

# 2022 CFA®

## Exam Prep

# SchweserNotes™

Corporate Issuers and  
Equity Investments

LEVEL I BOOK 3

KAPLAN SCHWESER

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# Book 3: Corporate Issuers and Equity Investments

SchweserNotes™ 2022

Level I CFA®



SCHWESERNOTES™ 2022 LEVEL I CFA® BOOK 3: CORPORATE ISSUERS & EQUITY INVESTMENT

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# LEARNING OUTCOME STATEMENTS (LOS)

## STUDY SESSION 9

*The topical coverage corresponds with the following CFA Institute assigned reading:*

### 27. Introduction to Corporate Governance and Other ESG Considerations

The candidate should be able to:

- a. describe corporate governance.
- b. describe a company's stakeholder groups, and compare interests of stakeholder groups.
- c. describe principal–agent and other relationships in corporate governance and the conflicts that may arise in these relationships.
- d. describe stakeholder management.
- e. describe mechanisms to manage stakeholder relationships and mitigate associated risks.
- f. describe functions and responsibilities of a company's board of directors and its committees.
- g. describe market and non-market factors that can affect stakeholder relationships and corporate governance.
- h. identify potential risks of poor corporate governance and stakeholder management, and identify benefits from effective corporate governance and stakeholder management.
- i. describe factors relevant to the analysis of corporate governance and stakeholder management.
- j. describe environmental and social considerations in investment analysis.
- k. describe how environmental, social, and governance factors may be used in investment analysis.

*The topical coverage corresponds with the following CFA Institute assigned reading:*

### 28. Uses of Capital

The candidate should be able to:

- a. describe the capital allocation process and basic principles of capital allocation.
- b. demonstrate the use of net present value (NPV) and internal rate of return (IRR) in allocating capital and describe the advantages and disadvantages of each method.
- c. describe expected relations among a company's investments, company value, and share price.
- d. describe types of real options relevant to capital investment.
- e. describe common capital allocation pitfalls.

*The topical coverage corresponds with the following CFA Institute assigned reading:*

### 29. Sources of Capital

The candidate should be able to:

- a. describe types of financing methods and considerations in their selection.
- b. describe primary and secondary sources of liquidity and factors that influence a company's liquidity position.
- c. compare a company's liquidity position with that of peer companies.
- d. evaluate choices of short-term funding.

## STUDY SESSION 10

*The topical coverage corresponds with the following CFA Institute assigned reading:*

### 30. Cost of Capital—Foundational Topics

The candidate should be able to:

- a. calculate and interpret the weighted average cost of capital (WACC) of a company.
- b. describe how taxes affect the cost of capital from different capital sources.
- c. calculate and interpret the cost of debt capital using the yield-to-maturity approach and the debt-rating approach.
- d. calculate and interpret the cost of noncallable, nonconvertible preferred stock.
- e. calculate and interpret the cost of equity capital using the capital asset pricing model approach and the bond yield plus risk premium approach.
- f. explain and demonstrate beta estimation for public companies, thinly traded public companies, and nonpublic companies.
- g. explain and demonstrate the correct treatment of flotation costs.

*The topical coverage corresponds with the following CFA Institute assigned reading:*

### 31. Capital Structure

The candidate should be able to:

- a. describe how a company's capital structure may change over its life cycle.
- b. explain the Modigliani–Miller propositions regarding capital structure.
- c. describe the use of target capital structure in estimating WACC, and calculate and interpret target capital structure weights.
- d. explain factors affecting capital structure decisions.
- e. describe competing stakeholder interests in capital structure decisions.

*The topical coverage corresponds with the following CFA Institute assigned reading:*

### 32. Measures of Leverage

The candidate should be able to:

- a. define and explain leverage, business risk, sales risk, operating risk, and financial risk and classify a risk.
- b. calculate and interpret the degree of operating leverage, the degree of financial leverage, and the degree of total leverage.
- c. analyze the effect of financial leverage on a company's net income and return on equity.
- d. calculate the breakeven quantity of sales and determine the company's net income at various sales levels.
- e. calculate and interpret the operating breakeven quantity of sales.

## STUDY SESSION 11

*The topical coverage corresponds with the following CFA Institute assigned reading:*

### 33. Market Organization and Structure

The candidate should be able to:

- a. explain the main functions of the financial system.
- b. describe classifications of assets and markets.
- c. describe the major types of securities, currencies, contracts, commodities, and real assets that trade in organized markets, including their distinguishing characteristics and major subtypes.

- d. describe types of financial intermediaries and services that they provide.
- e. compare positions an investor can take in an asset.
- f. calculate and interpret the leverage ratio, the rate of return on a margin transaction, and the security price at which the investor would receive a margin call.
- g. compare execution, validity, and clearing instructions.
- h. compare market orders with limit orders.
- i. define primary and secondary markets and explain how secondary markets support primary markets.
- j. describe how securities, contracts, and currencies are traded in quote-driven, order-driven, and brokered markets.
- k. describe characteristics of a well-functioning financial system.
- l. describe objectives of market regulation.

*The topical coverage corresponds with the following CFA Institute assigned reading:*

### **34. Security Market Indexes**

The candidate should be able to:

- a. describe a security market index.
- b. calculate and interpret the value, price return, and total return of an index.
- c. describe the choices and issues in index construction and management.
- d. compare the different weighting methods used in index construction.
- e. calculate and analyze the value and return of an index given its weighting method.
- f. describe rebalancing and reconstitution of an index.
- g. describe uses of security market indexes.
- h. describe types of equity indexes.
- i. describe types of fixed-income indexes.
- j. describe indexes representing alternative investments.
- k. compare types of security market indexes.

*The topical coverage corresponds with the following CFA Institute assigned reading:*

### **35. Market Efficiency**

The candidate should be able to:

- a. describe market efficiency and related concepts, including their importance to investment practitioners.
- b. contrast market value and intrinsic value.
- c. explain factors that affect a market's efficiency.
- d. contrast weak-form, semi-strong-form, and strong-form market efficiency.
- e. explain the implications of each form of market efficiency for fundamental analysis, technical analysis, and the choice between active and passive portfolio management.
- f. describe market anomalies.
- g. describe behavioral finance and its potential relevance to understanding market anomalies.

## **STUDY SESSION 12**

*The topical coverage corresponds with the following CFA Institute assigned reading:*

### **36. Overview of Equity Securities**

The candidate should be able to:

- a. describe characteristics of types of equity securities.

- b. describe differences in voting rights and other ownership characteristics among different equity classes.
- c. compare and contrast public and private equity securities.
- d. describe methods for investing in non-domestic equity securities.
- e. compare the risk and return characteristics of different types of equity securities.
- f. explain the role of equity securities in the financing of a company's assets.
- g. contrast the market value and book value of equity securities.
- h. compare a company's cost of equity, its (accounting) return on equity, and investors' required rates of return.

*The topical coverage corresponds with the following CFA Institute assigned reading:*

### **37. Introduction to Industry and Company Analysis**

The candidate should be able to:

- a. explain uses of industry analysis and the relation of industry analysis to company analysis.
- b. compare methods by which companies can be grouped.
- c. explain the factors that affect the sensitivity of a company to the business cycle and the uses and limitations of industry and company descriptors such as "growth," "defensive," and "cyclical".
- d. describe current industry classification systems, and identify how a company should be classified, given a description of its activities and the classification system.
- e. explain how a company's industry classification can be used to identify a potential "peer group" for equity valuation.
- f. describe the elements that need to be covered in a thorough industry analysis.
- g. describe the principles of strategic analysis of an industry.
- h. explain the effects of barriers to entry, industry concentration, industry capacity, and market share stability on pricing power and price competition.
- i. describe industry life-cycle models, classify an industry as to life-cycle stage, and describe limitations of the life-cycle concept in forecasting industry performance.
- j. describe macroeconomic, technological, demographic, governmental, social, and environmental influences on industry growth, profitability, and risk.
- k. compare characteristics of representative industries from the various economic sectors.
- l. describe the elements that should be covered in a thorough company analysis.

*The topical coverage corresponds with the following CFA Institute assigned reading:*

### **38. Equity Valuation: Concepts and Basic Tools**

The candidate should be able to:

- a. evaluate whether a security, given its current market price and a value estimate, is overvalued, fairly valued, or undervalued by the market.
- b. describe major categories of equity valuation models.
- c. describe regular cash dividends, extra dividends, stock dividends, stock splits, reverse stock splits, and share repurchases.
- d. describe dividend payment chronology.
- e. explain the rationale for using present value models to value equity and describe the dividend discount and free-cash-flow-to-equity models.
- f. calculate the intrinsic value of a non-callable, non-convertible preferred stock.
- g. 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.

- h. identify characteristics of companies for which the constant growth or a multistage dividend discount model is appropriate.
- i. 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.
- j. 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.
- k. describe enterprise value multiples and their use in estimating equity value.
- l. describe asset-based valuation models and their use in estimating equity value.
- m. explain advantages and disadvantages of each category of valuation model.

The following is a review of the Corporate Issuers (1) principles designed to address the learning outcome statements set forth by CFA Institute. Cross-Reference to CFA Institute Assigned Reading #27.

# READING 27: INTRODUCTION TO CORPORATE GOVERNANCE AND OTHER ESG CONSIDERATIONS

Study Session 9

## EXAM FOCUS

Candidates should understand the idea of a firm's stakeholders, how conflicts can arise between stakeholders, and how effective corporate governance can mitigate problems arising from these conflicts. Other important points are the election of the board of directors, the board's duties, and important factors in board composition. Finally, the rationale for incorporating environmental, social, and governance factors into the portfolio selection process is presented.

### MODULE 27.1: STAKEHOLDER MANAGEMENT

#### LOS 27.a: Describe corporate governance.



Video covering this content is available online.

*CFA® Program Curriculum, Volume 4, page 6*

In the CFA Institute publication, *The Corporate Governance of Listed Companies*:

A *Manual for Investors*<sup>1</sup>, corporate governance is described as “the system of internal controls and procedures by which individual companies are managed. It provides a framework that defines the rights, roles and responsibilities of various groups . . . within an organization. At its core, corporate governance is the arrangement of checks, balances, and incentives a company needs in order to minimize and manage the conflicting interests between insiders and external shareowners.”

Under **shareholder theory**, the primary focus of a system of corporate governance is the interests of the firm's shareholders, which are taken to be the maximization of the market value of the firm's common equity. Under this theory, corporate governance is primarily concerned with the conflict of interest between the firm's managers and its owners (shareholders).

The focus of corporate governance under **stakeholder theory** is broader; it considers conflicts among the several groups that have an interest in the activities and performance of the firm. These groups include shareholders, employees, suppliers, and customers, among others.

#### LOS 27.b: Describe a company's stakeholder groups, and compare interests of stakeholder groups.

*CFA® Program Curriculum, Volume 4, page 8*

The following have been identified as the primary stakeholders of a corporation.

**Shareholders** have a residual interest in the corporation in that they have claim to the net assets of the corporation after all liabilities have been settled. Shareholders have voting rights for the election of the board of directors and for other important corporate matters, which gives them effective control of the firm and its management. They have an interest in the ongoing profitability and growth of the firm, both of which can increase the value of their ownership shares.

The **board of directors** has a responsibility to protect the interests of shareholders; to hire, fire, and set the compensation of the firm's senior managers; to set the strategic direction of the firm; and to monitor financial performance and other aspects of the firm's ongoing activities.

Typically, the firm's executives (most-senior managers) serve on the board of directors, along with directors who are not otherwise employed by the firm. In a one-tier board structure, both company executives and non-executive board members serve on a single board of directors. In some countries, boards have a two-tier structure in which the non-executive board members serve on a supervisory board that oversees a management board, made up of company executives.

**Senior managers** typically receive compensation (remuneration) that is made up of a salary, a bonus based on some measure of company performance, and perquisites (e.g., expense accounts, use of company planes, special retirement benefits, vacation time off). Their interests can be expected to include continued employment and maximizing the total value of their compensation. Executive bonuses are typically tied to some measure of firm performance, giving senior managers a strong interest in the financial success of the firm.

**Employees** also have an interest in the sustainability and success of the firm. They have an interest in their rate of pay, opportunities for career advancement, training, and working conditions.

**Creditors** supply debt capital to the firm and are primarily owners of the firm's outstanding bonds and banks that have made loans to the firm. Providers of debt capital to the firm do not typically have a vote in firm management and do not participate in firm growth beyond receiving their promised interest and principal payments. The interests of creditors are protected to varying degrees by covenants in their debt agreements with the firm.

**Suppliers** of resources to the firm have an interest preserving an ongoing relationship with the firm, in the profitability of their trade with the firm, and in the growth and ongoing stability of the firm. As they are typically short-term creditors of the firm, they also have an interest in the firm's solvency and ongoing financial strength.

### **LOS 27.c: Describe principal-agent and other relationships in corporate governance and the conflicts that may arise in these relationships.**

*CFA® Program Curriculum, Volume 4, page 11*

The **principal-agent conflict** arises because an agent is hired to act in the interest of the principal, but an agent's interests may not coincide exactly with those of the principal. Consider an insurance agent who is paid a commission on policies written. It would be in the agent's interest to write insurance policies on people or property that are not good

risks, in order to maximize commission income. The principal (the owners of the insurance company) does not want to issue policies that are bad risks as that is a money-losing proposition. Insurance companies mitigate this conflict by imposing underwriting standards for the policies they will issue and by continuing to work only with agents who consistently act in the company's best interest.

## Conflicts of Interest Between Shareholders and Managers or Directors

In the context of a corporation, shareholders are the principals (owners), and firm management and board members (directors) are their agents. Managers and directors may choose a lower level of business risk than shareholders would. This conflict can arise because the risk of company managers and directors is more dependent of firm performance compared to the risk of shareholders, who hold diversified portfolios of stocks and are not dependent on the firm for employment.

Conflicts may also arise when directors who are also managers favor management interests at the expense of shareholders or when directors favor one group of shareholders at the expense of another.

There is also an **information asymmetry** between shareholders and managers because managers have more and better information about the functioning of the firm and its strategic direction than shareholders do. This decreases the ability of shareholders or non-executive directors to monitor and evaluate whether managers are acting in the best interests of shareholders.

## Conflicts Between Groups of Shareholders

A single shareholder or group of shareholders may hold a majority of the votes and act against the interests of the minority shareholders. Some firms have different classes of common stock outstanding, some with more voting power than others. A group of shareholders may have effective control of the company although they have a claim to less than 50% of the earnings and assets of the company.

In the event of an acquisition of the company, controlling shareholders may be in a position to get better terms for themselves relative to the terms forced on minority shareholders. Majority shareholders may cause the company to enter into **related party transactions**, agreements or specific transactions that benefit entities in which they have a financial interest, to the detriment of minority shareholders.

## Conflicts of Interest Between Creditors and Shareholders

Shareholders may prefer more business risk than creditors do because creditors have a limited upside from good results compared to shareholders. Equity owners could also act against the interests of creditors by issuing new debt that increases the default risk faced by existing debt holders, or by the company paying greater dividends to equity holders, thereby increasing creditors' risk of default.

## Conflicts of Interest Between Shareholders and Other Stakeholders

The company may decide to raise prices or reduce product quality in order to increase profits to the detriment of customers. The company may employ strategies that

significantly reduce the taxes they pay to the government.

#### **LOS 27.d: Describe stakeholder management.**

#### **LOS 27.e: Describe mechanisms to manage stakeholder relationships and mitigate associated risks.**

*CFA® Program Curriculum, Volume 4, page 14*

**Stakeholder management** refers to the management of company relations with stakeholders and is based on having a good understanding of stakeholder interests and maintaining effective communication with stakeholders. The management of stakeholder relationships is based on four types of infrastructures:

1. The **legal infrastructure** identifies the laws relevant to and the legal recourse of stakeholders when their rights are violated.
2. The **contractual infrastructure** refers to the contracts between the company and its stakeholders that spell out the rights and responsibilities of the company and the stakeholders.
3. The **organizational infrastructure** refers to a company's corporate governance procedures, including its internal systems and practices that address how it manages its stakeholder relationships.
4. **Governmental infrastructure** comprises the regulations to which companies are subject.

With respect to the company's relationship with shareholders, there are standard practices. These practices are required by corporate laws and similar in many jurisdictions, although there are some differences across countries.

Corporations typically hold an **annual general meeting** after the end of the firm's fiscal year. At the general meeting, company management provides shareholders with the audited financial statements for the year, addresses the company's performance and significant actions over the period, and answers shareholder questions.

Corporate laws dictate when the annual general meeting may occur and how the meeting must be communicated to shareholders. Typically, anyone owning shares is permitted to attend the annual general meeting, to speak or ask questions, and to vote their shares. A shareholder who does not attend the annual general meeting can vote her shares by **proxy**, meaning she assigns her right to vote to another who will attend the meeting, often a director, member of management, or the shareholder's investment advisor. A proxy may specify the shareholder's vote on specific issues or leave the vote to the discretion of the person to whom the proxy is assigned.

Ordinary resolutions, such as approval of auditor and the election of directors, require a simple majority of the votes cast. Other resolutions, such as those regarding a merger or takeover, or that require amendment of corporate bylaws, are termed **special resolutions** and may require a supermajority vote for passage, typically two-thirds or three-fourths of the votes cast. Such special resolutions can also be addressed at **extraordinary general meetings**, which can be called anytime there is a resolution about a matter that requires a vote of the shareholders.

When there are multiple board member elections at one meeting, some companies use majority voting and some use cumulative voting. With **majority voting**, the candidate

with the most votes for each single board position is elected. With **cumulative voting**, shareholders can cast all their votes (shares times number of board position elections) for a single board candidate or divide them among board candidates. Cumulative voting can result in greater minority shareholder representation on the board compared to majority voting.

