure.

LOS 45.e

An analyst should perform scenario analysis with multiple alternative assumptions to examine the sensitivity of net income to changes in these assumptions. The result is to develop a range of estimates.

ANSWER KEY FOR MODULE QUIZZES

Module Quiz 45.1

1. **B** An analyst's discretionary forecast is most frequently used for companies in cyclical industries as well as companies that have few or no peers, those that do not provide management guidance, and those in the midst of a significant business transition.

    The historical results approach is not appropriate for companies in cyclical industries because a future period is probably going to be at a dissimilar point in the business cycle compared to the current or past period, so the results would not be comparable. The historical base rates and convergence approach is not appropriate for companies in highly cyclical industries because the smooth convergence to a long-term base rate would hide the annual volatility. (LOS 45.a)

2. **B** Free cash flow is an example of a summary measure as it combines several measures into one (e.g., net income, depreciation expense, fixed capital investment). Revenue is an individual financial statement line. A contingent liability (e.g., pending legal proceeding) is an ad hoc object. (LOS 45.a)

3. **A** Forecast average selling price = $10 × 1.12 = $11.20

    Forecast quantity sold = 4,500,000 × (1 − 0.10) = 4,050,000

    Forecast average input cost = [(45,000,000 × 0.40) / 4,500,000] × 1.15 = $4.60

    Forecast total revenues = 4,050,000 × $11.20 = $45,360,000

    Forecast gross profit = 4,050,000 × ($11.20 − $4.60) = $26,730,000

    Forecast gross profit margin = $26,730,000 / $45,360,000 = 58.92%, which is 1.08% less than 60%. (LOS 45.e)

READING 46

EQUITY VALUATION: CONCEPTS AND BASIC TOOLS

MODULE 46.1: DIVIDENDS, SPLITS, AND REPURCHASES

LOS 46.a: Evaluate whether a security, given its current market price and a value estimate, is overvalued, fairly valued, or undervalued by the market.

Recall from the reading on Market Efficiency that **intrinsic value** or **fundamental value** is defined as the rational value investors would place on the asset if they had full knowledge of the asset's characteristics. Analysts use valuation models to estimate the intrinsic values of stocks and compare them to the stocks' market prices to determine whether individual stocks are overvalued, undervalued, or fairly valued. In doing valuation analysis for stocks, analysts are assuming that some stocks' prices deviate significantly from their intrinsic values.

To the extent that market prices deviate from intrinsic values, analysts who can estimate a stock's intrinsic value better than the market can earn abnormal profits if the stock's market price moves toward its intrinsic value over time. There are several things to consider, however, in deciding whether to invest based on differences between market prices and estimated intrinsic values.

1. The larger the percentage difference between market prices and estimated values, the more likely the investor is to take a position based on the estimate of intrinsic value. Small differences between market prices and estimates of intrinsic values are to be expected.

2. The more confident the investor is about the appropriateness of the valuation model used, the more likely the investor is to take an investment position in a stock that is identified as overvalued or undervalued.

3. The more confident the investor is about the estimated inputs used in the valuation model, the more likely the investor is to take an investment position in a stock that is identified as overvalued or undervalued. Analysts must also consider the sensitivity of a model value to each of its inputs in deciding whether to act on a difference between model values and market prices. If a decrease of one-half percent in the long-term growth rate used in the valuation model would produce an

estimated value equal to the market price, an analyst would have to be quite sure of the model's growth estimate to take a position in the stock based on its estimated value.

4. Even if we assume that market prices sometimes deviate from intrinsic values, market prices must be treated as fairly reliable indications of intrinsic value. Investors must consider why a stock is mispriced in the market. Investors may be more confident about estimates of value that differ from market prices when few analysts follow a particular security.

5. Finally, to take a position in a stock identified as mispriced in the market, an investor must believe that the market price will actually move toward (and certainly not away from) its estimated intrinsic value and that it will do so to a significant extent within the investment time horizon.

LOS 46.b: Describe major categories of equity valuation models.

Analysts use a variety of models to estimate the value of equities. Usually, an analyst will use more than one model with several different sets of inputs to determine a range of possible stock values.

In **discounted cash flow models** (or **present value models**), a stock's value is estimated as the present value of cash distributed to shareholders (*dividend discount models*) or the present value of cash available to shareholders after the firm meets its necessary capital expenditures and working capital expenses (*free cash flow to equity models*).

There are two basic types of **multiplier models** (or **market multiple models**) that can be used to estimate intrinsic values. In the first type, the ratio of stock price to such fundamentals as earnings, sales, book value, or cash flow per share is used to determine if a stock is fairly valued. For example, the price to earnings (P/E) ratio is frequently used by analysts.

The second type of multiplier model is based on the ratio of **enterprise value** to either earnings before interest, taxes, depreciation, and amortization (EBITDA) or revenue. Enterprise value is the market value of all a firm's outstanding securities minus cash and short-term investments. Common stock value can be estimated by subtracting the value of liabilities and preferred stock from an estimate of enterprise value.

In **asset-based models**, the intrinsic value of common stock is estimated as total asset value minus liabilities and preferred stock. Analysts typically adjust the book values of the firm's assets and liabilities to their fair values when estimating the market value of its equity with an asset-based model.

LOS 46.c: Describe regular cash dividends, extra dividends, stock dividends, stock splits, reverse stock splits, and share repurchases.

Cash dividends, as the name implies, are payments made to shareholders in cash. They may be regularly scheduled dividends or one-time special dividends. **Regular**

dividends occur when a company pays out a portion of profits on a consistent schedule (e.g., quarterly). A long-term record of stable or increasing dividends is widely viewed by investors as a sign of a company's financial stability. **Special dividends** are used when favorable circumstances allow the firm to make a one-time cash payment to shareholders, in addition to any regular dividends the firm pays. Many cyclical firms (e.g., automakers) will use a special dividend to share profits with shareholders when times are good but maintain the flexibility to conserve cash when profits are poor. Other names for special dividends include *extra dividends* and *irregular dividends*.

Stock dividends are dividends paid out in new shares of stock rather than cash. In this case, there will be more shares outstanding, but each one will be worth less. Total shareholders' equity remains unchanged. Stock dividends are commonly expressed as a percentage. A 20% stock dividend means every shareholder gets 20% more stock.

Stock splits divide each existing share into multiple shares, creating more shares. There are now more shares, but the price of each share will drop correspondingly to the number of shares created, so there is no change in the owner's wealth. Splits are expressed as a ratio. In a 3-for-1 stock split, each old share is split into three new shares. Stock splits are currently more common than stock dividends.

Reverse stock splits are the opposite of stock splits. After a reverse split, there are fewer shares outstanding but there is a higher stock price. Because these factors offset one another, shareholder wealth is unchanged.

A **share repurchase** is a transaction in which a company buys outstanding shares of its own common stock. Share repurchases are an alternative to cash dividends as a way of distributing cash to shareholders, and they have the same effect on shareholders' wealth as cash dividends of the same size. A company might repurchase shares to support their price or to signal that management believes the shares are undervalued. Share repurchases may also be used to offset an increase in outstanding shares from the exercise of employee stock options. In countries that tax capital gains at lower rates than dividends, shareholders may prefer share repurchases to dividend payments as a way to distribute cash to shareholders.

LOS 46.d: Describe dividend payment chronology.

The dates relevant to dividend payments are shown in Figure 46.1.

Figure 46.1: Dividend Payment Chronology
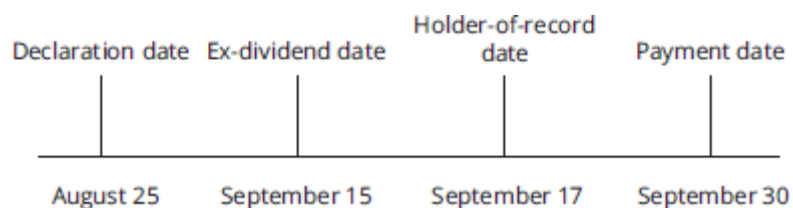
Declaration date. The date the board of directors approves payment of a dividend, specifying the per-share dividend amount, the date shareholders must own the stock to

receive the dividend (record date), and the date the dividend payment will be made (payment date).

Ex-dividend date. The first day on which a share purchaser will not receive the next dividend. The ex-dividend date is one or two business days before the holder-of-record date, depending on the settlement period for stock purchases. If you buy the share on or after the ex-dividend date, you will not receive the dividend.

Holder-of-record date (record date). The date on which all owners of shares become entitled to receive the dividend payment on their shares.

Payment date. The date dividend checks are mailed to, or payment is made electronically to, holders of record.

On the ex-dividend date, the share price will decrease from the previous day's closing price by approximately the amount of the dividend, in the absence of other factors affecting the stock price. Consider shares that are trading at $25 on the day prior to the ex-dividend date and will pay a $1 dividend. Purchasing a share on the day prior to the ex-dividend date will give the owner a share of stock and the $1 dividend on the payment date. Purchasing a share on the ex-dividend date will entitle the owner only to the share; the dividend payment will go to the seller.

MODULE QUIZ 46.1

1. An analyst estimates a value of $45 for a stock with a market price of $50. The analyst is *most likely* to conclude that a stock is overvalued if:
   A. few analysts follow the stock and the analyst has less confidence in his model inputs.
   B. few analysts follow the stock and the analyst is confident in his model inputs.
   C. many analysts follow the stock and the analyst is confident in his model inputs.

2. A valuation model based on free cash flow to equity is *most likely* to be a(n):
   A. multiplier model.
   B. asset-based model.
   C. present value model.

3. A company is evaluating the likely effects on its share price of declaring a 50% stock dividend or a 3-for-2 stock split. Other things equal, which of these will result in a lower share price?
   A. 3-for-2 stock split.
   B. 50% stock dividend.
   C. Both should have the same effect.

4. The first date on which the purchaser of a stock will not receive a dividend that has been declared is the:
   A. declaration date.
   B. ex-dividend date.

MODULE 46.2: DIVIDEND DISCOUNT MODELS

LOS 46.e: Explain the rationale for using present value models to value equity and describe the dividend discount and free-cash-flow-to-equity models.

The **dividend discount model (DDM)** is based on the rationale that the intrinsic value of stock is the present value of its future dividends.

The most general form of the model is as follows:

$$V_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1 + k_e)^t}$$

where:
V_0 = current stock value
D_t = dividend at time t
k_e = required rate of return on common equity

One-year holding period DDM. For a holding period of one year, the value of the stock today is the present value of any dividends during the year plus the present value of the expected price of the stock at the end of the year (referred to as its **terminal value**).

The one-year holding period DDM is simply:

$$\text{value} = \frac{\text{dividend to be received}}{(1 + k_e)} + \frac{\text{year-end price}}{(1 + k_e)}$$

> **EXAMPLE: One-period DDM valuation**
>
> Calculate the value of a stock that paid a $1 dividend last year, if next year's dividend will be 5% higher and the stock will sell for $13.45 at year-end. The required return is 13.2%.
>
> **Answer:**
>
> The next dividend is the current dividend increased by the estimated growth rate. In this case, we have:
>
> $$D_1 = D_0 \times (1 + \text{dividend growth rate}) = \$1.00 \times (1 + 0.05) = \$1.05$$
>
> The present value of the expected future cash flows is:
>
> $$\text{dividend: } \frac{\$1.05}{1.132} = \$0.93$$
> $$\text{year-end price: } \frac{\$13.45}{1.132} = \$11.88$$
>
> The current value based on the investor's expectations is:

> stock value = $0.93 + $11.88 = $12.81

Multiple-year holding period DDM. With a multiple-year holding period, we simply sum the present values of the estimated dividends over the holding period and the estimated terminal value.

For a two-year holding period, we have:

$$\text{value} = \frac{D_1}{(1 + k_e)} + \frac{D_2}{(1 + k_e)^2} + \frac{P_2}{(1 + k_e)^2}$$

PROFESSOR'S NOTE

It is useful to think of the subscript t on dividends (D_t) and prices (P_t) as the end of period t. For example, in the preceding equation, P_2 is the price at the end of Year 2. Think of it as the selling price of a share, immediately after D_2 is received.

EXAMPLE: Multiple-period DDM valuation

A stock recently paid a dividend of $1.50 which is expected to grow at 8% per year. The required rate of return of 12%. Calculate the value of this stock assuming that it will be priced at $51.00 three years from now.

Answer:

Find the PV of the future dividends:

$D_1 = \$1.50(1.08) = \$1.62$
$D_2 = \$1.50(1.08)^2 = \$1.75$
$D_3 = \$1.50(1.08)^3 = \$1.89$
PV of dividends = $\$1.62 / 1.12 + \$1.75 / (1.12)^2 + \$1.89 / (1.12)^3 = \$4.19$

Find the PV of the future price:

$\$51.00 / (1.12)^3 = \$36.30$

Add the present values. The current value based on the investor's expectations is $4.19 + $36.30 = $40.49.

The most general form of the DDM uses an infinite holding period because a corporation has an indefinite life. In an infinite-period DDM model, the present value of all expected future dividends is calculated and there is no explicit terminal value for the stock. In practice, as we will see, a terminal value can be calculated at a time in the future after which the growth rate of dividends is expected to be constant.

Free cash flow to equity (FCFE) is often used in discounted cash flow models instead of dividends because it represents the potential amount of cash that could be paid out to common shareholders. That is, FCFE reflects the firm's capacity to pay dividends. FCFE is also useful for firms that do not currently pay dividends.

FCFE is defined as the cash remaining after a firm meets all of its debt obligations and provides for the capital expenditures necessary to maintain existing assets and to purchase the new assets needed to support the assumed growth of the firm. In other words, it is the cash available to the firm's equity holders after a firm meets all of its other obligations. FCFE for a period is often calculated as:

$$FCFE = \text{net income} + \text{depreciation} - \text{increase in working capital} - \text{fixed capital}$$
$$\text{investment (FCInv)} - \text{debt principal repayments} + \text{new debt issues}$$

FCFE can also be calculated as:

$$FCFE = \text{cash flow from operations} - FCInv + \text{net borrowing}$$

In the second formula, **net borrowing** is the increase in debt during the period (i.e., amount borrowed minus amount repaid) and is assumed to be available to shareholders. Fixed capital investment must be subtracted because the firm must invest in assets to sustain itself. FCFE is projected for future periods using the firm's financial statements.

Restating the general form of the DDM in terms of FCFE, we have:

$$V_0 = \sum_{t=1}^{\infty} \frac{FCFE_t}{(1 + k_e)^t}$$

Estimating the Required Return for Equity

The capital asset pricing model (CAPM) provides an estimate of the required rate of return (k_i) for security i as a function of its systematic risk (β_i), the risk-free rate (R_f), and the expected return on the market [$E(R_{mkt})$] as:

$$k_i = R_f + \beta_i[E(R_{mkt}) - R_f]$$

There is some controversy over whether the CAPM is the best model to calculate the required return on equity. Also, different analysts will likely use different inputs, so there is no single number that is correct.

> **PROFESSOR'S NOTE**
> The CAPM is discussed in detail in Portfolio Management.

For firms with publicly traded debt, analysts often estimate the required return on the firm's common equity by adding a risk premium to the firm's current bond yield. If the firm does not have publicly traded debt, an analyst can add a larger risk premium to a government bond yield.

LOS 46.g: Calculate the intrinsic value of a non-callable, non-convertible preferred stock.

> **PROFESSOR'S NOTE**
> At the end of this reading we will address the LOS that concerns advantages and disadvantages of each category of valuation model.

Preferred stock pays a dividend that is usually fixed and usually has an indefinite maturity. When the dividend is fixed and the stream of dividends is infinite, the infinite period dividend discount model reduces to a simple ratio:

$$\text{preferred stock value} = \frac{D_p}{(1+k_p)^1} + \frac{D_p}{(1+k_p)^2} + \dots + \frac{D_p}{(1+k_p)^x} = \frac{D_p}{k_p}$$

> ### EXAMPLE: Preferred stock valuation
>
> A company's $100 par preferred stock pays a $5.00 annual dividend and has a required return of 8%. Calculate the value of the preferred stock.
>
> **Answer:**
>
> Value of the preferred stock: $D_p / k_p = \$5.00 / 0.08 = \$62.50$

LOS 46.h: Calculate and interpret the intrinsic value of an equity security based on the Gordon (constant) growth dividend discount model or a two-stage dividend discount model, as appropriate.