Minority shareholders may have special rights by law when the company is acquired by another company.

### **LOS 27.f: Describe functions and responsibilities of a company's board of directors and its committees.**

*CFA® Program Curriculum, Volume 4, page 21*

## **Board Structure**

A company may have any number of directors on its board. Companies often have directors with expertise in specific areas of the firm's business, such as risk management, finance, or industry strategy. In a **one-tier board**, there is a single board of directors that includes both internal and external directors. Internal directors (also called executive directors) are typically senior managers employed by the firm. External board members (also called non-executive directors) are those who are not company management. Non-executive directors who have no other relationship with the company are termed **independent directors**. Employee board representatives may be a significant portion of the non-executive directors.

In a **two-tier board** structure, there is a supervisory board that typically excludes executive directors. The supervisory board and the management board (made up of executive directors) operate independently. The management board is typically led by the company's CEO.

With a one-tier board, the chairman of the board is sometimes the company CEO. While this was common practice in the United States historically, separation of the CEO and chairman of the board functions has become more common in recent years. When a **lead independent director** is appointed, he has the ability to call meetings of the independent directors, separate from meetings of the full board.

Currently, the general practice is for all board member elections to be held at the same meeting and each election to be for multiple years. With a **staggered board**, elections for some board positions are held each year. This structure limits the ability of shareholders to replace board members in any one year and is used less now than it has been historically.

## **Board Responsibilities**

The board of directors is elected by shareholders to act in their interest. Board members are typically mandated by corporate law to be fully informed and to use due diligence and their expertise in fulfilling their obligation to act in the interests of the company and its shareholders.

The board of directors is not involved in the day-to-day management of the company; that responsibility rests with senior management. The duties of the board include responsibility for:

- Selecting senior management, setting their compensation and bonus structure, evaluating their performance, and replacing them as needed.
- Setting the strategic direction for the company and making sure that management implements the strategy approved by the board.
- Approving capital structure changes, significant acquisitions, and large investment expenditures.
- Reviewing company performance and implementing any necessary corrective steps.
- Planning for continuity of management and the succession of the CEO and other senior managers.
- Establishing, monitoring, and overseeing the firm's internal controls and risk management system.
- Ensuring the quality of the firm's financial reporting and internal audit, as well as oversight of the external auditors.

## Board Committees

A board of directors typically has committees made up of board members with particular expertise. These committees report to the board, which retains the overall responsibility for the various board functions. The following are examples of typical board committees.

An **audit committee** is responsible for:

- Oversight of the financial reporting function and implementation of accounting policies.
- Effectiveness of the company's internal controls and the internal audit function.
- Recommending an external auditor and its compensation.
- Proposing remedies based on their review of internal and external audits.

A **governance committee** is responsible for:

- Oversight of the company's corporate governance code.
- Implementing the company's code of ethics and policies regarding conflicts of interest.
- Monitoring changes in relevant laws and regulations.
- Ensuring that the company is in compliance with all applicable laws and regulations, as well as with the company's governance policies.

A **nominations committee** proposes qualified candidates for election to the board, manages the search process, and attempts to align the board's composition with the company's corporate governance policies.

A **compensation committee** or **remuneration committee** recommends to the board the amounts and types of compensation to be paid to directors and senior managers. This committee may also be responsible for oversight of employee benefit plans and evaluation of senior managers.

A **risk committee** informs the board about appropriate risk policy and risk tolerance of the organization, and oversees the enterprise-wide risk management processes of the organization.

An **investment committee** reviews and reports to the board on management proposals for large acquisitions or projects, sale or other disposal of company assets or segments, and the performance of acquired assets and other large capital expenditures.

The number and size of board committees will depend on the size, complexity, and nature of the business. Regulations often require that firms have audit committees. Financial services firms are often required to have a risk committee as well. Some companies combine two functions into one committee. The composition of a board committee is often based on its function, with audit committees, compensation committees, and governance committees often made up of only non-executive or independent directors.



## MODULE QUIZ 27.1

*To best evaluate your performance, enter your quiz answers online.*

1. The theory that deals with conflicts of interest between a company's owners and its creditors is *most appropriately* called:
  - A. structure theory.
  - B. stakeholder theory.
  - C. shareholder theory.
2. For which two of a company's stakeholders does information asymmetry *most likely* make monitoring more difficult?
  - A. Suppliers and employees.
  - B. Employees and managers.
  - C. Managers and shareholders.
3. The *least likely* item to be a requirement for good stakeholder management is:
  - A. maintaining effective communication with other stakeholders.
  - B. an understanding of the interests of several stakeholder groups.
  - C. the ability to put aside the interests of one's stakeholder group.
4. An agreement between a company and a labor union that represents most of its employees would be *most appropriately* considered part of a company's:
  - A. legal infrastructure.
  - B. contractual infrastructure.
  - C. organizational infrastructure.
5. The type of voting that is *most likely* to allow minority stockholders a greater representation on the board of directors is:
  - A. majority voting.
  - B. staggered voting.
  - C. cumulative voting.
6. The type of resolution *most likely* to require a supermajority of shareholder votes for passage is a resolution to:
  - A. acquire a company.
  - B. choose a board member.
  - C. approve the choice of an auditor.
7. The board of directors committee *most likely* to be responsible for monitoring the performance of a project that requires a large capital expenditure is:
  - A. the risk committee.
  - B. the audit committee.
  - C. the investment committee.

## MODULE 27.2: FACTORS AFFECTING CORPORATE GOVERNANCE



Video covering  
this content is  
available online.

## **LOS 27.g: Describe market and non-market factors that can affect stakeholder relationships and corporate governance.**

*CFA® Program Curriculum, Volume 4, page 25*

Several capital market factors can affect corporate governance and stakeholder relationships. Companies that work to have more communication and contact with shareholders, in addition to annual meetings and analyst meetings, have improved relations with shareholders who may be more likely to support management proposals and positions in the event of negative comments or pressure for change from dissident shareholder groups.

**Activist shareholders** pressure companies in which they hold a significant number of shares for changes, often changes they believe will increase shareholder value. They may bring pressure for change by initiating shareholder lawsuits or by seeking representation on the board of directors. Other activist tactics include proposing shareholder resolutions for a vote and raising their issues to all shareholders or the public to gain wider support. Hedge funds have, more and more, engaged in shareholder activism to increase the market values of firms in which they hold significant stakes.

A group may initiate a **proxy fight**, in which they seek the proxies of shareholders to vote in favor of their alternative proposals and policies. An activist group may make a **tender offer** for a specific number of shares of a company to gain enough votes to take over the company.

Both senior managers and boards of directors can be replaced by shareholders if they believe company performance is poor and would be improved by a change. The threat of a **hostile takeover**, one not supported by the company's management, can act as an incentive to influence company managements and boards to pursue policies more in alignment with the interests of shareholders and oriented toward increasing shareholder value.

Issues of corporate governance and conflicts of interest arise when company management proposes and the board passes anti-takeover measures to protect their jobs. Staggered board elections make a hostile takeover more costly and difficult.

An important non-market factor that can affect stakeholder relationships is the legal environment within which the company operates. Shareholders' and creditors' interests are considered to be better protected in countries with a **common-law system** under which judges' rulings become law in some instances. In a **civil law system**, judges are bound to rule based only on specifically enacted laws. In general, the rights of creditors are more clearly defined than those of shareholders and, therefore, are not as difficult to enforce through the courts.

In the past, corporate boards and managements have had an advantage in communicating through the media to influence shareholders or to shape public opinion. Advances in communications, especially through internet outlets and social media sites, have levelled the playing fields to a significant degree. It has become much easier for dissident shareholders to bring issues to the attention of other shareholders and to influence public opinion about certain issues. Among senior managers and board members, concern about their professional reputations has increased as a result. Media exposure can act as an important incentive for management to pursue policies that are consistent with the interests of shareholders and avoid egregious related-party transactions.

In 2003, the U.S. SEC mandated that U.S.-registered mutual funds institute policies and procedures to ensure that the proxies they hold for investors in their funds are voted in the best interests of fund investors. Prior to this, many funds that held shares for investors failed to devote resources to fulfill their responsibility to vote proxies. U.S. funds are also required to disclose their proxy voting records.

Overall, the increased focus on the importance of good corporate governance has given rise to a new industry focused on corporate governance, which includes firms that advise funds on proxy voting and corporate governance matters. Firms that provide ratings of companies' corporate governance practices offer another avenue to influence managements to better address the interests of shareholders.

**LOS 27.h: Identify potential risks of poor corporate governance and stakeholder management, and identify benefits from effective corporate governance and stakeholder management.**

*CFA® Program Curriculum, Volume 4, page 28*

## Risks of Poor Governance and Stakeholder Management

When corporate governance is weak, the control functions of audits and board oversight may be weak as well. The risk is that some stakeholders can gain an advantage, to the disadvantage of other stakeholders. Accounting fraud, or simply poor recordkeeping, will have negative implications for company performance and value.

When governance is weak and managers are not monitored, they may choose lower-than-optimal risk, reducing company value. Without proper monitoring and oversight, management may have incentive compensation that causes them to pursue their own benefit rather than the company's benefit. If they are allowed to engage in related-party transactions that benefit their friends or family, this will decrease company value.

Poor compliance procedures with respect to regulation and reporting can easily lead to legal and reputational risks. Violating stakeholder rights can lead to stakeholder lawsuits. A company's reputation can be damaged by failure to comply with governmental regulations. Failure to manage creditors' rights can lead to debt default and bankruptcy.

## Benefits of Effective Governance and Stakeholder Management

Effective corporate governance can improve operational efficiency by ensuring that management and board member incentives align their interests well with those of shareholders. Effective governance implies effective control and monitoring. Just as weak control can lead to abuses, a strong system of controls and compliance with laws and regulations can avoid many legal and regulatory risks.

Formal policies regarding conflicts of interest and related party transactions can also lead to better operating results. Proper governance with respect to the interests of creditors can reduce the risk of debt default or bankruptcy, thereby reducing the cost of debt financing. Alignment of management interests with those of shareholders leads to better financial performance and greater company value.

**LOS 27.i: Describe factors relevant to the analysis of corporate governance and stakeholder management.**

In recent years, both analysts and markets have had an increased focus on effective corporate governance as an important factor in operational and financial performance. Elements of corporate governance that analysts have focused on include ownership and voting structures, board composition, management remuneration, the composition of shareholders, strength of shareholder rights, and management of long-term risks.

## Company Ownership and Voting Structure

Voting control of companies is typically proportional to share ownership because each share entitles its holder to one vote. In a **dual class structure**, one class of shares may be entitled to several votes per share, while another class of shares is entitled to one vote per share. This structure is often used to ensure that founding shareholders (and, later, their heirs) can maintain control of the board of directors even when their economic ownership is significantly less than 50%. Companies with a dual-class share structure have traded, on average, at a discount to comparable companies with a single class of shares.

Clearly, the interests of the owners of shares with multiple votes will take precedence over the interests of shareholders in general. Analysts will consider what the interests of the controlling shareholders are and how the ownership of the controlling shares is expected to change over time.

## Composition of a Company's Board

Analysts may want to consider carefully the make-up of a company's board of directors. Important considerations are whether directors:

- Are executive, non-executive, or independent directors.
- Are involved in related-party transactions with the company.
- Have the diversity of expertise that suits the company's current strategy and challenges.
- Have served for many years and may have become too close to the company's management.

Overall, an analyst must decide if the board is responsive to shareholder interests or has conflicts of interest, and if the board has the mix of expertise that is needed to deal with challenges and pursue the best strategy for the company.

## Management Incentives and Remuneration

In addition to salary, senior corporate managers often receive cash bonuses based on short-term performance metrics and bonuses based on longer-term equity performance, such as company shares or options to be awarded at future dates. While such plans are typically described as being a mechanism to align the interests of management and shareholders more closely, in many cases they may not do that well. Analysts may be concerned if:

- The remuneration plan seems to offer greater incentives, paid in cash, to achieve short-term performance goals at the expense of building long-term company value through equity-based incentives.

- Performance-based incentive pay is fairly stable over time, indicating that the performance targets are possibly easy to achieve.
- Management remuneration is very high relative to that of comparable companies in the industry.
- Management incentives are not aligned with current company strategy and objectives.

## Composition of Shareholders

If a significant portion of a company's outstanding shares are held by an affiliated company or institution, those shareholders may be able to exert enough influence to dictate the company's policies and direction. In some countries, it is quite common for one company to hold a large minority stake in another company. Some claim that such cross-holdings between companies lead to greater stability, better cooperation between the two companies, and a longer-term perspective on company performance. However, when the shareholder company tends to vote with management and to support board members with long tenure, it can hinder change by protecting the company from potential hostile takeovers and activist shareholders.

Activist shareholders and investors who buy shares in an attempt to profit from their activism can cause changes in the composition of a firm's shareholders, its board membership, and its corporate strategy in a relatively short period of time.

## Relative Strength of Shareholders' Rights

If the rights of shareholders are weak, perceived increases in shareholder returns from being acquired or from significant changes in corporate strategy may be difficult or impossible to realize. Examples of weak shareholders' rights are the existence of anti-takeover provisions in the corporate charter or bylaws, staggered boards, and a class of super voting shares, which all restrict the rights of shareholders to effect change.

## Management of Long-Term Risks

Analysts should be concerned if a company does not manage the risks of stakeholder conflicts well over time. A failure to manage stakeholder issues well or a failure to manage other long-term risks to the company's sustainability can have disastrous consequences for shareholders and others with interests tied to company results.

### **LOS 27.j: Describe environmental and social considerations in investment analysis.**

*CFA® Program Curriculum, Volume 4, page 36*

While the quality of corporate governance has long been a consideration in investment analysis, the consideration of environmental and social factors is a more recent development. The use of environmental, social, and governance factors in making investment decisions is referred to as **ESG investing**. Many issues can be considered in this context, including harm or potential harm to the environment, risk of loss due to environmental accidents, the changing demographics of the workforce, and reputational risks from corrupt practices or human rights abuses.

ESG investing is also termed **sustainable investing** or **responsible investing** and sometimes **socially responsible investing**, although that term can be somewhat

ambiguous because it previously referred to investing that integrated ethical or moral concerns into the portfolio selection process.

Conflict may occur when integrating ESG considerations into portfolio construction when the manager has a fiduciary responsibility to act in the best financial interests of the account owner or beneficiaries. Choosing to construct a portfolio based on an environmental, social, or governance concern at the expense of investor returns would violate the manager's fiduciary duty. In the United States, the Employee Retirement Income Security Act (ERISA) describes the fiduciary duty of pension fund managers. Recently, the U.S. Department of Labor addressed this potential conflict, stating that using ESG factors in determining the risk and expected return of securities is not a violation of the manager's fiduciary responsibilities. Additionally, it was determined that for two investments that have the same relevant financial characteristics, using ESG factors to choose one over the other is not a violation of the fiduciary duty imposed by ERISA.

### **LOS 27.k: Describe how environmental, social, and governance factors may be used in investment analysis.**

*CFA® Program Curriculum, Volume 4, page 40*

There are several approaches to integrating ESG factors into the portfolio management process. The following are some important examples.

**Negative screening** refers to excluding specific companies or industries from consideration for the portfolio based on their practices regarding human rights, environmental concerns, or corruption. Examples of industries where ESG factors might lead to exclusion are mining, oil extraction and transport, and tobacco. Specific companies that might be excluded are those with poor records on corruption and human rights (labor) practices. Company scores based on a range of ESG concerns are often used in negative screening to identify companies that should be excluded.

Under the **positive screening** approach, investors attempt to identify companies that have positive ESG practices. For example, a portfolio manager may focus on environmental sustainability, employee rights and safety, and overall governance practices. Often a scoring system across a set of ESG factors is used to identify companies for inclusion in portfolios. A related approach, the **relative/best-in-class** approach, seeks to identify companies within each industry group with the best ESG practices. By constructing portfolios of these companies, a manager can preserve the index sector weightings in the portfolio while still taking advantage of opportunities to profit from (or simply to support) positive ESG practices.

**Full integration** refers to the inclusion of ESG factors or ESG scores in traditional fundamental analysis. A company's ESG practices are included in the process of estimating fundamental variables, such as a company's cost of capital or future cash flows. To the extent that ESG practices will affect such variables, integrating them into the analysis can help in determining which companies are currently overpriced or underpriced.

**Thematic investing** refers to investing in sectors or companies in an attempt to promote specific ESG-related goals, such as more sustainable practices in agriculture, greater use of cleaner energy sources, improved management of water resources, or the reduction of carbon emissions.

**Engagement/active ownership** investing refers to using ownership of company shares or other securities as a platform to promote improved ESG practices. Share ownership is used to initiate or support (through share voting) positive ESG changes. Contact with senior management or board members to promote such changes is also an active ownership strategy. Recently, this strategy has been used to promote reduction in a company's carbon footprint, increased wages, or other social and environmental goals, which may or may not be associated with improved financial results over time.

Another approach to ESG investing is **green finance**. Green finance refers to producing economic growth in a more sustainable way by reducing emissions and better managing natural resource use. An important part of green finance is the issuance of **green bonds**, bonds for which the funds raised are used for projects with a positive environmental impact. Issuance of green bonds has increased significantly in recent years, led by issuance in the United States and in China, which is prioritizing improvement in environmental conditions.

**Overlay/portfolio tilt** strategies are used by fund and portfolio managers to manage the ESG characteristics of their overall portfolios. For example, a fund manager may seek to reduce the environmental pollution or carbon footprint of their portfolio stocks as a whole. **Risk factor/risk premium** investing refers to the treatment of ESG factors as an additional source of systemic factor risk, along with such traditional risk factors as firm size and momentum.