The **Gordon growth model** (or **constant growth model**) assumes the annual growth rate of dividends, g_c, is constant. Hence, next period's dividend, D_1, is $D_0(1 + g_c)$, the second year's dividend, D_2, is $D_0(1 + g_c)^2$, and so on. The extended equation using this assumption gives the present value of the expected future dividends (V_0) as:

$$V_0 = \frac{D_0(1+g_c)}{(1+k_e)} + \frac{D_0(1+g_c)^2}{(1+k_e)^2} + \frac{D_0(1+g_c)^3}{(1+k_e)^3} + \dots + \frac{D_0(1+g_c)^\infty}{(1+k_e)^\infty}$$

When the growth rate of dividends is constant, this equation simplifies to the Gordon (constant) growth model:

$$V_0 = \frac{D_0(1+g_c)}{k_e - g_c} = \frac{D_1}{k_e - g_c}$$

> 🎓 **PROFESSOR'S NOTE**
> In much of the finance literature, you will see this model referred to as the constant growth DDM, infinite period DDM, or the Gordon growth model. Whatever you call it, memorize D_1 over (k minus g). Note that our valuation model for preferred stock is the same as the constant growth model with no growth ($g = 0$).

The assumptions of the Gordon growth model are:

- Dividends are the appropriate measure of shareholder wealth.
- The constant dividend growth rate, g_c, and required return on stock, k_e, are never expected to change.
- k_e must be greater than g_c. If not, the math will not work.

If any one of these assumptions is not met, the model is not appropriate.

PROFESSOR'S NOTE

When doing stock valuation problems on the exam, watch for words like "forever," "infinitely," "indefinitely," "for the foreseeable future," and so on. This will tell you that the Gordon growth model should be used. Also watch for words like "just paid" or "recently paid." These will refer to the last dividend, D_0. Words like "will pay" or "is expected to pay" refer to D_1.

This example demonstrates that the stock's value is determined by the relationship between the investor's required rate of return on equity, k_e, and the projected growth rate of dividends, g_c:

- As the difference between k_e and g_c widens, the value of the stock falls.
- As the difference narrows, the value of the stock rises.
- Small changes in the difference between k_e and g_c can cause large changes in the stock's value.

Because the estimated stock value is very sensitive to the denominator, an analyst should calculate several different value estimates using a range of required returns and growth rates.

An analyst can also use the Gordon growth model to determine how much of the estimated stock value is due to dividend growth. To do this, assume the growth rate is zero and calculate a value. Then, subtract this value from the stock value estimated using a positive growth rate.

$$\$40.50 - \$12.50 = \$28.00$$

Estimating the Growth Rate in Dividends

To estimate the growth rate in dividends, the analyst can use three methods:

1. Use the historical growth in dividends for the firm.
2. Use the median industry dividend growth rate.
3. Estimate the sustainable growth rate.

The **sustainable growth rate** is the rate at which equity, earnings, and dividends can continue to grow indefinitely assuming that ROE is constant, the dividend payout ratio is constant, and no new equity is sold.

$$\text{sustainable growth} = (1 - \text{dividend payout ratio}) \times \text{ROE}$$

The quantity (1 – dividend payout ratio) is also referred to as the **retention rate**, the proportion of net income that is not paid out as dividends and goes to retained earnings, thus increasing equity.

> **EXAMPLE: Sustainable growth rate**
>
> Green, Inc., is expected to pay dividends equal to 25% of earnings. Green's ROE is 21%. Calculate and interpret its sustainable growth rate.
>
> **Answer:**
>
> $$g = (1 - 0.25) \times 21\% = 15.75\%$$
>
> With long-run economic growth typically in the single digits, it is unlikely that a firm could sustain 15.75% growth forever. The analyst should also examine the growth rate for the industry and the firm's historical growth rate to determine whether the estimate is reasonable.

Some firms do not currently pay dividends but are expected to begin paying dividends at some point in the future. A firm may not currently pay a dividend because it is in financial distress and cannot afford to pay out cash or because the return the firm can earn by reinvesting cash is greater than what stockholders could expect to earn by investing dividends elsewhere.

For these firms, an analyst must estimate the amount and timing of the first dividend in order to use the Gordon growth model. Because these parameters are highly uncertain, the analyst should check the estimate from the Gordon growth model against estimates made using other models.

> **EXAMPLE: A firm with no current dividend**
>
> A firm currently pays no dividend but is expected to pay a dividend at the end of Year 4. Year 4 earnings are expected to be $1.64, and the firm will maintain a

dividend payout ratio of 50%. Assuming a constant growth rate of 5% and a required rate of return of 10%, estimate the current value of this stock.

Answer:

The first step is to find the value of the stock at the end of Year 3. Remember, P_3 is the present value of dividends in Years 4 through infinity, calculated at the end of Year 3, one period *before* the first dividend is paid.

Calculate D_4, the estimate of the dividend that will be paid at the end of Year 4:

$D_4 = (\text{dividend payout ratio})(E_4) = (0.5)(1.64) = \$0.82$

Apply the constant growth model to estimate V_3:

$V_3 = D_4 / (k_e - g_c) = \$0.82 / (0.10 - 0.05) = \$16.40$

The second step is to calculate the current value, V_0:

$V_0 = 16.40 / 1.1^3 = \$12.32$

Multistage Dividend Growth Models

A firm may temporarily experience a growth rate that exceeds the required rate of return on the firm's equity, but no firm can maintain this relationship indefinitely. A firm with an extremely high growth rate will attract competition, and its growth rate will eventually fall. We must assume the firm will return to a more sustainable rate of growth at some point in the future in order to calculate the present value of expected future dividends.

One way to value a dividend-paying firm that is experiencing temporarily high growth is to add the present values of dividends expected during the high-growth period to the present value of the constant growth value of the firm at the end of the high-growth period. This is referred to as the **multistage dividend discount model**.

$$\text{value} = \frac{D_1}{(1+k_e)} + \frac{D_2}{(1+k_e)^2} + \cdots + \frac{D_n}{(1+k_e)^n} + \frac{P_n}{(1+k_e)^n}$$

where $P_n = \dfrac{D_{n+1}}{k_e - g_c}$ is the terminal stock value, assuming that dividends at

$t = n + 1$ and beyond grow at a constant rate of g_c.

Steps in using the multistage model:

- Determine the discount rate, k_e.
- Project the size and duration of the high initial dividend growth rate, g^*.
- Estimate dividends during the high-growth period.
- Estimate the constant growth rate at the end of the high-growth period, g_c.
- Estimate the first dividend of the constant growth period.
- Use this dividend to calculate the stock value at the end of the high-growth period.

- Add the PVs of all dividends during the high-growth period to the PV of the value of the stock at the end of the high-growth period.

EXAMPLE: Multistage growth

Consider a stock with dividends that are expected to grow at 15% per year for two years, after which they are expected to grow at 5% per year, indefinitely. The last dividend paid was $1.00, and k_e = 11%. Calculate the value of this stock using the multistage growth model.

Answer:

Calculate the dividends over the high-growth period:

$$D_1 = D_0(1 + g*) = 1.00(1.15) = \$1.15$$
$$D_2 = D_1(1 + g*) = 1.15(1.15) = 1.15^2 = \$1.32$$

Calculate the first dividend of the constant-growth period:

$$D_3 = D_2(1 + g) = 1.32 \times 1.05 = \$1.386$$

Use the constant growth model to get P2, a value for all the (infinite) dividends expected from time = 3 onward:

$$P_2 = \frac{D_3}{k_e - g_c} = \frac{1.386}{0.11 - 0.05} = \$23.10$$

Finally, we can sum the present values of dividends 1 and 2 and of P2 to get the present value of all the expected future dividends during both the high-growth and constant-growth periods:

$$\frac{1.15}{1.11} + \frac{1.32 + 23.10}{(1.11)^2} = \$20.86$$

LOS 46.i: Identify characteristics of companies for which the constant growth or a multistage dividend discount model is appropriate.

The Gordon growth model uses a single constant growth rate of dividends and is most appropriate for valuing stable and mature, non-cyclical, dividend-paying firms.