## MODULE QUIZ 27.2

*To best evaluate your performance, enter your quiz answers online.*

1. Which of the following statements concerning corporate takeovers is *most accurate*?
  - A. Staggered board elections are considered an anti-takeover measure.
  - B. A proxy fight refers to a move by management to take away voting rights from an activist shareholder.
  - C. A takeover not supported by management is termed hostile, while a takeover supported by management is termed a tender offer.
2. Benefits of effective corporate governance and stakeholder management *most likely* include:
  - A. reduced risk of default.
  - B. more efficient related-party transactions.
  - C. greater control exercised by the most-interested stakeholders.
3. Executive compensation and bonuses are *most likely* consistent with the interests of shareholders if they are:
  - A. stable over time.
  - B. aligned with the company's strategy.
  - C. sufficiently high relative to the company's competitors.
4. The method of ESG integration that does not exclude any sectors but seeks to invest in the companies with the best practices regarding employee rights and environmental sustainability is:
  - A. thematic investing.
  - B. positive screening.
  - C. negative screening.

## KEY CONCEPTS

### LOS 27.a

Corporate governance refers to the internal controls and procedures of a company that delineate the rights and responsibilities of various groups and how conflicts of interest among the various groups are to be resolved.

### **LOS 27.b**

The primary stakeholders of a corporation include shareholders, the board of directors, senior management, employees, creditors, and suppliers.

### **LOS 27.c**

The principal-agent relationship refers to owners employing agents to act in their interests. Conflicts can arise because the agent's incentives may not align with those of the owner or, more generally, because the interests of one group within a corporation are not the same as those of other groups.

### **LOS 27.d**

Stakeholder management refers to the management of the company relations with stakeholders and is based on having a good understanding of stakeholder interests and maintaining effective communication with stakeholders.

### **LOS 27.e**

The management of stakeholder relationships is based on a company's legal, contractual, organizational, and government infrastructures.

### **LOS 27.f**

The duties of a board of directors include:

- Selecting senior management, setting their compensation, and evaluating their performance.
- Setting the strategic direction for the company.
- Approving capital structure changes, significant acquisitions, and large investment expenditures.
- Reviewing company performance and implementing any necessary corrective steps.
- Planning for continuity of management and the succession of the CEO.
- Establishing, monitoring, and overseeing the firm's internal controls and risk management.
- Ensuring the quality of the firm's financial reporting and internal audit.

### **LOS 27.g**

Factors that can affect stakeholder relationships and corporate governance include:

- Communication and engagement with shareholders.
- Shareholder activism.
- Threat of hostile takeover and existence of anti-takeover provisions.
- Company's legal environment.
- Growth of firms that advise funds on proxy voting and rate companies' corporate governance.

### **LOS 27.h**

The risks of poor governance include weak control systems, poor decision making, legal risk, reputational risk, and default risk. Good corporate governance can improve operational efficiency and performance, reduce default risk, reduce the cost of debt, improve financial performance, and increase firm value.

### **LOS 27.i**

Elements of corporate governance that analysts have found to be relevant include ownership and voting structures, board composition, management remuneration, the composition of shareholders, strength of shareholder rights, and management of long-term risks.

### **LOS 27.j**

The use of environmental, social, and governance (ESG) factors in making investment decisions is referred to as ESG investing. Many issues can be considered in this context, including harm or potential harm to the environment, risk of loss due to environmental accidents, the changing demographics of the workforce, and reputational risks from corrupt practices or human rights abuses.

### **LOS 27.k**

Methods of integrating ESG concerns or factors in portfolio construction include:

- Negative screening.
- Positive screening.
- Relative/best-in-class investing.
- Full integration.
- Thematic investing.
- Green finance/green bond investments.
- Overlay/portfolio tilt investing.
- Risk factor/risk premium investing.

## **ANSWER KEY FOR MODULE QUIZZES**

### **Module Quiz 27.1**

1. **B** Stakeholder theory focuses on the conflicts of interest among owners and several groups that have an interest in a company's activities, including creditors. (LOS 27.a)
2. **C** Information asymmetry can exist between a company's shareholders and its managers because the company's managers may be much more knowledgeable about the company's functioning and strategic direction. This makes it more difficult for shareholders to monitor the firm's managers and determine whether they are acting in shareholders' interests. (LOS 27.b)
3. **C** The ability to manage the conflicting interests of company relations with stakeholders requires good communication with stakeholders and a good understanding of their various interests. (LOS 27.c)
4. **B** A company's contractual infrastructure refers to the contracts between the company and its stakeholders that specify the rights and responsibilities of each

party. (LOS 27.d)

5. **C** With cumulative voting, shareholders get a vote for each share they own times the number of director elections each year and can give all their votes to a single candidate for the board. This helps minority stockholders to get more proportional representation on the board of directors. (LOS 27.e)
6. **A** Ordinary resolutions, such as those to appoint an auditor or elect a board member, require a simple majority. Acquisitions, mergers, takeovers, and amendments to the company bylaws often require a supermajority of more than 50% for passage. (LOS 27.e)
7. **C** The investment committee reviews proposals for large acquisitions or projects and also monitors the performance of acquired assets and of projects requiring large capital expenditures. (LOS 27.f)

## Module Quiz 27.2

1. **A** Because staggered board elections make it more difficult for activist shareholders to gain control of a board of directors, they are considered an anti-takeover measure. A proxy fight is an attempt to convince shareholders to vote a certain way. A tender offer can be made in the context of a takeover, whether hostile or otherwise. (LOS 27.g)
2. **A** Reduced risk of default is among the benefits of effective corporate governance. Risks from poor corporate governance include related-party transactions by managers and opportunities for some stakeholder groups to gain advantage at the expense of others. (LOS 27.h)
3. **B** Executive compensation should be designed to align management's incentives with the interests and objectives of the shareholders. Executive compensation that is stable over time may indicate that executives' performance targets are easy to achieve. High compensation relative to comparable companies may be a concern, especially if the company's performance has not been better than its peers. (LOS 27.i)
4. **B** Positive screening does not exclude any sectors but seeks to invest in the companies with the best practices. Negative screening typically excludes some sectors. Thematic investing refers to making an investment in a company or project in order to advance specific social or environmental goals. (LOS 27.j, 27.k)

<sup>1</sup>

[www.cfainstitute.org/learning/products/publications/readings/Pages/the\\_corporate\\_governance\\_of\\_listed\\_companies\\_a\\_manual\\_for\\_investors.aspx](http://www.cfainstitute.org/learning/products/publications/readings/Pages/the_corporate_governance_of_listed_companies_a_manual_for_investors.aspx)

The following is a review of the Corporate Issuers (1) principles designed to address the learning outcome statements set forth by CFA Institute. Cross-Reference to CFA Institute Assigned Reading #28.

# READING 28: USES OF CAPITAL

Study Session 9

## EXAM FOCUS

How a firm's management allocates the firm's capital to various activities is a vital determinant of the firm's financial results over time. Candidates should understand the process of evaluating investment opportunities. Calculating a project's IRR and NPV and understanding the implications of each measure are key components of capital allocation decisions. Understanding the types of real options and mistakes that are commonly encountered in capital allocation decisions will lead to better decisions.

## MODULE 28.1: CAPITAL ALLOCATION PRINCIPLES

### LOS 28.a: Describe the capital allocation process and basic principles of capital allocation.



*CFA® Program Curriculum, Volume 3, page 645*

Video covering  
this content is  
available online.

The **capital allocation process** is identifying and evaluating capital projects, that is, projects where the cash flows to the firm will be received over a period longer than a year. Any corporate decisions with an impact on future earnings can be examined using this framework. Decisions about whether to buy a new machine, expand business into another geographic area, move the corporate headquarters to Cleveland, or replace a delivery truck, to name a few, can be examined using a capital allocation analysis.

For a number of good reasons, capital allocation may be the most important responsibility that a financial manager has. First, because a capital allocation decision often involves the purchase of costly long-term assets with lives of many years, the decisions made may determine the future success of the firm. Second, the principles underlying the capital allocation process also apply to other corporate decisions, such as working capital management and making strategic mergers and acquisitions. Finally, making good capital allocation decisions is consistent with management's primary goal of maximizing shareholder value.

The capital allocation process has four administrative steps:

**Step 1:Idea generation.** The most important step in the capital allocation process is generating good project ideas. Ideas can come from a number of sources, including senior management, functional divisions, employees, or sources outside the company.

**Step 2:Analyzing project proposals.** Because the decision to accept or reject a capital project is based on the project's expected future cash flows, a cash flow forecast must be made for each project to determine its expected profitability.

**Step 3:** Create the firm-wide capital budget. Firms must prioritize profitable projects according to the timing of the project's cash flows, available company resources, and the company's overall strategic plan. Many projects that are attractive individually may not make sense strategically.

**Step 4:** Monitoring decisions and conducting a post-audit. It is important to follow up on all capital allocation decisions. An analyst should compare the actual results to the projected results, and project managers should explain why projections did or did not match actual performance. Because the capital allocation process is only as good as the estimates of the inputs into the model used to forecast cash flows, a post-audit should be used to identify systematic errors in the forecasting process and improve company operations.

Capital allocation projects may be divided into the following categories:

- *Replacement projects to maintain the business* are normally made without detailed analysis. The only issues are whether the existing operations should continue and, if so, whether existing procedures or processes should be maintained.
- *Replacement projects for cost reduction* determine whether equipment that is obsolete, but still usable, should be replaced. A fairly detailed analysis is necessary in this case.
- *Expansion projects* are taken on to grow the business and involve a complex decision-making process because they require an explicit forecast of future demand. A very detailed analysis is required.
- *New product or market development* also entails a complex decision-making process that will require a detailed analysis due to the large amount of uncertainty involved.
- *Mandatory projects* may be required by a governmental agency or insurance company and typically involve safety-related or environmental concerns. These projects typically generate little to no revenue, but they accompany new revenue-producing projects undertaken by the company.
- *Other projects*. Some projects are not easily analyzed through the capital allocation process. Such projects may include a pet project of senior management (e.g., purchase of a corporate jet) or a high-risk endeavor that is difficult to analyze with typical capital allocation assessment methods (e.g., research and development projects).

## Principles of Capital Allocation

The capital allocation process involves the following key assumptions:

- *Decisions are based on cash flows, not accounting income.* The relevant cash flows to consider as part of the capital allocation process are **incremental cash flows**, the changes in cash flows that will occur if the project is undertaken.
- *Cash flows are based on opportunity costs.* **Opportunity costs** are cash flows that a firm will lose by undertaking the project under analysis. These are cash flows generated by an asset the firm already owns that would be forgone if the project under consideration is undertaken. Opportunity costs should be included in project costs. For example, when building a plant, even if the firm already owns the land, the cost of the land should be charged to the project because it could be sold if not used.

- *The timing of cash flows is important.* Capital allocation decisions account for the time value of money, which means that cash flows received earlier are worth more than cash flows to be received later.
- *Cash flows are analyzed on an after-tax basis.* The impact of taxes must be considered when analyzing all capital allocation projects. Firm value is based on cash flows they get to keep, not those they send to the government.
- *Financing costs are reflected in the project's required rate of return.* Do not consider financing costs specific to the project when estimating incremental cash flows. The discount rate used in the capital allocation analysis takes account of the firm's cost of capital. Only projects that are expected to return more than the cost of the capital needed to fund them will increase the value of the firm.

**Sunk costs** are costs that cannot be avoided, even if the project is not undertaken. Because these costs are not affected by the accept/reject decision, they should not be included in the analysis. An example of a sunk cost is a consulting fee paid to a marketing research firm to estimate demand for a new product before making a decision on the project.

**Externalities** are the effects the acceptance of a project may have on other firm cash flows. The primary one is a negative externality called **cannibalization**, which occurs when a new project takes sales from an existing product. When considering externalities, the full implication of the new project (loss in sales of existing products) should be taken into account. An example of cannibalization is when a soft drink company introduces a diet version of an existing beverage. An analyst should subtract the lost sales of the existing beverage from the expected sales of the new diet version when estimating incremental project cash flows. A positive externality exists when doing the project would have a positive effect on sales of a firm's other product lines.

A project has a **conventional cash flow pattern** if the sign on the cash flows changes only once, with one or more cash outflows followed by one or more cash inflows. An **unconventional cash flow pattern** has more than one sign change. For example, a project might have an initial investment outflow, a series of cash inflows, and a cash outflow for asset retirement costs at the end of the project's life.

**Independent projects** are projects that can be evaluated solely on their own profitability. For example, if projects A and B are independent, and both projects are profitable, then the firm could accept both projects. Multiple projects are **mutually exclusive** if only one of them can be accepted so that profitability must be evaluated among the projects. If Projects A and B are mutually exclusive, either Project A or Project B can be accepted, but not both. Making a capital allocation decision to select one of two different stamping machines, each with different costs and outputs, is an example of ranking two mutually exclusive projects.

Some projects must be undertaken in a certain order, or sequence, so that investing in a project today creates the opportunity to invest in other projects in the future. For example, if a project undertaken today is profitable, that may create the opportunity to invest in a second project a year from now. However, if the project undertaken today turns out to be unprofitable, the firm will not invest in the second project. The opportunity to undertake the second project, depending on the outcome of the first, is referred to as a *real option*.

If a firm has unlimited access to investment capital, the firm can undertake all projects with expected returns that exceed the cost of capital. Many firms have constraints on the amount of capital they can raise and must use *capital rationing*. If a firm's profitable project opportunities exceed the amount of funds available, the firm must ration, or prioritize, its capital expenditures with the goal of achieving the maximum increase in value for shareholders, given its available capital.



## MODULE QUIZ 28.1

To best evaluate your performance, enter your quiz answers online.

1. In the capital allocation process, a post-audit is used to:
  - A. improve cash flow forecasts and stimulate management to improve operations and bring results into line with forecasts.
  - B. improve cash flow forecasts and eliminate potentially profitable but risky projects.
  - C. stimulate management to improve operations, bring results into line with forecasts, and eliminate potentially profitable but risky projects.
2. Which of the following statements concerning the principles underlying the capital allocation process is *most accurate*?
  - A. Cash flows should be based on opportunity costs.
  - B. Financing costs should be reflected in a project's incremental cash flows.
  - C. The net income for a project is essential for making a correct capital allocation decision.
3. A manufacturer of clothes washing machines decides to add matching clothes dryers to its product line. In this case, it is *most likely* important in the project analysis to consider:
  - A. cannibalization.
  - B. positive externalities.
  - C. sunk costs.

## MODULE 28.2: NET PRESENT VALUE AND INTERNAL RATE OF RETURN

**LOS 28.b: Demonstrate the use of net present value (NPV) and internal rate of return (IRR) in allocating capital and describe the advantages and disadvantages of each method.**



Video covering  
this content is  
available online.

*CFA® Program Curriculum, Volume 3, page 651*

### Net Present Value (NPV)

Net present value (NPV) is the sum of the present values of all the expected incremental cash flows if a project is undertaken. The discount rate used is the firm's cost of capital, adjusted for the risk level of the project. For a normal project, with an initial cash outflow followed by a series of expected after-tax cash inflows, the NPV is the present value of the expected inflows minus the initial cost of the project.

$$NPV = CF_0 + \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \dots + \frac{CF_n}{(1+k)^n} = \sum_{t=0}^n \frac{CF_t}{(1+k)^t}$$

where:

$CF_0$  = initial investment outlay (a negative cash flow)

$CF_t$  = after-tax cash flow at time  $t$  (can be positive or negative)

$k$  = required rate of return for project

A positive NPV project is expected to increase shareholder wealth, a negative NPV project is expected to decrease shareholder wealth, and a zero NPV project has no expected effect on shareholder wealth.

For *independent* projects, the *NPV decision rule* is simply to accept any project with a positive NPV and to reject any project with a negative NPV.

#### EXAMPLE: Net present value

Using the project cash flows presented in Table 1, compute the NPV of the project and determine whether it should be accepted or rejected. Assume that the cost of capital is 9%.

**Table 1: Expected Net After-Tax Cash Flows**

Year	Cash Flow
0	-\$100
1	25
2	50
3	75

**Answer:**

$$NPV = -100 + \frac{25}{1.09} + \frac{50}{(1.09)^2} + \frac{75}{(1.09)^3} = 22.93$$

The project has a positive NPV, so it should be accepted.

You may calculate NPV directly by using the cash flow (CF) keys on your calculator. The process is illustrated in Table 2.

**Table 2: Calculating NPV With the TI Business Analyst II Plus**

Keystrokes	Explanation	Display
[CF] [2nd] [CLR WORK]	Clear memory registers	CF0 = 0.0000
100 [+/-] [ENTER]	Initial cash outlay	CF0 = -100.0000
[↓] 25 [ENTER]	Period 1 cash flow	C01 = 25.0000
[↓]	Frequency of cash flow 1	F01 = 1.0000
[↓] 50 [ENTER]	Period 2 cash flow	C02 = 50.0000
[↓]	Frequency of cash flow 2	F02 = 1.0000
[↓] 75 [ENTER]	Period 3 cash flow	C03 = 75.0000
[↓]	Frequency of cash flow 3	F03 = 1.0000
[NPV] 9 [ENTER]	9% discount rate	I = 9.0000
[↓] [CPT]	Calculate NPV	NPV = 22.9335

## Internal Rate of Return (IRR)

For a normal project, the **internal rate of return (IRR)** is the discount rate that makes the present value of the expected incremental after-tax cash inflows just equal to the initial cost of the project. More generally, the IRR is the discount rate that makes the present value of a project's estimated cash inflows equal to the present value of the project's estimated cash outflows. That is, IRR is the discount rate that makes the following relationship hold:

$$PV(\text{inflows}) = PV(\text{outflows})$$

The IRR is also the discount rate for which the NPV of a project is equal to zero:

$$NPV = 0 = CF_0 + \frac{CF_1}{(1 + IRR)^1} + \frac{CF_2}{(1 + IRR)^2} + \dots + \frac{CF_n}{(1 + IRR)^n} = \sum_{t=0}^n \frac{CF_t}{(1 + IRR)^t}$$

To calculate the IRR, you may use the trial-and-error method. That is, just keep guessing IRRs until you get the right one, or you may use a financial calculator.