For dividend-paying firms with dividends that are expected to grow rapidly, slowly, or erratically over some period, followed by constant dividend growth, some form of the multistage growth model should be employed. The important points are that dividends must be estimable and must grow at a constant rate after some initial period so that the constant growth model can be used to determine the terminal value of the stock. Thus, we can apply multistage dividend growth models to a firm with high current growth that will drop to a stable rate in the future or to a firm that is temporarily losing market share and growing slowly or getting smaller, as long as its growth is expected to stabilize to a constant rate at some point in the future.

One variant of a multistage growth model assumes that the firm has three stages of dividend growth, not just two. These three stages can be categorized as growth,

transition, and maturity. A 3-stage model would be suitable for firms with an initial high growth rate, followed by a lower growth rate during a second, transitional period, followed by the constant growth rate in the long run, such as a young firm still in the high growth phase.

When a firm does not pay dividends, estimates of dividend payments some years in the future are highly speculative. In this case, and in any case where future dividends cannot be estimated with much confidence, valuation based on FCFE is appropriate as long as growth rates of earnings can be estimated. In other cases, valuation based on price multiples may be more appropriate.

MODULE QUIZ 46.2

1. The constant growth model requires which of the following?
   A. $g < k$.
   B. $g > k$.
   C. $g \neq k$.

2. What would an investor be willing to pay for a share of preferred stock that pays an annual $7 dividend if the required return is 7.75%?
   A. $77.50.
   B. $87.50.
   C. $90.32.

3. An analyst estimates that a stock will pay a $2 dividend next year and that it will sell for $40 at year-end. If the required rate of return is 15%, what is the value of the stock?
   A. $33.54.
   B. $36.52.
   C. $43.95.

4. What is the intrinsic value of a company's stock if dividends are expected to grow at 5%, the most recent dividend was $1, and investors' required rate of return for this stock is 10%?
   A. $20.00.
   B. $21.00.
   C. $22.05.

5. Assume that a stock is expected to pay dividends at the end of Year 1 and Year 2 of $1.25 and $1.56, respectively. Dividends are expected to grow at a 5% rate thereafter. Assuming that k_e is 11%, the value of the stock is *closest* to:
   A. $22.30.
   B. $23.42.
   C. $24.55.

6. An analyst feels that Brown Company's earnings and dividends will grow at 25% for two years, after which growth will fall to a constant rate of 6%. If the projected discount rate is 10%, and Brown's most recently paid dividend was $1, the value of Brown's stock using the multistage dividend discount model is *closest* to:
   A. $31.25.
   B. $33.54.
   C. $36.65.

7. Which of the following firms would *most likely* be appropriately valued using the constant growth DDM?
   A. An auto manufacturer.

B. A producer of bread and snack foods.

C. A biotechnology firm in existence for two years.

MODULE 46.3: RELATIVE VALUATION MEASURES

LOS 46.j: Explain the rationale for using price multiples to value equity, how the price to earnings multiple relates to fundamentals, and the use of multiples based on comparables.

Because the dividend discount model is very sensitive to its inputs, many investors rely on other methods. In a **price multiple** approach, an analyst compares a stock's price multiple to a benchmark value based on an index, industry group of firms, or a peer group of firms within an industry. Common price multiples used for valuation include price-to-earnings, price-to-cash flow, price-to-sales, and price-to-book value ratios.

Price multiples are widely used by analysts and readily available in numerous media outlets. Price multiples are easily calculated and can be used in time series and cross-sectional comparisons. Many of these ratios have been shown to be useful for predicting stock returns, with low multiples associated with higher future returns.

A critique of price multiples is that they reflect only the past because historical (trailing) data are often used in the denominator. For this reason, many practitioners use forward (leading or prospective) values in the denominator. The use of projected values can result in much different ratios. An analyst should be sure to use price multiple calculations consistently across firms.

When we compare a price multiple, such as P/E, for a firm to those of other firms based on market prices, we are using **price multiples based on comparables**. By contrast, **price multiples based on fundamentals** tell us what a multiple should be based on some valuation model and therefore are not dependent on the current market prices of other companies to establish value.

LOS 46.k: Calculate and interpret the following multiples: price to earnings, price to an estimate of operating cash flow, price to sales, and price to book value.

Price multiples used for valuation include:

- **Price-earnings (P/E) ratio:** The P/E ratio is a firm's stock price divided by earnings per share and is widely used by analysts and cited in the press.
- **Price-sales (P/S) ratio:** The P/S ratio is a firm's stock price divided by sales per share.
- **Price-book value (P/B) ratio:** The P/B ratio is a firm's stock price divided by book value of equity per share.
- **Price-cash flow (P/CF) ratio:** The P/CF ratio is a firm's stock price divided by cash flow per share, where cash flow may be defined as operating cash flow or free cash flow.

Other multiples can be used that are industry specific. For example, in the cable television industry, stock market capitalization is compared to the number of subscribers.

Multiples Based on Fundamentals

To understand fundamental price multiples, consider the Gordon growth valuation model:

$$P_0 = \frac{D_1}{k-g}$$

If we divide both sides of the equation by next year's projected earnings, E_1, we get

$$\frac{P_0}{E_1} = \frac{D_1/E_1}{k-g}$$

which is the leading P/E for this stock if it is valued in the market according to the constant growth DDM.

This P/E based on fundamentals is also referred to as a **justified P/E**. It is "justified" because, assuming we have the correct inputs for D_1, E_1, k_e, and g, the previous equation will provide a P/E ratio that is based on the present value of the future cash flows. We refer to this as a *leading P/E ratio* because it is based on expected earnings next period, not on actual earnings for the previous period, which would produce a lagging or *trailing P/E ratio*.

One advantage of this approach is that it makes clear how the firm's P/E ratio should be related to its fundamentals. It illustrates that the P/E ratio is a function of:

- D_1 / E_1 = expected dividend payout ratio.
- k = required rate of return on the stock.
- g = expected constant growth rate of dividends.

EXAMPLE: P/E based on fundamentals

A firm has an expected dividend payout ratio of 30%, a required rate of return of 13%, and an expected dividend growth rate of 6%. Calculate the firm's fundamental (justified) leading P/E ratio.

Answer:

expected P/E ratio: $0.3 / (0.13 - 0.06) = 4.3$

The justified P/E ratio serves as a benchmark for the price at which the stock should trade. In the previous example, if the firm's actual P/E ratio (based on the market price and expected earnings) was 8, the stock would be considered overvalued. If the firm's market P/E ratio was 2, the stock would be considered undervalued.

P/E ratios based on fundamentals are very sensitive to the inputs (especially the denominator, k − g), so the analyst should use several different sets of inputs to indicate a range for the justified P/E.

Because we started with the equation for the constant growth DDM, the P/E ratio calculated in this way is the P/E ratio consistent with the constant growth DDM. We can see from the formula that, *other things equal*, the P/E ratio we have defined here will increase with (1) a higher dividend payout rate, (2) a higher growth rate, or (3) a lower required rate of return. So, if the subject firm has a higher dividend payout ratio, higher growth rate, and lower required return than its peers, a higher P/E ratio may be justified.

In practice, other things are not equal. An increase in the dividend payout ratio, for example, will reduce the firm's sustainable growth rate. While higher dividends will increase firm value, a lower growth rate will decrease firm value. This relationship is referred to as the **dividend displacement of earnings**. The net effect on firm value of increasing the dividend payout ratio is ambiguous. As intuition would suggest, firms cannot continually increase their P/Es or market values by increasing the dividend payout ratio. Otherwise, all firms would have 100% payout ratios.

> **PROFESSOR'S NOTE**
> Watch for the wording "other things equal" or "other variables unchanged" in any exam questions about the effect of changing one variable.

EXAMPLE: Fundamental P/E ratio comparison

Holt Industries makes decorative items. The following figures are for Holt and its industry.

	Holt Industries	Industry Average
Dividend payout ratio	25%	16%
Sales growth	7.5%	3.9%
Total debt to equity	113%	68%

Which of these factors suggest a higher fundamental P/E ratio for Holt?

Answer:

- The higher dividend payout ratio supports Holt having a higher P/E ratio than the industry.

- Higher growth in sales suggests that Holt will be able to increase dividends at a faster rate, which supports Holt having a higher P/E ratio than the industry.

- The higher level of debt, however, indicates that Holt has higher risk and a higher required return on equity, which supports Holt having a lower P/E ratio than the industry.

Multiples Based on Comparables

Valuation based on price multiple comparables (or comps) involves using a price multiple to evaluate whether an asset is valued properly relative to a benchmark. Common benchmarks include the stock's historical average (a time series comparison)

or similar stocks and industry averages (a cross-sectional comparison). Comparing firms within an industry is useful for analysts who are familiar with a particular industry. Price multiples are readily calculated and provided by many media outlets.

The economic principle guiding this method is the **law of one price**, which asserts that two identical assets should sell at the same price, or in this case, two comparable assets should have approximately the same multiple.

The analyst should be sure that any comparables used really are comparable. Price multiples may not be comparable across firms if the firms are different sizes, are in different industries, or will grow at different rates. Furthermore, using P/E ratios for cyclical firms is complicated due to their sensitivity to economic conditions. In this case, the P/S ratio may be favored over the P/E ratio because the sales are less volatile than earnings due to both operating and financial leverage.

The disadvantages of using price multiples based on comparables are (1) a stock may appear overvalued by the comparable method but undervalued by the fundamental method, or vice versa; (2) different accounting methods can result in price multiples that are not comparable across firms, especially internationally; and (3) price multiples for cyclical firms may be greatly affected by economic conditions at a given point in time.

EXAMPLE: Valuation using comparables

The following figures are for Renee's Bakery. All figures except the stock price are in millions.

Fiscal Year-End	20X3	20X2	20X1
Total stockholder's equity	$55.60	$54.10	$52.60
Net revenues	$77.30	$73.60	$70.80
Net income	$3.20	$1.10	$0.40
Net cash flow from operations	$17.90	$15.20	$12.20
Stock price	$11.40	$14.40	$12.05
Shares outstanding	4.476	3.994	3.823

Calculate Renee's lagging P/E, P/CF, P/S, and P/B ratios. Judge whether the firm is undervalued or overvalued using the following relevant industry averages for 20X3 and the firm's historical trend.

Lagging Industry Ratios	20X3
Price-to-earnings	8.6
Price-to-cash flow	4.6
Price-to-sales	1.4
Price-to-book value	3.6

Answer:

To calculate the lagging price multiples, first divide the relevant financial statement items by the number of shares to get per-share amounts. Then, divide the stock price by this figure.

For example, for the P/S ratio for 20X3, divide net revenue (net sales) by the number of shares:

$$\frac{sales}{number\ of\ shares} = \frac{\$77.30}{4.476} = 17.270$$

Then, divide the stock price by sales per share:

$$\frac{P}{S} = \frac{\$11.40}{17.3} = 0.7$$

Using the net income for earnings, the net cash flow from operations for the cash flow, and stockholder's equity for book value, the ratios for Renee's Bakery are:

	20X3	20X2	20X1
P/E	15.9	52.3	115.2
P/CF	2.9	3.8	3.8
P/S	0.7	0.8	0.7
P/B	0.9	1.1	0.9

Comparing Renee's Bakery's ratios to the industry averages for 20X3, the price multiples are lower in all cases except for the P/E multiple. This cross-sectional evidence suggests that Renee's Bakery is undervalued.

The P/E ratio merits further investigation. Renee's Bakery may have a higher P/E because its earnings are depressed by high depreciation, interest expense, or taxes. Calculating the price-EBITDA ratio would provide an alternative measure that is unaffected by these expenses.

On a time series basis, the ratios are trending downward. This indicates that Renee's Bakery may be currently undervalued relative to its past valuations. We could also calculate average price multiples for the ratios over 20X1–20X3 as a benchmark for the current values:

Company average P/E 20X1–20X3	61.1
Company average P/CF 20X1–20X3	3.5
Company average P/S 20X1–20X3	0.7
Company average P/B 20X1–20X3	1.0

The current P/E, P/CF, and P/B ratios are lower than their 3-year averages. This indicates that Renee's Bakery may be currently undervalued. It also may be the case, however, that P/E ratios for the market as a whole have been decreasing over the period due to systematic factors.

LOS 46.l: Describe enterprise value multiples and their use in estimating equity value.

Enterprise value (EV) measures total company value. EV can be viewed as what it would cost to acquire the firm:

$$EV = \text{market value of common and preferred stock} + \text{market value of debt}$$
$$- \text{cash and short-term investments}$$

Cash and short-term investments are subtracted because an acquirer's cost for a firm would be decreased by the amount of the target's liquid assets. Although an acquirer assumes the firm's debt, it also receives the firm's cash and short-term investments. Enterprise value is appropriate when an analyst wants to compare the values of firms that have significant differences in capital structure.

EBITDA (earnings before interest, taxes, depreciation, and amortization are subtracted) is probably the most frequently used denominator for EV multiples; operating income can also be used. Because the numerator represents total company value, it should be compared to earnings of both debt and equity owners. An advantage of using EBITDA instead of net income is that EBITDA is usually positive even when earnings are not. When net income is negative, value multiples based on earnings are meaningless. A disadvantage of using EBITDA is that it often includes non-cash revenues and expenses.

A potential problem with using enterprise value is that the market value of a firm's debt is often not available. In this case, the analyst can use the market values of similar bonds or can use their book values. Book value, however, may not be a good estimate of market value if firm and market conditions have changed significantly since the bonds were issued.

EXAMPLE: Calculating EV/EBITDA multiples

Daniel, Inc., is a manufacturer of small refrigerators and other appliances. The following figures are from Daniel's most recent financial statements except for the market value of long-term debt, which has been estimated from financial market data.

Stock price	$40.00
Shares outstanding	200,000
Market value of long-term debt	$600,000
Book value of long-term debt	$900,000
Book value of total debt	$2,100,000
Cash and marketable securities	$250,000
EBITDA	$1,000,000

Calculate the EV/EBITDA multiple.

Answer:

First, we must estimate the market value of the firm's short-term debt and liabilities. To do so, subtract the book value of long-term debt from the book value of total debt: $2,100,000 − $900,000 = $1,200,000. This is the book value of the firm's short-term debt. We can assume the market value of these short-term items is close to their book value. (As we will see in the Fixed Income topic area, the market values of debt instruments approach their face values as they get close to maturity.)

Add the market value of long-term debt to get the market value of total debt: $600,000 + $1,200,000 = $1,800,000.

The market value of equity is the stock price multiplied by the number of shares: $40 × 200,000 = $8,000,000.

The enterprise value of the firm is the sum of debt and equity minus cash: $1,800,000 + $8,000,000 − $250,000 = $9,550,000.

$$\text{EV/EBITDA} = \$9{,}550{,}000\ /\ \$1{,}000{,}000 \approx 9.6$$

If the competitor or industry average EV/EBITDA is above 9.6, Daniel is relatively undervalued. If the competitor or industry average EV/EBITDA is below 9.6, Daniel is relatively overvalued.

LOS 46.m: Describe asset-based valuation models and their use in estimating equity value.

Our third category of valuation model is **asset-based models**, which are based on the idea that equity value is the market or fair value of assets minus the market or fair value of liabilities. Because market values of firm assets are usually difficult to obtain, the analyst typically starts with the balance sheet to determine the values of assets and liabilities. In most cases, market values are not equal to book values. Possible approaches to valuing assets are to value them at their depreciated values, inflation-adjusted depreciated values, or estimated replacement values.

Applying asset-based models is especially problematic for a firm that has a large amount of intangible assets, on or off the balance sheet. The effect of the loss of the current owners' talents and customer relationships on forward earnings may be quite difficult to measure. Analysts often consider asset-based model values as floor or minimum values when significant intangibles, such as business reputation, are involved. An analyst should consider supplementing an asset-based valuation with a more forward-looking valuation, such as one from a discounted cash flow model.

Asset-based model valuations are most reliable when the firm has primarily tangible short-term assets, assets with ready market values (e.g., financial or natural resource firms), or when the firm will cease to operate and is being liquidated. Asset-based models are often used to value private companies but may be increasingly useful for public firms as they move toward fair value reporting on the balance sheet.