*IRR decision rule:* First, determine the required rate of return for a given project. This is usually the firm's cost of capital. Note that the required rate of return may be higher or lower than the firm's cost of capital to adjust for differences between the project's risk and the average risk of all of the firm's projects (which is reflected in the firm's current cost of capital).

If  $IRR >$  the required rate of return, accept the project.

If  $IRR <$  the required rate of return, reject the project.

For this reason, the minimum IRR, above which a project will be accepted, is often referred to as the **hurdle rate**. Projects with IRRs above this rate will be accepted, while those with IRRs below this rate will not be accepted.

#### EXAMPLE: Internal rate of return

Continuing with the cash flows presented in Table 1 for the previous example, compute the IRR of the project and determine whether it should be accepted or rejected. Assume that the required rate of return is 9%.

**Answer:**

$$0 = -100 + \frac{25}{(1 + IRR)} + \frac{50}{(1 + IRR)^2} + \frac{75}{(1 + IRR)^3}$$

The cash flows should be entered as in Table 2 (if you haven't changed or cleared them, they are still there from the previous calculation of NPV).

With the TI calculator, the IRR can be calculated with:

[IRR] [CPT] to get 19.4377%.

The project should be accepted because its IRR is greater than the 9% required rate of return.

## The Relative Advantages and Disadvantages of the NPV and IRR Methods

A **key advantage of NPV** is that it is a direct measure of the expected increase in the value of the firm. NPV is theoretically the best method. Its main weakness is that it does not include any consideration of the size of the project. For example, an NPV of \$100 is great for a project costing \$100 but not so great for a project costing \$1 million.

A **key advantage of IRR** is that it measures profitability as a percentage, showing the return on each dollar invested. The IRR provides information on the margin of safety that the NPV does not. From the IRR, we can tell how much below the IRR (estimated return) the actual project return could fall, in percentage terms, before the project becomes uneconomic (has a negative NPV).

The *disadvantages* of the IRR method are (1) the possibility of producing rankings of mutually exclusive projects different from those from NPV analysis and (2) the possibility that a project has multiple IRRs or no IRR.

### LOS 28.c: Describe expected relations among a company's investments, company value, and share price.

*CFA® Program Curriculum, Volume 3, page 654*

One way to approach the question of whether a company is creating value for its shareholders is to compare the return on the company's investment in assets to its cost of capital. A company's **return on invested capital (ROIC)**, or simply **return on capital**, is defined as its **net operating profit after tax (NOPAT)**, or simply after-tax net profit, over a period, divided by the average book value of its total capital over the period.

$$\text{return on invested capital} = \frac{\text{after-tax net profit}}{\text{average book value of total capital}}$$

or:

$$\text{return on invested capital} = \frac{\text{net operating profit after tax}}{\text{average book value of total capital}}$$

Because we want to measure the return to all sources of capital (both debt and equity), after-tax net profit is net income plus after-tax interest expense. For net *operating* profit after tax, we would subtract after-tax nonoperating income as well. The denominator is the sum of the average book values of debt, common stock, and preferred stock.

Because return on invested capital is a measure of the after-tax return on the amounts invested in the company over time by both equity investors and debtholders, we can compare it to the company's *weighted average cost of capital* (WACC), a weighted average of the required after-tax rates of return on the company's various sources of capital. If a firm's ROIC is greater than its WACC, then the company's management is increasing the value of the firm (and shareholders' wealth). Of course, the opposite is true as well, an ROIC less than a firm's WACC indicates that value is being reduced.



#### PROFESSOR'S NOTE:

We will discuss WACC in detail in our topic review of "Cost of Capital—Foundational Topics."

Because the NPV method is a direct measure of the expected change in firm value from undertaking a capital project, the NPV is related to share value. In theory, a positive NPV project should cause a proportionate increase in a company's stock price.

In reality, the impact of a project on the company's stock price is more complicated. A company's stock price is a function of the present value of its expected future earnings stream. As a result, changes in the stock price will result more from changes in *expectations* about the profitability of a firm's future investments.

#### MODULE QUIZ 28.2



To best evaluate your performance, enter your quiz answers online.

1. A company is considering the purchase of a copier that costs \$5,000. Assume a required rate of return of 10% and the following cash flow schedule:

- Year 1: \$3,000.
- Year 2: \$2,000.
- Year 3: \$2,000.

The project's NPV is *closest* to:

- A. -\$309.
  - B. +\$883.
  - C. +\$1,523.
2. A company is considering moving its manufacturing facilities to either Texas or South Carolina to decrease taxes and labor costs. After estimating all the relevant incremental after-tax cash flows of each move, an analyst estimates the IRR of a move to Texas to be 13% and the IRR of a move to South Carolina to be 15%. If the appropriate discount rate to evaluate the moves is 14%, the analyst:
- A. can conclude that the move to South Carolina should be undertaken.
  - B. cannot conclude that the move to South Carolina should be undertaken because the two moves are mutually exclusive.
  - C. may find that the move to Texas is preferable when projects are ranked by their NPVs.
3. Fullen Machinery is investing \$400 million in new industrial equipment. The present value of the future after-tax cash flows resulting from the equipment is \$700 million. Fullen currently has 200 million shares of common stock outstanding, with a current market price of \$36 per share. Assuming that this project is new information and is independent of other expectations about the company, what is the theoretical effect of the new equipment on Fullen's stock price? The stock price will:
- A. decrease to \$33.50.
  - B. increase to \$37.50.
  - C. increase to \$39.50.

## MODULE 28.3: REAL OPTIONS AND CAPITAL ALLOCATION PITFALLS

### LOS 28.d: Describe types of real options relevant to capital investment.



*CFA® Program Curriculum, Volume 3, page 656*

Video covering  
this content is  
available online.

**Real options** are future actions that a firm can take, given that they invest in a project today. Real options are similar to financial options (put and call options) in that they give the option holder the right, but not the obligation, to take a future action. The value of real options should be included in the calculation of project's NPV. Options never have negative values because if, in the future, the specified action will have a negative value, the option holder will not take the action.

Types of real options include the following:

- **Timing options** allow a company to delay making an investment because they expect to have better information in the future.
- **Abandonment options** are similar to put options (the option to sell an asset at a given price in the future). They allow management to abandon a project if the present value of the incremental cash flows from exiting a project exceeds the present value of the incremental cash flows from continuing the project.
- **Expansion options** are similar to call options (the option to buy an asset at a given price in the future). Expansion options allow a company to make additional

investments in future projects if the company decides they will create value.

- **Flexibility options** give managers choices regarding the operational aspects of a project. The two main forms are price-setting and production flexibility options.
  - *Price-setting* options allow the company to change the price of a product. For example, the company may raise prices if demand for a product is high, in order to benefit from that demand without increasing production.
  - *Production-flexibility* options may include paying workers overtime, using different materials as inputs, or producing a different variety of product.
- **Fundamental options** are projects that are options themselves because the payoffs depend on the price of an underlying asset. For example, the payoff for a copper mine is dependent on the market price for copper. If copper prices are low, it may not make sense to open a copper mine, but if copper prices are high, opening the copper mine could be very profitable. The operator has the option to close the mine when prices are low and open it when prices are high.

### LOS 28.e: Describe common capital allocation pitfalls.

*CFA® Program Curriculum, Volume 3, page 659*

Common mistakes managers make when evaluating capital projects include the following:

- *Failing to incorporate economic responses into the analysis.* For example, if a profitable project is in an industry with low barriers to entry, competitors will likely undertake similar projects, reducing future profitability.
- *Misusing standardized templates.* Since managers may evaluate hundreds of projects in a given year, they often create templates to streamline the analysis process. However, the template may not be an exact match for the project, resulting in estimation errors.
- *Pet projects of senior management.* Projects that have the personal backing of influential members of senior management may contain overly optimistic projections that make the project appear more profitable than it really is. In addition, the project may not be subjected to the same level of analysis as other projects.
- *Basing investment decisions on EPS or ROE.* Managers whose incentive compensation is tied to increasing EPS or ROE may avoid positive long-term NPV investments that are expected to reduce EPS or ROE in the short run.
- *Using the IRR criterion for project decisions.* When comparing two mutually exclusive projects, one project may have a higher IRR, but a lower NPV. The NPV criterion is theoretically sound, accurately reflecting the goal of maximizing shareholder wealth, and should be used to choose between two projects that are both acceptable.
- *Poor cash flow estimation.* For a complex project, it is easy to double count or fail to include certain cash flows in the analysis. For example, the effects of inflation must be properly accounted for.
- *Misestimating overhead costs.* The cost of a project should include only the incremental overhead costs related to management time and information technology support. These costs are often difficult to quantify, and over- or underestimation can lead to incorrect investment decisions.

- *Using the incorrect discount rate.* The required rate of return on the project should reflect the project's risk. Simply using the company's WACC as a discount rate without adjusting it for the risk of the project may lead to significant errors when estimating the NPV of a project.
- *Politics involved with spending the entire capital budget.* Many managers try to spend their entire capital budget each year and ask for an increase for the following year. In a company with a culture of maximizing shareholder value, managers will return excess funds whenever there is a lack of positive NPV projects and make a case for expanding the budget when there are multiple positive NPV opportunities.
- *Failure to generate alternative investment ideas.* Generating investment ideas is a crucial step in the capital allocation process. However, once a manager comes up with a "good" idea, they may go with it rather than searching for an idea that is "better."
- *Improper handling of sunk and opportunity costs.* Managers should not consider sunk costs in the evaluation of a project because they are not incremental cash flows (they are incurred whether the project is undertaken or not). Managers should always consider opportunity costs because they are incremental. However, in practice, many managers do this incorrectly.



## MODULE QUIZ 28.3

*To best evaluate your performance, enter your quiz answers online.*

1. Albert Duffy, a project manager at Crane Plastics, is considering taking on a new capital project. When presenting the project, Duffy shows members of Crane's executive management team that because the company has the ability to have employees work overtime, the project makes sense. The project Duffy is taking on would be *best* described as having:
  - a fundamental option.
  - an expansion option.
  - a flexibility option.
2. A company is considering building a distribution center that will allow it to expand sales into a new region comprising three provinces. John Parker, a firm analyst, has argued that the current analysis fails to incorporate the amount they could get from selling the distribution center at the end of year 2, rather than operating it to the end of the project's assumed economic life. Parker is suggesting that:
  - the assumed investment horizon is too long.
  - the analysis should include the value of a put option.
  - the analysis should include the value of a call option.
3. An analyst is estimating the NPV of a project to introduce a new spicier version of its well-known barbecue sauce into its product line. A cost that should *most likely* be excluded from his analysis is:
  - \$200,000 to develop a recipe for the new sauce.
  - a \$150,000 decrease in sales of its current sauce as some current customers switch to the spicier sauce.
  - \$100,000 for a marketing survey that was conducted to determine demand for a spicier sauce.

## KEY CONCEPTS

### LOS 28.a

Capital allocation is the process of evaluating capital projects, projects with cash flows over a period longer than one year.

Steps of the capital allocation process are: (1) Generate investment ideas; (2) Analyze project ideas; (3) Create a firm-wide capital budget; and (4) Monitor decisions and conduct a post-audit.

Categories of capital projects include the following:

- Replacement projects for maintaining the business or for cost reduction
- Expansion projects
- New product or market development
- Mandatory projects to meet environmental or regulatory requirements
- Other projects, such as research and development or pet projects of senior management.

Capital allocation decisions should be based on incremental after-tax cash flows, the expected differences in after-tax cash flows if a project is undertaken.

Acceptable independent projects can all be undertaken, while a firm must choose between or among mutually exclusive projects.

Project sequencing concerns the opportunities for future capital projects that may be created by undertaking a current project.

If a firm cannot undertake all profitable projects because of limited ability to raise capital, the firm should choose that group of fundable positive NPV projects with the highest total NPV.

### **LOS 28.b**

NPV is the sum of the present values of a project's expected cash flows and represents the change in firm value from undertaking a project. Positive NPV projects should be undertaken, but negative NPV projects should not because they are expected to decrease the value of the firm.

An IRR is the discount rate at which the present values of a project's expected cash inflows and cash outflows are equal (i.e., the discount rate for which the NPV of a project is zero). A project for which the IRR is greater (less) than the appropriate discount rate for the project will have an NPV that is positive (negative) and should be accepted (not accepted).

### **LOS 28.c**

Return on invested capital can be compared to a company's weighted average cost of capital to indicate whether the company has increased or decreased firm value over time.

NPV is a measure of the expected change in company value from undertaking a project. A firm's stock price may be affected to the extent that engaging in a project with a positive NPV was previously unanticipated by investors (not already reflected in the stock price).

### **LOS 28.d**

Real options allow managers to make future decisions that change the value of capital allocation decisions made today.

- Timing options allow a company to delay making an investment.

- Abandonment options allow management to abandon a project if the present value of the incremental cash flows from exiting a project exceeds the present value of the incremental cash flows from continuing a project.
- Expansion options allow a company to make additional investments in a project if doing so creates value.
- Flexibility options give managers choices regarding the operational aspects of a project. The two main forms are price-setting and production flexibility options.
- Fundamental options are projects that are options themselves because the payoffs depend on the price of an underlying asset.

## LOS 28.e

Common mistakes in the capital allocation process include the following:

- Failing to incorporate economic responses into the analysis
- Misusing standardized project evaluation templates
- Having overly optimistic assumptions for pet projects of senior management
- Basing long-term investment decisions on short-term EPS or ROE considerations
- Using the IRR criterion for choosing between mutually exclusive projects
- Poor cash flow estimation
- Misestimating overhead costs
- Using a discount rate that does not accurately reflect the project's risk
- Politics involved with spending the entire capital budget
- Failure to generate alternative investment ideas
- Improper handling of sunk and opportunity costs

## ANSWER KEY FOR MODULE QUIZZES

### Module Quiz 28.1

- A** A post-audit identifies what went right and what went wrong. It is used to improve forecasting and operations. (LOS 28.a)
- A** Cash flows are based on opportunity costs. Financing costs are recognized in the project's required rate of return. Accounting net income, which includes non-cash expenses, is irrelevant; incremental cash flows are essential for making correct capital allocation decisions. (LOS 28.a)
- B** It is quite possible that offering a matching dryer will increase sales of their washers, because some consumers will prefer a matching set. The increased sales of their washers is a positive externality, and those incremental sales should be considered in the analysis. Cannibalization would be a consideration if the introduction of dryers was expected to decrease washer sales. Sunk costs should not be considered in project analysis. (LOS 28.a)

### Module Quiz 28.2

- B**  $CF_0 = -5,000$ ;  $CF_1 = 3,000$ ;  $CF_2 = 2,000$ ;

$CF_3 = 2,000$ ;  $I / Y = 10$ ;  $NPV = \$883$ . (LOS 28.b)

2. **A** Based on the IRRs, the move to South Carolina will have a positive NPV (the IRR is greater than the discount rate) and the move to Texas will have a negative NPV. In this case, we can rank the two projects based on their IRRs. If the appropriate discount rate was less than both IRRs, for example, 10%, the IRR rankings could not reliably be used to choose between the two proposed moves. (LOS 28.b)
3. **B** The NPV of the new equipment is  $\$700 \text{ million} - \$400 \text{ million} = \$300 \text{ million}$ . The NPV of this project is added to Fullen's current market value. On a per share basis, the addition is worth  $\$300 \text{ million} / 200 \text{ million shares}$ , for a net addition to the share price of  $\$1.50 + \$36.00 = \$37.50$ . (LOS 28.c)

### Module Quiz 28.3

1. **C** The project described has a production-flexibility regarding the level of production. Other flexibility options might be to produce a different product or to use different inputs at some future date. Including the value of real options can improve the NPV estimates for individual projects. (LOS 28.d)
2. **B** The option to abandon the project and receive the market value of the facility if actual cash flows are less than expected over the first two years can be viewed as a valuable put option that should be included in the calculation of the project's NPV. (LOS 28.d)
3. **C** The cost of the marketing survey should not be included because it is a sunk cost; it will be incurred whether they decide to do the project or not. The decrease in sales of their current sauce if the spicier version is introduced (cannibalization) should be considered in the analysis. The cost of recipe development should be included because it will only be incurred if they decide to go ahead with the introduction of the new spicier sauce. (LOS 28.e)

The following is a review of the Corporate Issuers (1) principles designed to address the learning outcome statements set forth by CFA Institute. Cross-Reference to CFA Institute Assigned Reading #29.

# READING 29: SOURCES OF CAPITAL

Study Session 9

## EXAM FOCUS

This topic should possibly be titled “Sources of Funds,” because it broadly covers a firm’s operating cash flows, working capital cash flows, and various sources of short-term and long-term financing. The reading is relatively short but has a lot of useful (and testable) information. The requirements for candidates are clear in the LOS for this one, so focus on those as you study the material.

## MODULE 29.1: SOURCES OF CAPITAL

**LOS 29.a: Describe types of financing methods and considerations in their selection.**



*CFA® Program Curriculum, Volume 3, page 670*

Video covering this content is available online.

### Internal Sources of Funds

A company’s **operating cash flow** can be estimated as net income plus depreciation less dividend payments. It is a measure of how much cash the firm is generating from its business operations that is available to finance and invest in its business.

**Accounts receivable** represent the amounts owed to a company from customer sales it has made on credit. Collection of accounts receivable is typically an important source of cash over the short term. Collecting accounts receivable sooner increases a company’s available short-term funds.

**Accounts payable** represent the amounts a company owes to its suppliers. Delaying payment of accounts payable increases the cash a company has available, but doing so may have explicit costs. Often, credit terms offer a discount for earlier payment. Terms of “2/15 net 45,” for example, mean that if an invoice is paid within 15 days, the customer receives a 2% discount. The full amount of the invoice must be paid within 45 days if the customer does not take advantage of the discount for early payment. The cost of delaying payment from day 15 to day 45 (for 30 days) is 2%, or more than 24% annualized, which may be a fairly expensive source of short-term funding.

Selling **inventory** generates funds, and there is a cost to having funds invested in inventory. A company may attempt to shorten production times and the time between getting goods ready for sale and the actual sales. On the other hand, carrying too little inventory may result in lost sales when orders cannot be filled immediately.

Liquid debt or equity securities that a company intends to sell within a year are classified as **marketable securities**. These can represent a quick source of cash for a company.

# Financial Intermediaries

Bank **lines of credit** are used primarily by large, financially sound companies. Lines of credit may be uncommitted, committed, or revolving.

- *Uncommitted line of credit.* A bank extends an offer of credit for a certain amount but may refuse to lend if circumstances change, making this a less reliable source of funds.
- *Committed (regular) line of credit.* A bank extends an offer of credit that it “commits to” for some period of time. The fact that the bank has committed to extend credit in amounts up to the credit line makes this a more reliable source of short-term funding than an uncommitted line of credit. Banks charge a fee for making such a commitment. Loans under the agreement are typically for periods of less than a year, and interest charges are stated in terms of a short-term reference rate, plus a margin to compensate for the credit risk of the loan. Outside the United States, similar arrangements are referred to as *overdraft lines of credit*.
- *Revolving line of credit.* An even more reliable source of short-term financing than a committed line of credit, a revolving line of credit is typically for a longer term, sometimes years. With a revolving line of credit, companies may borrow and repay funds as their needs change over time. Along with committed lines of credit, revolving credit lines can be verified and can be listed in the footnotes of a firm’s financial statements as a source of liquidity.

Companies with weaker credit may have to pledge assets as collateral for bank borrowings. Fixed assets, inventory, and accounts receivable may all serve as collateral for loans. Short-term financing is typically collateralized by receivables or inventory and longer-term loans are secured with a claim to fixed (longer-term) assets. The bank may also have a **blanket lien**, which gives it a claim to all current and future firm assets as collateral in case the primary collateral is insufficient and the borrowing firm defaults. When a firm assigns its receivables to the bank making a loan, the company still services the receivables and remains responsible for any receivables that are not paid.

**Secured (asset-backed) loans** are backed by collateral, for example, fixed assets, receivables, or inventory. **Factoring** refers to the actual sale of receivables at a discount from their face value. The size of the discount will depend on the amount of time until the receivables are due, the creditworthiness of the firm’s customers, and the firm’s collection history on its receivables. The “factor” (the buyer of the receivables) takes on the responsibility for collecting receivables and the credit risk of the receivables portfolio.

**Web-based and non-bank lenders** typically lend to medium-to-small-size firms and typically charge fees in addition to interest charges.

In managing its short-term financing, a firm should focus on the objectives of having sufficient sources of funding for current, as well as foreseeable future, cash needs and should seek the most cost-effective rates available given its needs, assets, and creditworthiness. The firm should have the ability to prepay short-term borrowings when cash flow permits and have the flexibility to structure its short-term financing so that the debt matures without peaks and can be matched to expected cash flows. For larger borrowers, it is important that the firm has alternative sources of short-term funding and even alternative lenders for a particular type of financing. It is often worth

having slightly higher overall short-term funding costs in order to have flexibility and redundant sources of financing.

## Capital Markets Sources of Funds

Companies can issue **public debt** (trades on public markets) or **private debt** (provided by private entities and not actively traded). Debt payments have priority over payments to equity holders and the interest paid on debt is typically tax deductible. In addition to current market conditions, interest rates on a company's debt depend on its creditworthiness and the collateral, if any, pledged for repayment of the debt.

Large, creditworthy companies often issue short-term debt securities called **commercial paper**, which is sometimes issued by companies with lower credit ratings as well. Whether the firm sells the paper directly to investors (direct placement) or sells it through dealers (dealer-placed paper), the interest costs are typically lower than the rate they would get from a bank (in cases where that is an alternative). Maturities on commercial paper range from a few days to one year (272 days in the U.S.). The debt is unsecured and typically supplemented with a **backup line of credit** that will provide funds if markets for commercial paper are disrupted so that a company cannot replace maturing commercial paper with new paper.

**Long-term debt** often carries a fixed interest rate through maturity, which may be decades after issuance.

Companies sell **common equity** (common stock) both in public markets and privately. Equity owners have a lower priority to a firm's cash flows than debtholders, making a company's equity riskier than its debt.

**Preferred stock** (preference shares) has qualities of both debt and equity and is, therefore, referred to as a hybrid security. Preferred stock typically promises fixed dividend payments and has no maturity date (perpetual preferred). Dividend payments on preferred shares have priority over common stock dividends but lower priority than interest payments on debt. Preferred stock dividends are not tax deductible.

Other hybrid securities include **convertible preferred stock** and **convertible bonds**. Each of these specifies a number of common shares that the security owner can convert their securities into.

**Leases** are also a source of financing for the firm. The firm promises to make regular lease payments in exchange for the right to use an asset over a specified period.

## Selecting Sources of Financing

Companies choose financing sources based on cost, risk, and flexibility. Some of a company's decisions regarding financing are simply a result of which sources are available. The largest publicly traded companies have access to sources of funding that smaller or privately held companies do not. Companies without stable and substantial operating cash flows will find some types of debt financing expensive or not available at all. Companies with valuable liquid assets will find debt financing more available because such assets can be pledged as collateral.

Companies that have access to and utilize public debt markets tend to match the maturities of their outstanding debt to the lives of their various assets. Companies with

significant operations and assets in a country that uses a different currency will often finance them with debt denominated in that currency.

Economic conditions and governmental policies can also affect companies' financing decisions. When interest payments are tax deductible, the reduction in the after-tax cost of debt will increase the attractiveness of debt financing. An increase in tax rates will also make debt financing relatively more attractive.

Inflation can also affect financing decisions. Expected increases in inflation can make long-term fixed-rate debt attractive, because future debt payments will be less in real terms. On the other hand, uncertainty about and variability of inflation rates can make issuing long-term fixed-rate debt riskier and issuing short-term or floating-rate debt more attractive.

Governments may make below-market rate debt or debt guarantees available to specific companies or industries, increasing the attractiveness of, or simply making available, greater amounts of debt financing.

Expansionary monetary policy that results in low (or even negative) real rates of interest will make it more attractive for companies to issue debt and (hopefully) invest in their businesses. Low real interest rates can also cause companies to issue debt and repurchase equity, effectively increasing their financial leverage.

### **LOS 29.b: Describe primary and secondary sources of liquidity and factors that influence a company's liquidity position.**

*CFA® Program Curriculum, Volume 3, page 680*

A company's **primary sources of liquidity** are the sources of cash it uses in its normal day-to-day operations. The company's *cash balances* result from selling goods and services, collecting receivables, and generating cash from other sources such as short-term investments. Typical sources of *short-term funding* include trade credit from vendors and lines of credit from banks. Effective *cash flow management* of a firm's collections and payments can also be a source of liquidity for a company.

**Secondary sources of liquidity** include liquidating short-term or long-lived assets, renegotiating debt agreements, or filing for bankruptcy and reorganizing the company. While using its primary sources of liquidity is unlikely to change the company's normal operations, resorting to secondary sources of liquidity such as these can change the company's financial structure and operations significantly and may indicate that its financial position is deteriorating.

In general, a company's liquidity position improves if it can get cash to flow in more quickly and flow out more slowly.

**Drags on liquidity** delay or reduce cash inflows, or increase borrowing costs. Examples include uncollected receivables and bad debts, obsolete inventory (takes longer to sell and can require significant price discounts), and limited short-term credit availability due to economic conditions.

**Pulls on liquidity** accelerate cash outflows. Examples include paying vendors sooner and changes in credit terms that accelerate the required payment of outstanding balances.

### **LOS 29.c: Compare a company's liquidity position with that of peer companies.**

Some companies tend to have chronically weak liquidity positions, often due to specific factors that affect the company or its industry. These companies typically need to borrow against their long-lived assets to acquire working capital.

Liquidity ratios are employed by analysts to determine the firm's ability to pay its short-term liabilities.

- The *current ratio* is the best-known measure of liquidity:

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

The higher the current ratio, the more likely it is that the company will be able to pay its short-term bills. A current ratio of less than one means that the company has negative working capital and is probably facing a liquidity crisis. Working capital equals current assets minus current liabilities.

- The *quick ratio* or *acid-test ratio* is a more stringent measure of liquidity because it does not include inventories and other assets that might not be very liquid:

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

The higher the quick ratio, the more likely it is that the company will be able to pay its short-term bills.

The current and quick ratios differ only in the assumed liquidity of the current assets that the analyst projects will be used to pay off current liabilities.

- A measure of accounts receivable liquidity is the *receivables turnover*:

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

It is considered desirable to have a receivables turnover figure close to the industry norm.



### PROFESSOR'S NOTE

This formula for the receivables turnover ratio uses credit sales in the numerator, rather than total sales, as shown in the earlier topic review on ratio analysis. While an analyst within a company will know what proportion of sales are credit or cash sales, an external analyst will likely not have this information but may be able to estimate it based on standard industry practice.

In most cases when a ratio compares a balance sheet account (such as receivables) with an income or cash flow item (such as sales), the balance sheet item will be the average of the account instead of simply the end-of-year balance. Averages are calculated by adding the beginning-of-year account value and the end-of-year account value, then dividing the sum by two.

- The inverse of the receivables turnover multiplied by 365 is the *number of days of receivables* (also called *average days' sales outstanding*), which is the average number of days it takes for the company's customers to pay their bills:

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

$$= \frac{\text{average receivables}}{\text{average day's credit sales}}$$

It is considered desirable to have a collection period (and receivables turnover) close to the industry norm. The firm's credit terms are another important benchmark used to interpret this ratio. A collection period that is too high might mean that customers are too slow in paying their bills, which means too much capital is tied up in assets. A collection period that is too low might indicate that the firm's credit policy is too rigorous, which might be hampering sales.

- A measure of a firm's efficiency with respect to its processing and inventory management is the *inventory turnover*:

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



### PROFESSOR'S NOTE

Pay careful attention to the numerator in the turnover ratios. For inventory turnover, be sure to use cost of goods sold, not sales.

- The inverse of the inventory turnover multiplied by 365 is the *average inventory processing period* or *number of days of inventory*:

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

$$= \frac{\text{average inventory}}{\text{average day's COGS}}$$

As is the case with accounts receivable, it is considered desirable to have an inventory processing period (and inventory turnover) close to the industry norm. A processing period that is too high might mean that too much capital is tied up in inventory and could mean that the inventory is obsolete. A processing period that is too low might indicate that the firm has inadequate stock on hand, which could hurt sales.

- A measure of the use of trade credit by the firm is the *payables turnover ratio*:

$$\text{payables turnover ratio} = \frac{\text{purchases}}{\text{average trade payables}}$$

The inverse of the payables turnover ratio multiplied by 365 is the *payables payment period* or *number of days of payables*, which is the average amount of time it takes the company to pay its bills:

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

$$= \frac{\text{average payables}}{\text{average day's purchases}}$$

- The **operating cycle**, the average number of days that it takes to turn raw materials into cash proceeds from sales, is:

operating cycle = days of inventory + days of receivables

- The *cash conversion cycle* or *net operating cycle* is the length of time it takes to turn the firm's cash investment in inventory (including raw materials for a manufacturer) back into cash, in the form of collections from the inventory sales. The cash conversion cycle is computed from the average receivables collection period, average inventory processing period, and the payables payment period:

$$\text{cash conversion cycle} = \left( \frac{\text{average days}}{\text{of receivables}} \right) + \left( \frac{\text{average days}}{\text{of inventory}} \right) - \left( \frac{\text{average days}}{\text{of payables}} \right)$$

High cash conversion cycles are considered undesirable. A conversion cycle that is too high implies that the company has an excessive amount of investment in working capital.

#### **LOS 29.d: Evaluate choices of short-term funding.**

*CFA® Program Curriculum, Volume 3, page 645*

A company's short-term funding plan should ensure that it maintains sufficient borrowing capacity to meet its ongoing needs, including seasonal or other times of peak requirements.

The primary consideration when choosing a strategy for short-term funding is cost. Companies should stay up-to-date on the costs of the various funding sources available to them.

Even companies that rely primarily or exclusively on one particular type of funding may find it advantageous to work with more than one lender.

Companies that rely on significant short-term financing should use more than one type of financing and multiple lenders for a given type of financing, because markets and lender circumstances can change over time, sometimes suddenly.

Maintaining excess funding for unforeseen events or to take advantage of business opportunities is also an important consideration. Ensuring access to funds may increase borrowing costs.



#### **MODULE QUIZ 29.1**

*To best evaluate your performance, enter your quiz answers online.*

- A company has an agreement with its lender to borrow funds as they need to up to a specified maximum amount and to repay its borrowings as they have funds available. This arrangement is *most* appropriately called:
  - a committed line of credit.
  - a revolving line of credit.
  - a capped line of credit.
- A company receives an invoice of \$150,000 for machine tools with terms of “1.5/15 net 40.” The cost to the company of delaying payment of this receivable is *most* appropriately described as \$2,250 for the use of:
  - \$150,000 for 40 days.
  - \$150,000 for 25 days.
  - \$147,500 for 25 days.
- An example of a primary source of liquidity is:

- A. liquidating assets.
  - B. negotiating debt contracts.
  - C. short-term investment portfolios.
4. Firm P and Firm Q have the same current assets and current liabilities, but Firm P has a lower quick ratio than Firm Q. Compared with Firm Q, it is *most likely* that Firm P has:
- A. greater inventory.
  - B. greater payables.
  - C. a higher receivables turnover ratio.
5. A company would *best* improve its cash conversion cycle by decreasing its:
- A. receivables turnover.
  - B. payables turnover.
  - C. inventory turnover.

## KEY CONCEPTS

### LOS 29.a

Companies choose among their financing alternatives based on cost, risk, ease of access, flexibility, and current availability. Types of company financing are as follows:

- Internal sources: operating cash flows, accounts payable, accounts receivable, inventory, and marketable securities.
- Financial intermediaries: bank borrowing, asset-backed loans, loans from non-bank finance companies (more expensive), asset leasing.
- Capital markets: long-term debt (highest priority), preferred equity (next in priority), common equity (has a residual claim to firm cash flows and assets). All can be either private or publicly traded. Debt that is convertible into common shares and preferred equity that is convertible into common shares are both considered hybrid securities, having some of the characteristics of debt and some characteristics of common stock.

### LOS 29.b

Primary sources of liquidity are the sources of cash a company uses in its normal operations. If its primary sources are inadequate, a company can use secondary sources of liquidity, such as asset sales, debt renegotiation, and bankruptcy reorganization.

A company's liquidity position depends on the effectiveness of its cash flow management and is influenced by drags on its cash inflows (e.g., uncollected receivables, obsolete inventory) and pulls on its cash outflows (e.g., early payments to vendors, reductions in credit limits).

### LOS 29.c

Measures of a company's short-term liquidity include:

- Current ratio = current assets / current liabilities.
- Quick ratio = (cash + marketable securities + receivables) / current liabilities.

Measures of how well a company is managing its working capital include:

- Receivables turnover = credit sales / average receivables.
- Number of days of receivables = 365 / receivables turnover.
- Inventory turnover = cost of goods sold / average inventory.

- Number of days of inventory = 365 / inventory turnover.
- Payables turnover = purchases / average trade payables.
- Number of days of payables = 365 / payables turnover.

The operating cycle and the cash conversion cycle (net operating cycle) are summary measures of the effectiveness of a company's working capital management. Cycles that are high relative to a company's peers suggest the company has too much cash tied up in working capital.

- Operating cycle = days of inventory + days of receivables.
- Cash conversion cycle = days of inventory + days of receivables – days of payables.

#### **LOS 29.d**

Companies must maintain sufficient short-term borrowing capacity to meet anticipated peak cash needs. They should also maintain some additional borrowing capacity to meet unanticipated needs and provide the flexibility to take advantage of investment opportunities that may arise.

The primary consideration when choosing short-term funding sources is cost. However, companies that rely on significant short-term borrowing should, at a minimum, use more than one type of debt and maintain a relationship with more than one lender, as circumstances and market conditions can change. It is important for company managers to keep up-to-date on the available types of short-term financing and their costs.