EXAMPLE: Using an asset-based model for a public firm

Williams Optical is a publicly traded firm. An analyst estimates that the market value of net fixed assets is 120% of book value. Liability and short-term asset market values are assumed to equal their book values. The firm has 2,000 shares outstanding.

Using the selected financial results in the table, calculate the value of the firm's net assets on a per-share basis.

Cash	$10,000
Accounts receivable	$20,000
Inventories	$50,000
Net fixed assets	$120,000
Total assets	$200,000
Accounts payable	$5,000
Notes payable	$30,000
Term loans	$45,000
Common stockholder equity	$120,000
Total liabilities and equity	$200,000

Answer:

Estimate the market value of assets, adjusting the fixed assets for the analyst's estimates of their market values:

$\$10,000 + \$20,000 + \$50,000 + \$120,000(1.20) = \$224,000$

Determine the market value of liabilities:

$\$5,000 + \$30,000 + \$45,000 = \$80,000$

Calculate the adjusted equity value:

$\$224,000 - \$80,000 = \$144,000$

Calculate the adjusted equity value per share:

$\$144,000 / 2,000 = \$72$

LOS 46.f: Explain advantages and disadvantages of each category of valuation model.

Advantages of discounted cash flow models:

- They are based on the fundamental concept of discounted present value and are well grounded in finance theory.
- They are widely accepted in the analyst community.

Disadvantages of discounted cash flow models:

- Their inputs must be estimated.
- Value estimates are very sensitive to input values.

Advantages of comparable valuation using price multiples:

- Evidence that some price multiples are useful for predicting stock returns.
- Price multiples are widely used by analysts.
- Price multiples are readily available.
- They can be used in time series and cross-sectional comparisons.

- EV/EBITDA multiples are useful when comparing firm values independent of capital structure or when earnings are negative and the P/E ratio cannot be used.

Disadvantages of comparable valuation using price multiples:

- Lagging price multiples reflect the past.
- Price multiples may not be comparable across firms if the firms have different size, products, and growth.
- Price multiples for cyclical firms may be greatly affected by economic conditions at a given point in time.
- A stock may appear overvalued by the comparable method but undervalued by a fundamental method or vice versa.
- Different accounting methods can result in price multiples that are not comparable across firms, especially internationally.
- A negative denominator in a price multiple results in a meaningless ratio. The P/E ratio is especially susceptible to this problem.

Advantages of price multiple valuations based on fundamentals:

- They are based on theoretically sound valuation models.
- They correspond to widely accepted value metrics.

Disadvantage of price multiple valuations based on fundamentals:

- Price multiples based on fundamentals will be very sensitive to the inputs (especially the k – g denominator).

Advantages of asset-based models:

- They can provide floor values.
- They are most reliable when the firm has primarily tangible short-term assets, assets with ready market values, or when the firm is being liquidated.
- They are increasingly useful for valuing public firms that report fair values.

Disadvantages of asset-based models:

- Market values are often difficult to obtain.
- Market values are usually different than book values.
- They are inaccurate when a firm has a high proportion of intangible assets or future cash flows not reflected in asset values.
- Assets can be difficult to value during periods of hyperinflation.

MODULE QUIZ 46.3

1. Which of the following is *least likely* a rationale for using price multiples?
   A. Price multiples are easily calculated.
   B. The fundamental P/E ratio is insensitive to its inputs.

C. The use of forward values in the divisor provides an incorporation of the future.

2. A firm has an expected dividend payout ratio of 60% and an expected future growth rate of 7%. What should the firm's fundamental price-to-earnings (P/E) ratio be if the required rate of return on stocks of this type is 15%?
   A. 5.0×.
   B. 7.5×.
   C. 10.0×.

3. Enterprise value is defined as the market value of equity plus:
   A. the face value of debt minus cash and short-term investments.
   B. the market value of debt minus cash and short-term investments.
   C. cash and short-term investments minus the market value of debt.

4. Which of the following firms would *most appropriately* be valued using an asset-based model?
   A. An energy exploration firm in financial distress that owns drilling rights for offshore areas.
   B. A paper firm located in a country that is experiencing high inflation.
   C. A software firm that invests heavily in research and development and frequently introduces new products.

5. Which type of valuation model is viewed as having the disadvantage of producing results that may not be comparable across firms?
   A. Asset-based models.
   B. Price multiple models.
   C. Discounted cash flow models.

KEY CONCEPTS

LOS 46.a

An asset is fairly valued if the market price is equal to its estimated intrinsic value, undervalued if the market price is less than its estimated value, and overvalued if the market price is greater than the estimated value.

For security valuation to be profitable, the security must be mispriced now and price must converge to intrinsic value over the investment horizon.

Securities that are followed by many investors are more likely to be fairly valued than securities that are neglected by analysts.

LOS 46.b

Discounted cash flow models estimate the present value of cash distributed to shareholders (dividend discount models) or the present value of cash available to shareholders after meeting capital expenditures and working capital expenses (free cash flow to equity models).

Multiplier models compare the stock price to earnings, sales, book value, or cash flow. Alternatively, enterprise value is compared to sales or EBITDA.

Asset-based models define a stock's value as the firm's total asset value minus liabilities and preferred stock, on a per-share basis.

LOS 46.c

Regular cash dividends are paid at set intervals. A special dividend is a one-time cash payment to shareholders.

Stock dividends are additional shares of stock. Stock splits divide each existing share into multiple shares. In either case, the value of each share will decrease because the total value of outstanding shares is unchanged. The portion of the company owned by each shareholder is also unchanged.

In a reverse stock split, the number of shares owned by each shareholder is decreased, so total shares outstanding are decreased and the value of a single share is increased.

A share repurchase is a purchase by the company of its outstanding shares. Share repurchases are an alternative to cash dividends as a way to distribute cash to shareholders.

LOS 46.d

Dividend payment chronology:

- Declaration date: The date the board of directors approves payment of the dividend.
- Ex-dividend date: The first day a share of stock trades without the dividend, one or two business days before the holder-of-record date. On the ex-dividend date, the value of each share decreases by the amount of the dividend.
- Holder-of-record date: The date on which share owners who will receive the dividend are identified.
- Payment date. The date the dividend checks are sent to, or payment is transferred to, shareholders.

LOS 46.e

The dividend discount model is based on the rationale that a corporation has an indefinite life, and a stock's value is the present value of its future cash dividends. The most general form of the model is:

$$V_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1 + k_e)^t}$$

Free cash flow to equity (FCFE) can be used instead of dividends. FCFE is the cash remaining after a firm meets all of its debt obligations and provides for necessary capital expenditures. FCFE reflects the firm's capacity for dividends and is useful for firms that currently do not pay a dividend. By using FCFE, an analyst does not need to project the amount and timing of future dividends.

LOS 46.f

Advantages of discounted cash flow models:

- Easy to calculate.
- Widely accepted in the analyst community.
- FCFE model is useful for firms that currently do not pay a dividend.
- Gordon growth model is useful for stable, mature, noncyclical firms.

- Multistage models can be used for firms with nonconstant growth.

Disadvantages of discounted cash flow models:

- Inputs must be forecast.
- Estimates are very sensitive to inputs.
- For the Gordon growth model specifically:
  – Very sensitive to the k – g denominator.
  – Required return on equity must be greater than the growth rate.
  – Required return on equity and growth rate must remain constant.
  – Firm must pay dividends.

Advantages of price multiples:

- Often useful for predicting stock returns.
- Widely used by analysts.
- Easily calculated and readily available.
- Can be used in time series and cross-sectional comparisons.
- EV/EBITDA multiples are useful when comparing firm values independent of capital structure or when earnings are negative and the P/E ratio cannot be used.

Disadvantages of price multiples:

- P/E ratio based on fundamentals will be very sensitive to the inputs.
- May not be comparable across firms, especially internationally.
- Multiples for cyclical firms may be greatly affected by economic conditions. P/E ratio may be especially inappropriate. The P/S multiple may be more appropriate for cyclical firms.
- A stock may appear overvalued by the comparable method but undervalued by the fundamental method or vice versa.
- Negative denominator results in a meaningless ratio; the P/E ratio is especially susceptible to this problem.
- A potential problem with EV/EBITDA multiples is that the market value of a firm's debt is often not available.