### **ANSWERS TO MODULE QUIZZES**

1. **B** A line of credit where the borrower can draw funds as they need them and repay them when they have the funds available to do so is called a revolving line of credit. (LOS 29.a)
2. **C** The terms indicate that the company can pay  $\$150,000(1 - 0.015) = \$147,500$  on day 15 (after the invoice date) or pay \$150,000 on day 40—effectively gaining the use of \$147,500 for 25 days at a cost of \$2,250. (LOS 29.a)
3. **C** Primary sources of liquidity include ready cash balances, short-term funds (e.g., short-term investment portfolios), and effective cash flow management. Secondary sources of liquidity include renegotiating debt contracts, liquidating assets, and filing for bankruptcy protection and reorganization. (LOS 29.b)
4. **A** Firms P and Q will have the same quick ratios, CA/CL. The quick ratio numerator is CA – inventory, so for firm P to have a smaller quick ratio than firm Q, it must have greater inventory. (LOS 29.c)
5. **B** A decrease in the payables turnover would increase days payables, which would decrease (improve) the firm's cash conversion cycle. A decrease in a company's receivables turnover would increase days receivables, and a decrease in a company's inventory turnover would increase its days inventory on hand. Both would increase the cash conversion cycle. (LOS 29.c)

The following is a review of the Corporate Issuers (2) principles designed to address the learning outcome statements set forth by CFA Institute. Cross-Reference to CFA Institute Assigned Reading #30.

# READING 30: COST OF CAPITAL— FOUNDATIONAL TOPICS

Study Session 10

## EXAM FOCUS

The firm must decide how to raise the capital to fund its business or finance its growth, dividing it among common equity, debt, and preferred stock. The mix that produces the minimum overall cost of capital will maximize the value of the firm (share price). From this topic review, you must understand weighted average cost of capital and its calculation and be ready to calculate the costs of common equity, preferred stock, and the after-tax cost of debt.

## MODULE 30.1: WEIGHTED AVERAGE COST OF CAPITAL

**LOS 30.a: Calculate and interpret the weighted average cost of capital (WACC) of a company.**



**LOS 30.b: Describe how taxes affect the cost of capital from different capital sources.**

Video covering this content is available online.

*CFA® Program Curriculum, Volume 4, page 6*

The capital allocation process involves discounted cash flow analysis. To conduct such analysis, we must know the appropriate discount rate to use. This topic review discusses how, as an analyst, you can determine the proper rate at which to discount the cash flows associated with a project. This discount rate is the firm's **weighted average cost of capital (WACC)** and is also referred to as the **marginal cost of capital (MCC)**.

**Basic definitions.** On the right (liabilities and equity) side of a firm's balance sheet, we have debt, preferred equity, and common equity. These are normally referred to as the *capital components* of the firm. Any increase in a firm's total assets will have to be financed through an increase in at least one of these capital accounts. The cost of each of these components is called the *component cost* of capital.

Throughout this review, we focus on the following capital components and their component costs:

$k_d$	The rate at which the firm can issue new debt. This is the yield to maturity on existing debt. This is also called the before-tax component cost of debt.
$k_d(1 - t)$	The after-tax cost of debt. Here, $t$ is the firm's marginal tax rate. The after-tax component cost of debt, $k_d(1 - t)$ , is used to calculate the WACC.
$k_{ps}$	The cost of preferred stock.
$k_{ce}$	The cost of common equity. It is the required rate of return on common stock and is generally difficult to estimate.

In many countries, the interest paid on corporate debt is tax deductible. Because we are interested in the after-tax cost of capital, we adjust the cost of debt,  $k_d$ , for the firm's marginal tax rate,  $t$ . Because there is typically no tax deduction allowed for payments to common or preferred stockholders, there is no equivalent deduction to  $k_{ps}$  or  $k_{ce}$ .

How a company raises capital and how it budgets or invests it are considered independently. Most companies have separate departments for the two tasks. The financing department is responsible for keeping costs low and using a balance of funding sources: common equity, preferred stock, and debt. Generally, it is necessary to raise each type of capital in large sums. The large sums may temporarily overweight the most recently issued capital, but in the long run, the firm will adhere to target weights. Because of these and other financing considerations, each investment decision must be made assuming a WACC, which includes each of the different sources of capital and is based on the long-run target weights. A company creates value by producing a return on assets that is higher than the required rate of return on the capital needed to fund those assets.

The WACC, as we have described it, is the cost of financing firm assets. We can view this cost as an opportunity cost. Consider how a company could reduce its costs if it found a way to produce its output using fewer assets, like less working capital. If we need less working capital, we can use the funds freed up to buy back our debt and equity securities in a mix that just matches our target capital structure. Our after-tax savings would be the WACC based on our target capital structure multiplied by the total value of the securities that are no longer outstanding.

For these reasons, any time we are considering a project that requires expenditures, comparing the return on those expenditures to the WACC is the appropriate way to determine whether undertaking that project will increase the value of the firm. This is the essence of the capital allocation decision. Because a firm's WACC reflects the average risk of the projects that make up the firm, it is not appropriate for evaluating all new projects. It should be adjusted upward for projects with greater-than-average risk and downward for projects with less-than-average risk.

The weights in the calculation of a firm's WACC are the proportions of each source of capital in a firm's capital structure.

## Calculating a Company's Weighted Average Cost of Capital

The WACC is given by:

$$WACC = (w_d)[k_d(1 - t)] + (w_{ps})(k_{ps}) + (w_{ce})(k_{ce})$$

where:

$w_d$  = percentage of debt in the capital structure

$w_{ps}$  = percentage of preferred stock in the capital structure

$w_{ce}$  = percentage of common stock in the capital structure

#### EXAMPLE: Computing WACC

Suppose Dexter, Inc.'s target capital structure is as follows:

$$w_d = 0.45, w_{ps} = 0.10, \text{ and } w_{ce} = 0.45$$

Its before-tax cost of debt is 7.5%, its cost of equity is 11.5%, its cost of preferred stock is 9.0%, and its marginal tax rate is 40%. Calculate Dexter's WACC.

**Answer:**

Dexter's WACC will be:

$$WACC = (w_d)(k_d)(1 - t) + (w_{ps})(k_{ps}) + (w_{ce})(k_{ce})$$

$$WACC = (0.45)(0.075)(0.6) + (0.10)(0.09) + (0.45)(0.115) = 0.081 = 8.1\%$$

### LOS 30.c: Calculate and interpret the cost of debt capital using the yield-to-maturity approach and the debt-rating approach.

*CFA® Program Curriculum, Volume 4, page 9*

The **after-tax cost of debt**,  $k_d(1 - t)$ , is used in computing the WACC. It is the interest rate at which firms can issue new debt ( $k_d$ ) net of the tax savings from the tax deductibility of interest,  $k_d(t)$ :

$$\text{after-tax cost of debt} = \text{interest rate} - \text{tax savings} = k_d - k_d(t) = k_d(1 - t)$$

$$\text{after-tax cost of debt} = k_d(1 - t)$$

#### EXAMPLE: Cost of debt

Dexter, Inc., is planning to issue new debt at an interest rate of 7.5%. Dexter has a 40% marginal federal-plus-state tax rate. What is Dexter's cost of debt capital?

**Answer:**

$$k_d(1 - t) = 7.5\%(1 - 0.4) = 4.5\%$$



#### PROFESSOR'S NOTE

It is important that you realize that the cost of debt is the market interest rate (YTM) on new (marginal) debt, not the coupon rate on the firm's existing debt. CFA Institute may provide you with both rates, and you need to select the current market rate.

In tax jurisdictions where interest payments are not deductible for tax purposes,  $t$  is zero, and the pretax and after-tax cost of debt are the same.

It may be that interest is tax deductible but the amount of the deduction is capped at some maximum. In this case, if the firm's interest costs will be less than the maximum

tax-deductible amount if a project is undertaken, the appropriate cost of debt is the after-tax cost based on the firm's tax rate. For a project that would require debt interest payments in excess of the maximum tax-deductible amount, the appropriate cost of debt is the pretax cost, because no additional tax deductions for interest on debt are permitted.

If a market YTM is not available because the firm's debt is not publicly traded, the analyst may use the rating and maturity of the firm's existing debt to estimate the before-tax cost of debt. If, for example, the firm's debt carries a single-A rating and has an average maturity of 15 years, the analyst can use the yield curve for single-A rated debt to determine the current market rate for debt with a 15-year maturity. This approach is an example of **matrix pricing** or valuing a bond based on the yields of comparable bonds.

If any characteristics of the firm's anticipated debt would affect the yield (e.g., covenants or seniority), the analyst should make the appropriate adjustment to his estimated before-tax cost of debt. For firms that primarily employ floating-rate debt, the analyst should estimate the longer-term cost of the firm's debt using the current yield curve (term structure) for debt of the appropriate rating category.

#### **LOS 30.d: Calculate and interpret the cost of noncallable, nonconvertible preferred stock.**

*CFA® Program Curriculum, Volume 4, page 12*

The **cost of preferred stock** ( $k_{ps}$ ) is:

$$k_{ps} = D_{ps} / P$$

where:

$D_{ps}$  = preferred dividends

P = market price of preferred

#### **EXAMPLE: Cost of preferred stock**

Suppose Dexter, Inc., has preferred stock that pays an \$8.50 dividend per share and sells for \$100 per share. What is Dexter's cost of preferred stock?

**Answer:**

$$k_{ps} = D_{ps} / P$$

$$k_{ps} = \$8.50 / \$100 = 0.085 = 8.5\%$$

Note that the equation  $k_{ps} = D_{ps} / P$  is just a rearrangement of the preferred stock valuation model  $P = D_{ps} / k_{ps}$ , where  $P$  is the market price.

#### **LOS 30.e: Calculate and interpret the cost of equity capital using the capital asset pricing model approach and the bond yield plus risk premium approach.**

*CFA® Program Curriculum, Volume 4, page 13*

The opportunity **cost of equity capital** ( $k_{ce}$ ) is the required rate of return on the firm's common stock. The rationale here is that the firm could avoid part of the cost of common stock outstanding by using retained earnings to buy back shares of its own stock. The

cost of (i.e., the required return on) common equity can be estimated using one of the following approaches:

### 1. The capital asset pricing model approach.

**Step 1:** Estimate the risk-free rate,  $R_f$ . Yields on default risk-free debt such as U.S. Treasury notes are usually used. The most appropriate maturity to choose is one that is close to the useful life of the project.

**Step 2:** Estimate the stock's beta,  $\beta$ . This is the stock's risk measure.

**Step 3:** Estimate the expected rate of return on the market,  $E(R_{mkt})$ .

Use the capital asset pricing model (CAPM) equation to estimate the required rate of return

$$k_{ce} = R_f + \beta [E(R_{mkt}) - R_f]$$

#### EXAMPLE: Using CAPM to estimate $k_{ce}$

Suppose  $R_f = 5\%$ ,  $R_{mkt} = 11\%$ , and Dexter has a beta of 1.1. Estimate Dexter's cost of equity.

#### Answer:

The required rate of return for Dexter's stock is:

$$k_{ce} = 5\% + 1.1(11\% - 5\%) = 11.6\%$$



#### PROFESSOR'S NOTE

If you are unfamiliar with the capital asset pricing model, you can find more detail and the basic elements of its derivation in the Portfolio Management topic area.

### 2. Bond yield plus risk premium approach.

Analysts often use an ad hoc approach to estimate the required rate of return. They add a risk premium (three to five percentage points) to the market yield on the firm's long-term debt.

$$k_{ce} = \text{bond yield} + \text{risk premium}$$

#### EXAMPLE: Estimating $k_{ce}$ with bond yields plus a risk premium

Dexter's interest rate on long-term debt is 7.5%. Suppose the risk premium is estimated to be 4%. Estimate Dexter's cost of equity.

#### Answer:

Dexter's estimated cost of equity is:

$$k_{ce} = 7.5\% + 4.0\% = 11.5\%$$

Note that the three models gave us three different estimates of  $k_{ce}$ . The CAPM estimate was 11.6%, the dividend discount model estimate was 12%, and the bond yield plus risk premium estimate was 11.5%. Analysts must use their judgment to decide which is most appropriate.



#### MODULE QUIZ 30.1

*To best evaluate your performance, enter your quiz answers online.*

1. An analyst gathered the following data about a company:

<b>Capital Structure</b>	<b>Required Rate of Return</b>
30% debt	10% for debt
20% preferred stock	11% for preferred stock
<b>50% common stock</b>	<b>18% for common stock</b>

Assuming a 40% tax rate, what after-tax rate of return must the company earn on its investments?

- A. 13.0%.
  - B. 14.2%.
  - C. 18.0%.
2. A company is planning a \$50 million expansion. The expansion is to be financed by selling \$20 million in new debt and \$30 million in new common stock. The before-tax required return on debt is 9% and 14% for equity. If the company is in the 40% tax bracket, the company's marginal cost of capital is *closest* to:
- A. 7.2%.
  - B. 10.6%.
  - C. 12.0%.
3. A company has \$5 million in debt outstanding with a coupon rate of 12%. Currently, the yield to maturity (YTM) on these bonds is 14%. If the firm's tax rate is 40%, what is the company's after-tax cost of debt?
- A. 5.6%.
  - B. 8.4%.
  - C. 14.0%.
4. A company's \$100, 8% preferred is currently selling for \$85. What is the company's cost of preferred equity?
- A. 8.0%.
  - B. 9.4%.
  - C. 10.8%.
5. If the risk-free rate is 2% and the market rate of return is 5%, the cost of equity for a company with a beta of 0.8 is closest to:
- A. 2.4%.
  - B. 4.0%.
  - C. 4.4%.

## MODULE 30.2: BETA ESTIMATION AND FLOTATION COSTS

Video covering this content is available online.



**LOS 30.f: Explain and demonstrate beta estimation for public companies, thinly traded public companies, and nonpublic companies.**

*CFA® Program Curriculum, Volume 4, page 18*

For a publicly traded company with an active market, the beta of a stock is estimated from the linear relationship between the returns on the stock (dependent variable) and the returns on a proxy for the market portfolio (independent variable). In the U.S., the proxy for the market portfolio is typically the S&P 500 Index, but other broad-based indexes can be used. The slope of an ordinary least squares regression line of a stock's

returns on the returns of the market is used as an estimate of beta, a stock's systematic risk.

The estimate of beta is affected by the choice of the proxy for the overall market portfolio, by the length of the total time period selected, and by the time period for the individual returns. In practice, 60 observations of monthly returns are most often used.

A stock's beta estimated in this manner is referred to as a "raw" or "unadjusted" beta. Studies have shown that stock betas move toward one over time. To adjust for this reversion toward one, the following adjustment is used:

$$\text{Adjusted beta} = 2/3 \times \text{unadjusted beta} + 1/3$$



### PROFESSOR'S NOTE

The theory of the capital asset pricing model (CAPM) and using beta as an estimate of an asset's systematic risk is more fully developed in the topic area of Portfolio Management.

For a (target) stock that is not publicly traded or that is simply very thinly (infrequently) traded, we can estimate its beta from the returns on a comparable stock or group of comparable stocks that are actively traded. We can select a stock or group of stocks from the same industrial classification as the target company, or simply identify a stock or stocks that have similar business risks to our target company (a peer company or peer group of companies).

For companies that are comparable in their business risks, their individual betas will vary due to differences in their use of financial leverage and the tax rates they are subject to.

To account for these differences, we begin with the beta of a company or group of companies that are *purely* engaged in a business similar to that of the target company. Thus, using the beta of a conglomerate that is engaged in the same business as the target company would be inappropriate because its beta depends on its many different lines of business.

The beta of a firm is a function not only of the business risks of its lines of business but also of its financial structure. For a given set of projects, the greater a firm's reliance on debt financing, the greater its equity beta. For this reason, we must adjust the beta from a comparable company (or group of companies) for its leverage and tax rate (unlever it) to get the comparable company's asset beta (unlevered beta). We can then adjust the comparable company's asset beta (re-lever it) based on the financial leverage and the marginal tax rate of the target company. We can then use this equity beta in the CAPM equation to estimate the cost of equity of the target company.

To get the *unlevered beta* or *asset beta* of a comparable company, we use the following formula:

$$\beta_{\text{ASSET}} = \beta_{\text{EQUITY}} \left\{ \frac{1}{1 + [(1 - t) \frac{D}{E}]} \right\}$$

where:

$D/E$  = comparable company's debt-to-equity ratio and  $t$  is its marginal tax rate

To get the equity beta for the target company, we use the target company's tax rate and debt-to-equity ratio to re-lever the comparable company's asset beta:

$$\beta_{\text{TARGET}} = \beta_{\text{ASSET}} \left\{ 1 + \left[ (1 - t) \frac{D}{E} \right] \right\}$$

The following example illustrates this technique.

#### EXAMPLE: Estimating the cost of capital for a thinly traded stock

Acme, Inc., is in the food distribution business and its stock is thinly traded. It has a D/E ratio of 2 and a marginal tax rate of 40%. Balfour, a publicly traded firm that operates only in the food distribution business, has a D/E ratio of 1.5, a marginal tax rate of 30%, and an equity beta of 0.9. The risk-free rate is 5%, and the expected return on the market portfolio is 12%. Calculate Balfour's asset beta and Acme's adjusted equity beta, and estimate the cost of equity capital for Acme.

**Answer:**

Balfour's asset beta:

$$\beta_{\text{ASSET}} = 0.9 \left\{ \frac{1}{1 + [(1 - 0.3)1.5]} \right\} = 0.439$$

Unadjusted equity beta for Acme:

$$\text{Acme Beta}_{\text{unadjusted}} = 0.439[1 + (1 - 0.4)(2)] = 0.966$$

$$\text{Acme Beta}_{\text{adjusted}} = (2/3) 0.966 + 1/3 = 0.977$$

$$\text{Acme's cost of equity} = 5\% + 0.977(12\% - 5\%) = 11.839\%$$

If we use a peer group of companies, the method is the same, but for our estimate of the asset (unlevered) beta of the peer group stocks, we simply take the average of the asset betas calculated for each of our peer group firms.