Advantages of asset-based models:

- Can provide floor values.
- Most reliable when the firm has mostly tangible short-term assets, assets with a ready market value, or when the firm is being liquidated.
- May be increasingly useful for valuing public firms if they report fair values.

Disadvantages of asset-based models:

- Market values of assets can be difficult to obtain and are usually different than book values.
- Inaccurate when a firm has a large amount of intangible assets or future cash flows not reflected in asset value.

- Asset values can be difficult to value during periods of hyperinflation.

LOS 46.g

Preferred stock typically pays a fixed dividend and does not mature. It is valued as:

$$\text{preferred stock value} = \frac{D_p}{k_p}$$

LOS 46.h

The Gordon growth model assumes the growth rate in dividends is constant:

$$V_0 = \frac{D_1}{k_e - g_c}$$

The sustainable growth rate is the rate at which earnings and dividends can continue to grow indefinitely:

$$g = b \times ROE$$

where:
b   = earnings retention rate = $1 -$ dividend payout ratio
ROE = return on equity

A firm with high growth over some number of periods followed by a constant growth rate of dividends forever can be valued using a multistage model:

$$\text{value} = \frac{D_1}{(1 + k_e)} + \frac{D_2}{(1 + k_e)^2} + \ldots + \frac{D_n}{(1 + k_e)^n} + \frac{P_n}{(1 + k_e)^n}$$

where:
$$P_n = \frac{D_{n+1}}{k_e - g_c}$$
g_c = constant growth rate of dividends
n = number of periods of supernormal growth

LOS 46.i

The constant growth model is most appropriate for firms that pay dividends that grow at a constant rate, such as stable and mature firms or noncyclical firms such as utilities and food producers in mature markets.

A 2-stage DDM would be most appropriate for a firm with high current growth that will drop to a stable rate in the future, an older firm that is experiencing a temporary high growth phase, or an older firm with a market share that is decreasing but expected to stabilize.

A 3-stage model would be appropriate for a young firm still in a high growth phase.

LOS 46.j

The P/E ratio based on fundamentals is calculated as:

$$\frac{P_0}{E_1} = \frac{D_1/E_1}{k - g}$$

If the subject firm has a higher dividend payout ratio, higher growth rate, and lower required return than its peers, it may be justified in having a higher P/E ratio.

Price multiples are widely used by analysts, are easily calculated and readily available, and can be used in time series and cross-sectional comparisons.

LOS 46.k

The price-earnings (P/E) ratio is a firm's stock price divided by earnings per share.

The price-sales (P/S) ratio is a firm's stock price divided by sales per share.

The price-book value (P/B) ratio is a firm's stock price divided by book value per share.

The price-cash flow (P/CF) ratio is a firm's stock price divided by cash flow per share. Cash flow may be defined as operating cash flow or free cash flow.

LOS 46.l

Enterprise value (EV) measures total company value:

$$\text{enterprise value} = \text{market value of common and preferred stock} + \text{market value}$$
$$\text{of debt} - \text{cash and short-term investments}$$

EBITDA is frequently used as the denominator in EV multiples because EV represents total company value, and EBITDA represents earnings available to all investors.

LOS 46.m

Asset-based models value equity as the market or fair value of assets minus liabilities. These models are most appropriate when a firm's assets are largely tangible and have fair values that can be established easily.

ANSWER KEY FOR MODULE QUIZZES

Module Quiz 46.1

1. **B** If the analyst is more confident of his input values, he is more likely to conclude that the security is overvalued. The market price is more likely to be correct for a security followed by many analysts and less likely correct when few analysts follow the security. (LOS 46.a)

2. **C** One example of a present value model is valuation based on the present value of future cash flows available to equity holders. (LOS 46.b)

3. **C** Both a 50% stock dividend and a 3-for-2 stock split will increase the number of shares by 50%, while neither will affect value of the company. Therefore, the decrease in the share price should be the same in either case. (LOS 46.c)

4. **B** The chronology of a dividend payout is declaration date, ex-dividend date, holder-of-record date, and payment date. The ex-dividend date is the cutoff date for receiving the dividend: stocks purchased on or after the ex-dividend date will not receive the dividend. (LOS 46.d)

Module Quiz 46.2

1. **A** For the constant growth model, the constant growth rate (g) must be less than the required rate of return (k). (LOS 46.e)

2. **C** The share value is 7.0 / 0.0775 = $90.32. (LOS 46.g)

3. **B** ($40 + $2) / 1.15 = $36.52

    (LOS 46.h)

4. **B** Using the constant growth model, $1(1.05) / (0.10 − 0.05) = $21.00. (LOS 46.h)

5. **C** $D_3 = D_2(1 + g) = 1.56 \times 1.05 = \$1.638$

$$P_2 = \frac{D_3}{k_e - g_c} = \frac{1.638}{0.11 - 0.05} = \$27.30$$

$$\frac{1.25}{1.11} + \frac{1.56 + 27.30}{(1.11)^2} = \$24.55$$

    (LOS 46.h)

6. **C** $D_1 = \$1.00(1.25) = \$1.25$
$D_2 = \$1.25(1.25) = \$1.5625$
$D_3 = 1.5625 \times 1.06 = \$1.6563$

$$P_2 = \frac{1.6563}{0.10 - 0.06} = \$41.41$$

$$\frac{1.25}{1.10} + \frac{1.5625 + 41.41}{(1.10)^2} = \$36.65$$

    (LOS 46.h)

7. **B** The constant growth DDM assumes that the dividend growth rate is constant. The most likely choice here is the bread and snack producer. Auto manufacturers are more likely to be cyclical than to experience constant growth. A biotechnology firm in existence for two years is unlikely to pay a dividend, and if it does, dividend growth is unlikely to be constant. (LOS 46.i)

Module Quiz 46.3

1. **B** The fundamental P/E ratio is sensitive to its inputs. It uses the DDM as its framework, and the denominator k − g in both has a large impact on the calculated P/E or stock value. (LOS 46.j)

2. **B** Using the earnings multiplier model, 0.6 / (0.15 − 0.07) = 7.5×. (LOS 46.k)

3. **B** Enterprise value is market value of equity plus market value of debt minus cash and short-term investments. (LOS 46.l)

4. **A** The energy exploration firm would be most appropriately valued using an asset-based model. Its near-term cash flows are likely negative, so a forward-looking model is of limited use. Furthermore, it has valuable assets in the form of drilling rights that likely have a readily determined market value. The paper firm would likely not be appropriately valued using an asset-based model because high inflation makes the values of a firm's assets more difficult to estimate. An asset-

based model would not be appropriate to value the software firm because the firm's value largely consists of internally developed intangible assets. (LOS 46.m)

5. **B** Results that may not be comparable across firms are considered a disadvantage of valuation models based on price multiples. (LOS 46.f)

You have now finished the Equity Investments topic section. Please log into your Schweser online dashboard and take the Topic Quiz on this section. The Topic Quiz provides immediate feedback on how effective your study has been for this material. Questions are more exam-like than typical Module Quiz or QBank questions; a score of less than 70% indicates that your study likely needs improvement. These tests are best taken timed; allow 1.5 minutes per question.