#### LOS 30.g: Explain and demonstrate the correct treatment of flotation costs.

*CFA® Program Curriculum, Volume 4, page 22*

**Flotation costs** are the fees charged by investment bankers when a company raises external equity capital. Flotation costs can be substantial and often amount to between 2% and 7% of the total amount of equity capital raised, depending on the type of offering.

#### Incorrect Treatment of Flotation Costs

Because the LOS asks for the “correct treatment of flotation costs,” that implies that there is an incorrect treatment. Many financial textbooks incorporate flotation costs directly into the cost of capital by increasing the cost of external equity. For example, if a company has a dividend of \$1.50 per share, a current price of \$30 per share, and an expected growth rate of 6%, the cost of equity without flotation costs would be:

$$r_e = \left( \frac{\$1.50(1 + 0.06)}{\$30} \right) + 0.06 = 0.1130, \text{ or } 11.30\%$$



#### PROFESSOR'S NOTE

Here we're using the constant growth model, rather than the CAPM, to estimate the cost of equity.

If we incorporate flotation costs of 4.5% directly into the cost of equity computation, the cost of equity increases:

$$r_e = \left[ \frac{\$1.50(1 + 0.06)}{\$30(1 - 0.045)} \right] + 0.06 = 0.1155, \text{ or } 11.55\%$$

## Correct Treatment of Flotation Costs

In the *incorrect* treatment we have just seen, flotation costs effectively increase the WACC by a fixed percentage and will be a factor for the duration of the project because future project cash flows are discounted with a higher WACC to determine project NPV. The problem with this approach is that flotation costs are not an ongoing expense for the firm. Flotation costs are a cash outflow that occurs at the initiation of a project and affect the project NPV by increasing the initial cash outflow. Therefore, *the correct way to account for flotation costs is to add them to the initial project cost*. An analyst should calculate the dollar amount of the flotation cost attributable to the project and increase the initial cash outflow for the project by this amount.

### EXAMPLE: Correctly accounting for flotation costs

Omni Corporation is considering a project that requires a \$400,000 cash outlay and is expected to produce cash flows of \$150,000 per year for the next four years. Omni's tax rate is 35%, and the before-tax cost of debt is 6.5%. The current share price for Omni's stock is \$36 per share, and the expected dividend next year is \$2 per share. Omni's expected growth rate is 5%. Assume that Omni finances the project with 50% debt and 50% equity capital and that flotation costs for equity are 4.5%. The appropriate discount rate for the project is the WACC.

Calculate the NPV of the project using the correct treatment of flotation costs and discuss how the result of this method differs from the result obtained from the incorrect treatment of flotation costs.

**Answer:**

$$\text{after-tax cost of debt} = 6.5\%(1 - 0.35) = 4.23\%$$

$$\text{cost of equity} = \left( \frac{\$2}{\$36} \right) + 0.05 = 0.1055, \text{ or } 10.55\%$$

$$\text{WACC} = 0.50(0.0423) + 0.05(0.1055) = 7.39\%$$

Because the project is financed with 50% equity, the amount of equity capital raised is  $0.50 \times \$400,000 = \$200,000$ .

Flotation costs are 4.5%, which equates to a dollar cost of  $\$200,000 \times 0.045 = \$9,000$ .

$$\begin{aligned} \text{NPV} &= -\$400,000 - \$9,000 + \frac{\$150,000}{1.0739} + \frac{\$150,000}{(1.0739)^2} \\ &\quad + \frac{\$150,000}{(1.0739)^3} + \frac{\$150,000}{(1.0739)^4} = \$94,640 \end{aligned}$$

For comparison, if we would have adjusted the cost of equity for flotation costs, the cost of equity would have increased to  $10.82\% \left( = \frac{\$2.00}{\$36(1 - 0.045)} + 0.05 \right)$  which would have increased the WACC to 7.53%. Using this method, the NPV of the project would have been:

$$\begin{aligned} \text{NPV} &= -\$400,000 + \frac{\$150,000}{1.0753} + \frac{150,000}{(1.0753)^2} + \frac{\$150,000}{(1.0753)^3} + \frac{150,000}{(1.0753)^4} \\ &= \$102,061 \end{aligned}$$

The two methods result in significantly different estimates for the project NPV. Adjusting the initial outflow for the dollar amount of the flotation costs is the correct approach because it provides the most accurate assessment of the project's value once all cash costs, and their timing, are considered.

Note that flotation costs may be tax-deductible for some firms. In that case, the initial cash flow of the project should be adjusted by the after-tax flotation cost. In this example, Omni would have an after-tax flotation cost of  $\$9,000(1 - 0.35) = \$5,850$ , and the project NPV would be \$97,790.



### MODULE QUIZ 30.2

To best evaluate your performance, enter your quiz answers online.

- An analyst is estimating an equity beta for Jay Company, which has a thinly traded stock. Jay is in the same line of business as Cass Company, which trades more frequently and has a beta of 1.2. Jay's debt-to-equity ratio is 2.0 and Cass's debt-to-equity ratio is 1.6. Both companies have a tax rate of 30%. For Jay, the analyst should use an adjusted equity beta *closest* to:
  - 0.57.
  - 1.24.
  - 1.36.
- When the equity portion of the financing for new capital projects will be raised by issuing new equity shares, equity flotation costs should be:
  - used to adjust the estimated cost of equity capital.
  - treated as part of each project's initial cash outflow.
  - disregarded because they are unlikely to be material.

## KEY CONCEPTS

### LOS 30.a

$$WACC = (w_d)(k_d)(1 - t) + (w_{ps})(k_{ps}) + (w_{ce})(k_{ce})$$

The weighted average cost of capital, or WACC, is calculated using weights based on the market values of each component of a firm's capital structure and is the correct discount rate to use to discount the cash flows of projects with risk equal to the average risk of a firm's projects.

### LOS 30.b

Interest expense on a firm's debt is tax deductible, so the pre-tax cost of debt must be reduced by the firm's marginal tax rate to get an after-tax cost of debt capital:

$$\text{after-tax cost of debt} = k_d (1 - \text{firm's marginal tax rate})$$

The pretax and after-tax capital costs are equal for both preferred stock and common equity because dividends paid by the firm are not tax deductible.

### LOS 30.c

The before-tax cost of fixed-rate debt capital,  $k_d$ , is the rate at which the firm can issue new debt.

- The yield-to-maturity approach assumes the before-tax cost of debt capital is the YTM on the firm's existing publicly traded debt.
- If a market YTM is not available, the analyst can use the debt rating approach, estimating the before-tax cost of debt capital based on market yields for debt with the same rating and average maturity as the firm's existing debt.

### LOS 30.d

The cost (and yield) of noncallable, nonconvertible preferred stock is simply the annual dividend divided by the market price of preferred shares.

### LOS 30.e

The cost of equity capital,  $k_{ce}$ , is the required rate of return on the firm's common stock.

Approaches to estimating  $k_{ce}$ :

- CAPM approach:  $k_{ce} = R_f + \beta[E(R_{mkt}) - R_f]$ .

- Bond yield plus risk premium approach: add a risk premium of 3% to 5% to the market yield on the firm's long-term debt.

### LOS 30.f

We can use the beta of a comparable company or group of companies to estimate the beta of a target company. This method involves the following steps:

1. Estimate the beta for a comparable company or companies.
2. Unlever the beta to get the asset beta using the marginal tax rate and debt-to-equity ratio of the comparable company:

$$\beta_{\text{ASSET}} = \beta_{\text{EQUITY}} \left\{ \frac{1}{1 + [(1 - t) \frac{D}{E}]} \right\}$$

3. Re-lever the beta using the marginal tax rate and debt-to-equity ratio for the target company:

$$\beta_{\text{TARGET}} = \beta_{\text{ASSET}} \left\{ 1 + \left[ (1 - t) \frac{D}{E} \right] \right\}$$

4. Use the CAPM to estimate the target company's required return on equity.

### LOS 30.g

The correct method to account for flotation costs of raising new equity capital is to increase a project's initial cash outflow by the flotation cost attributable to the project when calculating the project's NPV.

## ANSWER KEY FOR MODULE QUIZZES

### Module Quiz 30.1

- A** WACC =  $(w_d)(k_d)(1 - t) + (w_{ps})(k_{ps}) + (w_{ce})(k_{ce}) = (0.3)(0.1)(1 - 0.4) + (0.2)(0.11) + (0.5)(0.18) = 13\%$  (LOS 30.a)
- B**  $w_d = 20 / (20 + 30) = 0.4$ ,  $w_{ce} = 30 / (20 + 30) = 0.6$  WACC =  $(w_d)(k_d)(1 - t) + (w_{ce})(k_{ce}) = (0.4)(9)(1 - 0.4) + (0.6)(14) = 10.56\% = \text{MCC}$  (LOS 30.a, 30.b)
- B**  $k_d(1 - t) = (0.14)(1 - 0.4) = 8.4\%$  (LOS 30.c)
- B**  $k_{ps} = D_{ps} / P_{ps}$ ,  $D_{ps} = \$100 \times 8\% = \$8$ ,  $k_{ps} = 8 / 85 = 9.4\%$  (LOS 30.d)
- C**  $k_e = 2\% + 0.8(5\% - 2\%) = 4.4\%$ . (LOS 30.e)

### Module Quiz 30.2

$$\text{Unlevered beta for Cass} = 1.2 \left\{ \frac{1}{1 + [(1 - 0.3)1.6]} \right\} = 0.566$$

- B** Unadjusted equity beta for Jay =  $0.566 \{1 + [(1 - 0.3)2.0]\} = 1.358$

$$\text{Adjusted equity beta for Jay} = (2/3 \times 1.358) + 1/3 = 1.239 \quad (\text{LOS 30.f})$$

2. **B** The correct treatment of flotation costs is to treat them as part of each project's initial cash outflow. (LOS 30.g)

The following is a review of the Corporate Issuers (2) principles designed to address the learning outcome statements set forth by CFA Institute. Cross-Reference to CFA Institute Assigned Reading #31.

# READING 31: CAPITAL STRUCTURE

Study Session 10

## EXAM FOCUS

This topic review explores various theories related to how a firm chooses its proportions of debt and equity financing. Candidates should know the Miller and Modigliani propositions and understand how taxes drive these results. Understand well the concept of an optimal capital structure based on the trade-off between the tax savings and additional risk of increased financial leverage. How firms make financing decisions in practice by developing a target capital structure is important for analysts. Finally, understand how capital structure decisions affect various firm stakeholders and the nature of conflicts of interest among them with regard to debt financing.

## MODULE 31.1: CAPITAL STRUCTURE THEORIES

### LOS 31.a: Describe how a company's capital structure may change over time.



*CFA® Program Curriculum, Volume 4, page 40* Video covering this content is available online.

A company's **capital structure** refers to how it has financed its assets and operations. In a simple case, a company's capital structure might be described as 60% equity (stock) and 40% debt (bonds). In general, a company will choose a capital structure that minimizes its weighted average cost of capital, that is, its cost of capital considering its capital structure and the weights of debt and equity.

Note that when we are discussing a company's debt-to-equity ratios in the context of capital structure, we use *market values* for both debt and equity, not accounting values from the balance sheet.

Company characteristics that influence the proportion of debt in a company's capital structure include the following:

- *Growth and stability of revenue.* High growth of revenue or stability of significant revenue suggest continuing ability to service debt.
- *Growth and predictability of cash flow.* Growing cash flow increases the ability to service debt. Significant and stable cash flows indicate continuing ability to service debt.
- *Amount of business risk.* More business risk (operational risk and demand risk) means greater variability of earnings and cash flows, which decreases the ability to service debt.
- *Amount and liquidity of company assets.* Assets can be pledged as collateral to make a company's debt more attractive. When assets are more liquid (easier to turn into cash, values more stable), they can be pledged more readily.

- *Cost and availability of debt financing.* Companies find debt relatively more attractive when the cost of debt is lower and investors are more willing to lend to the company. Both of these are greater when the above characteristics support the issuance of debt.

We can see the effects of these various factors on the debt-to-equity ratios of companies at different stages of their company's life cycle. Consider the following three stages:

*Start-up stage:* Sales are just beginning and operating earnings and cash flows tend to be low or negative. Business risk is relatively high. Company debt is quite risky and, if issued, would require high interest rates. Assets, both accounts receivable and fixed assets, typically are low and therefore not available as collateral for debt. For these reasons, start-up companies are financed almost exclusively with equity.

*Growth stage:* Revenue and cash flow are rising and business risk is somewhat reduced. Debt financing cost is somewhat reduced and investors may be willing to lend to the company, often with the loans secured by fixed assets or accounts receivable. Depending on the company, debt issuance may be as much as 20% of the firm's capital structure.

*Mature stage:* In this stage, revenue growth is slowing and business risk is much lower. Cash flow is significant and relatively stable. Debt financing is widely available at relatively low cost. Firms issue debt, both secured and unsecured, in amounts in excess of 20% of a firm's capital structure and sometimes significantly more than that. Over time, as the equity value of a mature company grows, the debt proportion will fall. Some companies may repurchase their debt, reducing its proportion in the capital structure (deleveraging) in addition to paying significant cash dividends.



### PROFESSOR'S NOTE

We will address company and industry life cycles in the Equity Investments topic area.

#### **LOS 31.b: Explain the Modigliani–Miller propositions regarding capital structure.**

*CFA® Program Curriculum, Volume 4, page 47*

#### **MM Proposition I (No Taxes): Capital Structure Irrelevance**

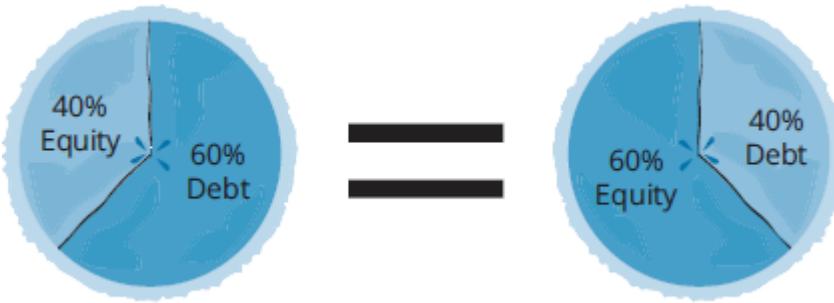
In 1958, Nobel laureates Franco Modigliani and Merton Miller (we will refer to them as MM) published their seminal work on capital structure theory. In it, MM demonstrate that under certain assumptions, the value of a firm is unaffected by its capital structure. This result is referred to as MM I. The assumptions that lead to MM I are:

- *Capital markets are perfectly competitive:* There are no transactions costs, taxes, or bankruptcy costs.
- *Investors have homogeneous expectations:* They have the same expectations with respect to cash flows generated by the firm.
- *Riskless borrowing and lending:* Investors can borrow and lend at the risk-free rate.
- *No agency costs:* There are no conflicts of interest between managers and shareholders.
- *Investment decisions are unaffected by financing decisions:* Operating income is independent of how the firm is financed.

Intuitively, we can explain MM I in terms of a pie. MM I essentially concludes that the amount of pie available (value of the firm) does not depend on how it is sliced (the

capital structure). The value of a firm does not change depending on how the claims to its earnings are divided. This idea is illustrated in Figure 31.1.

Figure 31.1: MM Capital Structure Irrelevance Proposition



Consider why the pie analogy holds. The operating earnings (EBIT) of a firm are available to providers of capital. In a company with no debt, all of the operating earnings are available to equity holders, and the value of the company is the discounted present value of these earnings, with a discount rate that depends on the risk of (uncertainty about) earnings. If a company is financed partly by debt and partly by equity, operating earnings are divided between debtholders and equity holders. If one entity purchased all the debt and all the equity of the firm, it would be entitled to all the operating earnings (EBIT) of the firm, so the total value of its holdings must equal the value of an all-equity firm, which also has a claim to all the operating earnings of the firm. Under the assumption that operating earnings are unaffected by financing decisions, the total value of debt and equity will be unaffected by the proportions of debt and equity in a firm's capital structure.

## MM Proposition II: Cost of Equity and Leverage

MM's second proposition (MM II) is framed in terms of a firm's cost of capital, rather than firm value. Based on the same assumptions as MM I, MM II states that the cost of equity increases linearly as a company increases its proportion of debt financing. The cash flows promised to bondholders have priority, so that equity holders receive the remaining cash flows after the claims of debtholders have been met. Because the cash flows promised to debtholders are more certain (less risky) than the residual cash flows promised to equity holders, the cost of debt will be less than the cost of equity. The greater the amount of debt in a firm's capital structure, the more uncertain are the residual cash flows to equity holders. MM II tells us that as companies increase the proportion of debt financing, the risk of the cash flows to equity holders increases, which increases the cost of equity.

The conclusion of MM II is that the decrease in financing costs from using a larger proportion of (lower cost) debt is just offset by the increase in the cost of equity, resulting in no change in the firm's weighted average cost of capital (WACC).