FORMULAS

Free cash flow to the firm:

$$FCFF = NI + NCC + [Int \times (1 - \text{tax rate})] - FC_{INV} - WC_{INV}$$

where:

NI $= $ net income

NCC $= $ noncash charges (depreciation and amortization)

Int $= $ cash interest paid

FC_{INV} $= $ fixed capital investment (net capital expenditures)

WC_{INV} $= $ working capital investment

Or:

$$FCFF = CFO + [Int \times (1 - \text{tax rate})] - FC_{INV}$$

where:

CFO $= $ cash flow from operations

Int $= $ cash interest paid

FC_{INV} $= $ fixed capital investment (net capital expenditures)

Free cash flow to equity:

$$FCFE = CFO - FC_{INV} + \text{net borrowing}$$

where:

CFO $= $ cash flow from operations

FC_{INV} $= $ fixed capital investment (net capital expenditures)

net borrowing $= $ debt issued $- $ debt repaid

$$\text{cash-flow-to-revenue ratio} = \frac{\text{CFO}}{\text{net revenue}}$$

$$\text{cash-return-on-assets ratio} = \frac{\text{CFO}}{\text{average total assets}}$$

$$\text{cash-return-on-equity ratio} = \frac{\text{CFO}}{\text{average total equity}}$$

$$\text{cash-to-income ratio} = \frac{\text{CFO}}{\text{operating income}}$$

$$\text{cash flow per share} = \frac{\text{CFO} - \text{preferred dividends}}{\text{weighted average number of common shares}}$$

$$\text{debt coverage} = \frac{\text{CFO}}{\text{total debt}}$$

$$\text{interest coverage} = \frac{\text{CFO} + \text{interest paid} + \text{taxes paid}}{\text{interest paid}}$$

$$\text{reinvestment} = \frac{\text{CFO}}{\text{cash paid for long-term assets}}$$

$$\text{debt payment} = \frac{\text{CFO}}{\text{cash long-term debt repayment}}$$

$$\text{dividend payment} = \frac{\text{CFO}}{\text{dividends paid}}$$

$$\text{investing and financing} = \frac{\text{CFO}}{\text{cash outflows from investing and financing activities}}$$

$$\text{average age} = \frac{\text{accumulated depreciation}}{\text{annual depreciation expense}}$$

$$\text{total useful life} = \frac{\text{historical cost (gross cost)}}{\text{annual depreciation expense}}$$

$$\text{remaining useful life} = \frac{\text{ending net PP\&E}}{\text{annual depreciation expense}}$$

$$\text{tax expense} = \text{tax payable} + \Delta\text{DTL} - \Delta\text{DTA}$$

$$\text{effective tax rate} = \frac{\text{income tax expense}}{\text{pretax income}}$$

$$\text{cash tax rate} = \frac{\text{tax paid (cash)}}{\text{pretax income}}$$

$$\text{vertical common-size balance sheet ratios} = \frac{\text{balance sheet account}}{\text{total assets}}$$

$$\text{vertical common-size income statement ratios} = \frac{\text{income statement account}}{\text{sales}}$$

$$\text{receivables turnover} = \frac{\text{annual sales}}{\text{average receivables}}$$

$$\text{days of sales outstanding} = \frac{365}{\text{receivables turnover}}$$

$$\text{inventory turnover} = \frac{\text{cost of goods sold}}{\text{average inventory}}$$

$$\text{days of inventory on hand} = \frac{365}{\text{inventory turnover}}$$

$$\text{payables turnover} = \frac{\text{cost of goods sold}}{\text{average trade payables}}$$

$$\text{number of days of payables} = \frac{365}{\text{payables turnover ratio}}$$

$$\text{total asset turnover} = \frac{\text{revenue}}{\text{average total assets}}$$

$$\text{fixed asset turnover} = \frac{\text{revenue}}{\text{average net fixed assets}}$$

$$\text{working capital turnover} = \frac{\text{revenue}}{\text{average working capital}}$$

$$\text{current ratio} = \frac{\text{current assets}}{\text{current liabilities}}$$

$$\text{quick ratio} = \frac{\text{cash} + \text{marketable securities} + \text{receivables}}{\text{current liabilities}}$$

$$\text{cash ratio} = \frac{\text{cash} + \text{marketable securities}}{\text{current liabilities}}$$

$$\text{defensive interval} = \frac{\text{cash} + \text{marketable securities} + \text{receivables}}{\text{average daily expenditures}}$$

$$\text{cash conversion cycle} = \text{days' sales outstanding} + \text{days of inventory on hand} - \text{number of days of payables}$$

$$\text{debt-to-equity} = \frac{\text{total debt}}{\text{total shareholders' equity}}$$

$$\text{debt-to-capital} = \frac{\text{total debt}}{\text{total debt} + \text{total shareholders' equity}}$$

$$\text{debt-to-assets} = \frac{\text{total debt}}{\text{total assets}}$$

$$\text{financial leverage} = \frac{\text{average total assets}}{\text{average total equity}}$$

$$\text{interest coverage} = \frac{\text{earnings before interest and taxes}}{\text{interest payments}}$$

$$\text{debt-to-EBITDA} = \frac{\text{total debt}}{\text{EBITDA}}$$

$$\text{fixed charge coverage} = \frac{\text{earnings before interest and taxes} + \text{lease payments}}{\text{interest payments} + \text{lease payments}}$$

$$\text{net profit margin} = \frac{\text{net income}}{\text{revenue}}$$

$$\text{gross profit margin} = \frac{\text{gross profit}}{\text{revenue}}$$

$$\text{operating profit margin} = \frac{\text{operating income}}{\text{revenue}} \text{ or } \frac{\text{EBIT}}{\text{revenue}}$$

$$\text{pretax margin} = \frac{\text{EBT}}{\text{revenue}}$$

$$\text{return on assets} = \frac{\text{net income}}{\text{average total assets}}$$

$$\text{operating return on assets} = \frac{\text{operating income}}{\text{average total assets}} \text{ or } \frac{\text{EBIT}}{\text{average total assets}}$$

$$\text{return on invested capital} = \frac{\text{after-tax operating profit}}{\text{average long-term capital}}$$

$$\text{return on equity} = \frac{\text{net income}}{\text{average total equity}}$$

$$\text{return on common equity} = \frac{\text{net income} - \text{preferred dividends}}{\text{average common equity}}$$

$$= \frac{\text{net income available to common}}{\text{average common equity}}$$

Original DuPont decomposition:

$$\text{ROE} = \left(\frac{\text{net income}}{\text{revenue}}\right)\left(\frac{\text{revenue}}{\text{average total assets}}\right)\left(\frac{\text{average total assets}}{\text{average stockholders' equity}}\right)$$

Extended DuPont decomposition:

$$\text{ROE} = \left(\frac{\text{net income}}{\text{EBT}}\right)\left(\frac{\text{EBT}}{\text{EBIT}}\right)\left(\frac{\text{EBIT}}{\text{revenue}}\right)\left(\frac{\text{revenue}}{\text{average assets}}\right)\left(\frac{\text{average assets}}{\text{average equity}}\right)$$

Coefficients of variation:

$$\text{CV sales} = \frac{\text{standard deviation of sales}}{\text{mean sales}}$$

$$\text{CV operating income} = \frac{\text{standard deviation of operating income}}{\text{mean operating income}}$$

$$\text{CV net income} = \frac{\text{standard deviation of net income}}{\text{mean net income}}$$

$$\text{margin call price} = P_0\left(\frac{1 - \text{initial margin}}{1 - \text{maintenance margin}}\right)$$

where:

P_0 = initial purchase price

$$\text{Price-weighted index} = \frac{\text{sum of stock prices}}{\text{number of stocks in index adjusted for splits}}$$

Market capitalization-weighted index =

$$\frac{\text{current total market value of index stocks}}{\text{base year total market value of index stocks}} \times \text{base year index value}$$

Equal-weighted index = (1 + average percentage change in index stocks) × initial index value

$$[Q \times (P - VC)] - FC$$

where:

Q = number of units sold
P = price per unit
VC = variable costs
FC = fixed costs

Degree of operating leverage (DOL): DOL = %Δ operating profit / %Δ sales

Degree of financial leverage (DFL): DFL = %Δ net income / %Δ operating income

$$\text{preferred stock value} = \frac{D_p}{k_P}$$

Constant growth dividend discount model (Gordon growth model):

$$V_0 = \frac{D_1}{k_e - g_c}$$

Sustainable growth rate:

$$g = b \times ROE$$

where:

b = earnings retention rate = 1 − dividend payout rate
ROE = return on equity

Multistage dividend discount model:

$$\text{value} = \frac{D_1}{(1+k_e)} + \frac{D_2}{(1+k_e)^2} + \ldots + \frac{D_n}{(1+k_e)^n} + \frac{P_n}{(1+k_e)^n}$$

where:

$$P_n = \frac{D_{n+1}}{k_e - g_c}$$

g_c = constant growth rate of dividends
n = number of periods of supernormal growth

Justified P/E ratio:

$$\frac{P_0}{E_1} = \frac{D_1/E_1}{k-g}$$

Enterprise value = market value of common and preferred stock + market value of debt − cash and short-term investments

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