Given MM II (that the value of the firm, and therefore its WACC, is unaffected by changes in the proportion of debt financing), we can state the relation that must hold between a company's debt-to-equity ratio and its cost of equity:

$$r_e = r_0 + \frac{D}{E}(r_0 - r_d)$$

where:

$r_e$  = cost of equity

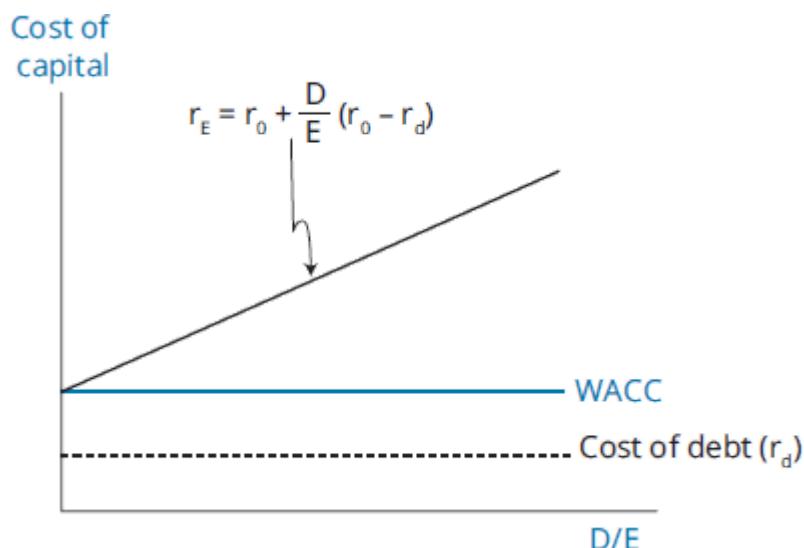
$r_0$  = cost of equity with no debt (all equity)

$r_d$  = cost of debt

$\frac{D}{E}$  = debt-to-equity ratio

As leverage (the debt-to-equity ratio) increases, the cost of equity increases, but the cost of debt and WACC are unchanged. This relationship between the cost of equity financing and the debt-to-equity ratio is illustrated in Figure 31.2.

Figure 31.2: MM Proposition II (No Taxes)



MM II is consistent with MM I; if the benefits of greater use of lower-cost debt financing are just offset by the increased cost of equity, the proportions of debt versus equity in the firm's capital structure do not affect the firm's overall cost of capital or the value of the firm.

## MM With Taxes: Value Is Maximized at 100% Debt

As is often done in theoretical work, MM started with several simplifying assumptions. The next step is to examine the effects of relaxing some of those assumptions. Here we examine the MM propositions under the assumptions that earnings are taxed and that interest payments to debtholders are tax deductible. Under the tax code of most countries, interest payments are a pretax expense and are therefore tax deductible, while dividends paid to equity holders are not tax deductible.

This differential tax treatment encourages firms to use debt financing because debt provides a **tax shield** that adds value to the company. The tax shield is equal to the tax rate multiplied by the amount of debt in the capital structure. In other words, the value of a levered firm is equal to the value of an unlevered firm plus the value of the tax shield provided by debt financing.

To continue our analogy of a pie, with the introduction of taxes, the government gets a slice of the pie. When debt financing is used, the government's slice of the pie is smaller,

so that the amount of pie available to debt and equity holders is greater. If a firm were 100% financed with debt, the taxes avoided would be at a maximum and the after-tax cash flows of the firm (size of the pie) would be maximized. The conclusion of *MM I with taxes* is that the value of the firm is maximized with 100% debt financing.

If we assume a positive tax rate, the formula to solve for return on equity can be used to illustrate *MM II with taxes*:

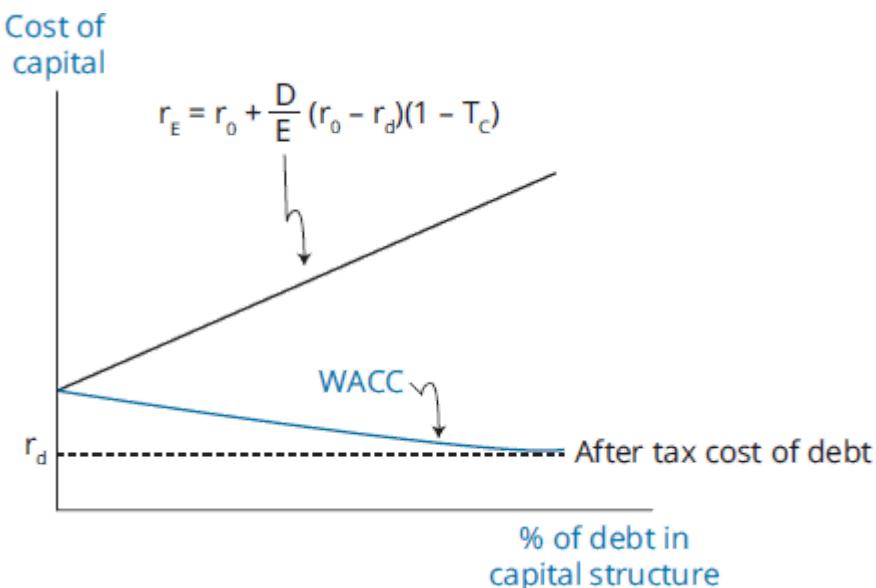
$$r_E = r_0 + \frac{D}{E}(r_0 - r_d)(1 - T_C)$$

where:

$T_C$  = tax rate

Figure 31.3 illustrates that the tax shield provided by debt causes the WACC to decline as leverage increases. The value of the firm is maximized at the point where the WACC is minimized, which is 100% debt.

Figure 31.3: MM Proposition II (With Taxes)



In practice, we do not find that companies finance their assets with 100% debt, or close to it. MM suggested that differential investor tax rates on dividends and interest income could explain differences in capital structures.

Current theory suggests that differences in value-maximizing choices of how much financial leverage to use are the result of additional costs of using debt financing that we have not yet considered. One type of cost that can be expected to increase at higher levels of debt financing is **costs of financial distress**. Costs of financial distress are the increased costs a company faces when earnings decline to the point where the firm has trouble paying its fixed financing costs (interest on debt). The expected costs of financial distress for a firm have two components:

- *Costs of financial distress and bankruptcy* can be direct or indirect. Direct costs of financial distress include the cash expenses associated with the bankruptcy, such as legal fees and administrative fees. Indirect costs include foregone investment opportunities and the costs that result from losing the trust of customers, creditors, suppliers, and employees. Additionally, during periods of financial distress, conflicts

of interest between managers (who represent equity owners) and debtholders impose additional costs referred to as the **agency costs of debt**.

- *Probability of financial distress* is related to the firm's use of operating and financial leverage. In general, higher amounts of financial leverage increase the probability of financial distress (higher probability that cash flows will fall to an amount that is insufficient to make their promised debt payments). Other factors to consider include the quality of a firm's management and the company's corporate governance structure. Lower-quality management and poor corporate governance lead to a higher probability of financial distress.

Higher expected costs of financial distress tend to discourage companies from using large proportions of debt in their capital structures, all else equal. The expected costs of financial distress shrink our pie as the proportion of debt financing is increased.

## Static Trade-Off Theory

The **static trade-off theory** seeks to balance the costs of financial distress with the tax shield benefits from using debt. There is an amount of debt financing at which the increase in the value of the tax shield from additional borrowing is exceeded by the value reduction of higher expected costs of financial distress. This point represents the **optimal capital structure** for a firm, where the WACC is minimized and the value of the firm is maximized.

Accounting for the costs of financial distress, the expression for the value of a levered firm becomes:

$$V_L = V_U + (t \times \text{debt}) - PV(\text{costs of financial distress})$$

We illustrate this relationship in Figure 31.4.

Figure 31.4: Static Trade-Off Theory: Cost of Capital vs. Capital Structure

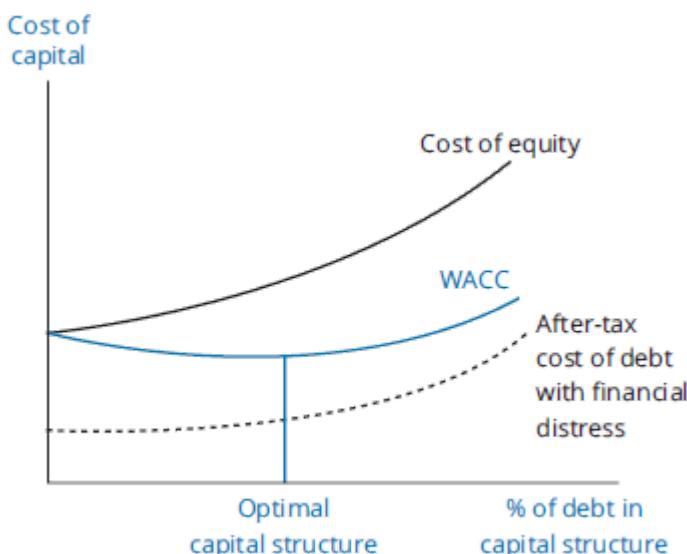
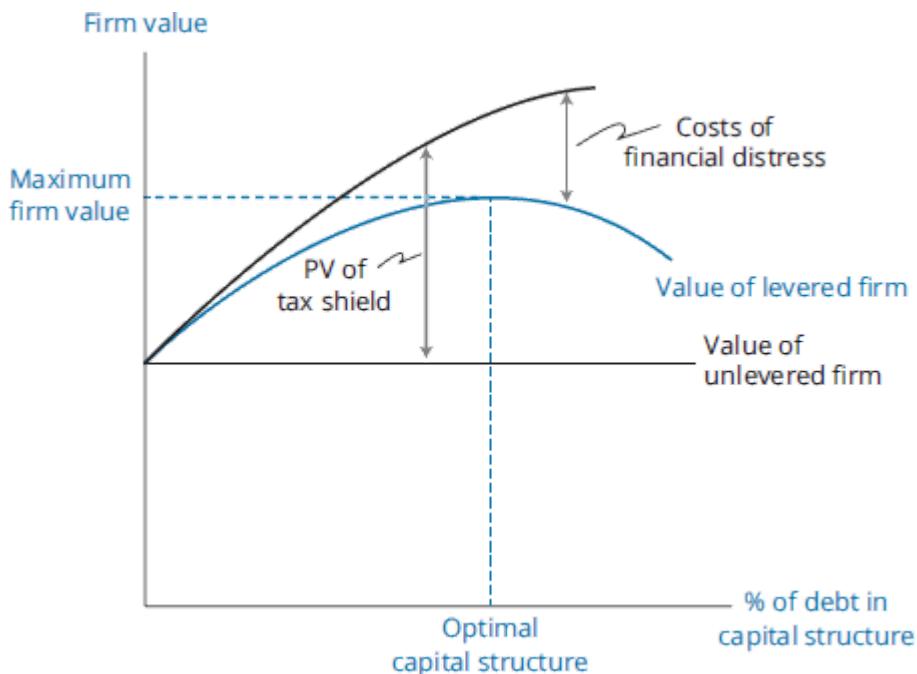


Figure 31.5 illustrates the trade-off between firm value and capital structure. Note that each firm's optimal capital structure depends on its business risk (operating risk and sales risk), tax rate, corporate governance, industry influences, and other factors.

Figure 31.5: Static Trade-Off Theory: Firm Value vs. Capital Structure



To summarize:

- *MM's propositions with no taxes or costs of financial distress* are that a company's capital structure is irrelevant because its WACC and its value (the discounted present value of its operating earnings) are unchanged by changes in capital structure.
- *MM's propositions with taxes but without costs of financial distress* are that a company's WAAC is minimized and its value is maximized with 100% debt.
- *Static trade-off theory* indicates that firm value initially increases (and WACC decreases) with additional debt financing, but company value decreases at some point when the increase in the expected value of financial distress outweighs the tax benefits of additional debt.



## MODULE QUIZ 31.1

*To best evaluate your performance, enter your quiz answers online.*

1. A company is *most likely* to be financed only by equity during its:
  - A. start-up stage.
  - B. growth stage.
  - C. mature stage.
2. A company's optimal capital structure:
  - A. maximizes firm value and minimizes the weighted average cost of capital.
  - B. minimizes the interest rate on debt and maximizes expected earnings per share.
  - C. maximizes expected earnings per share and maximizes the price per share of common stock.
3. Which of the following statements regarding Modigliani and Miller's Proposition I is *most accurate*?
  - A. A firm's cost of equity financing increases as the proportion equity in a firm's capital structure is increased.
  - B. A firm's cost of debt financing increases as firm's financial leverage increases.
  - C. A firm's weighted average cost of capital is not affected by its choice of capital structure.

## MODULE 31.2: CAPITAL STRUCTURE DECISIONS

### LOS 31.c: Describe the use of target capital structure in estimating WACC, and calculate and interpret target capital structure weights.



*CFA® Program Curriculum, Volume 4, page 54*

Video covering  
this content is  
available online.

**Target capital structure** is the capital structure that a firm seeks to achieve on average over time to maximize firm value. That is, it reflects management's beliefs about its optimal capital structure.

In practice, a firm's actual capital structure tends to fluctuate around the target capital structure for two reasons:

- *Management may choose to exploit opportunities in a specific financing source.* For example, a temporary rise in the firm's stock price may create a good opportunity to issue additional equity, which would result in a higher percentage of equity than the target.
- *Market values of a firm's equity and debt fluctuate.* Because capital structure weights are based on market values, market fluctuations (especially the market value of firm equity) may cause the firm's capital structure to vary from the target.

For analysis, the weights to use when estimating a firm's WACC should be based on its target capital structure, the proportions (based on market values) of debt, preferred stock, and equity that the firm expects to achieve over time. An analyst may use management's stated target proportions of equity and debt; however, most firms do not provide these.

In the absence of stated capital structure weights, an analyst must estimate a firm's target capital structure. Alternatives for estimating target capital structure include the following:

- An analyst may simply use the firm's current capital structure (based on market values) as the best indication of its target capital structure.
- If there has been a noticeable trend in the firm's capital structure, an analyst may incorporate this trend into her estimate of the firm's target.
- An analyst may use the average capital structure weights for a firm's industry.

### LOS 31.d: Explain factors affecting capital structure decisions.

*CFA® Program Curriculum, Volume 4, page 57*

The theoretical model we have developed can explain why there is an optimal capital structure for a company, based on the trade-off between increasing tax benefits and increasing expected costs of financial distress, as the amount of debt financing is increased. In practice, companies cannot accurately estimate their cost of equity or the expected costs of financial distress for each possible capital structure. Here we examine how companies actually choose how much debt to issue.

In practice, a company will base its capital structure decision on its investments and its ability to support debt, given its business risk, the nature of its assets, and its expected operating cash flows. Note that the costs of using less than the optimal amount of debt are relatively small, while the costs of using too much debt may be quite large and threaten the company's continued viability.

As noted previously, start-up companies will typically use little or no debt financing. Companies subject to regulation may have to limit debt to specified levels. Companies that regularly use significant debt to finance their assets and operations will likely benefit from an explicit and well-reasoned target capital structure.

**Debt ratings** from agencies such as Standard & Poor's and Moody's reflect the creditworthiness of a company's debt. The agencies perform an extensive analysis of a company's ability to make interest and principal payments and assign a rating based on their expectations of a bond's default risk. Lower debt ratings denote higher levels of default risk for both shareholders and bondholders, who in turn demand higher returns on their capital. As a company's total debt increases, ratings tend to decrease. Lower-rated bonds require higher interest rates on debt.

Because the cost of capital is tied to debt ratings, many managers have goals for maintaining certain minimum debt ratings when determining their capital structure policies. If a bond rating drops from investment grade (BBB or above) to speculative grade (BB or below), the cost of debt increases considerably. A firm might follow a policy of issuing debt to finance its activities as long as its debt will remain investment grade. One motivation for preserving a minimum rating is that it gives the company the flexibility to issue additional debt when it identifies investment opportunities or when equity issuance is not attractive.

Ratings agencies use accounting ratios as an important part of the ratings process. Coverage ratios (e.g., EBIT-to-interest expense) and leverage ratios (e.g., debt-to-equity) are key ratios for evaluating creditworthiness.

Ratings also depend on a firm's assets. Assets that are liquid (readily salable) lead to higher debt ratings. When assets are pledged as collateral to support a specific bond issue, the issue will get a higher rating.

While the theoretical explanation for the existence of an optimal proportion of debt is based on market values, in practice book values are used to determine debt levels.

Reasons for this include:

- Market values (especially equity values) can fluctuate significantly over time as market prices change.
- Lenders often use book values in evaluating debt issues (e.g., accounting ratios).
- Firms often match their debt issuance to their capital investments. A firm making a significant acquisition may issue debt to fund the acquisition, especially if the asset acquired will generate significant cash flows that can be used to reduce the debt over time. Firms may also match the maturity of the debt issued to the expected economic lives of assets acquired or constructed.

Market conditions can also influence a firm's financing decisions. Firms may issue equity when they perceive the market price of their stock to be temporarily high (or simply greater than their estimate of its intrinsic value), or repurchase their stock when they judge it to be "too low" in the market (sometimes when book-to-market value is below a specific level). When market interest rates fall, or are thought to be temporarily low, firms will likely show a preference for issuing debt. Even when rates are not temporarily low, but have just fallen to historically low levels that are expected to persist, firms often increase their target proportion of debt to reflect its lower cost.

Because firms may be opportunistic in making decisions about whether to issue debt or equity, investors may infer management's expectations for future cash flows, or whether management believes the firm's shares are overvalued or undervalued, based on their financing decisions.

**Costs of asymmetric information** arise from the fact that managers typically have more information about a company's prospects and future performance than owners or creditors. Firms with complex products or little transparency in financial statements tend to have higher costs of asymmetric information, which result in higher required returns on both debt and equity capital.

Because shareholders and creditors are aware that asymmetric information problems exist, these investors look for management behavior that signals what knowledge or opinions management may have about the firm's prospects. For example, taking on the commitment to make fixed interest payments through debt financing sends a signal that management is confident in the firm's ability to make these payments in the future. By contrast, issuing equity is typically viewed as a negative signal that managers believe a firm's stock is overvalued. The cost of asymmetric information increases with the proportion of equity in the capital structure.

**Agency costs of equity** are related to conflicts of interest between managers and owners. Managers who do not have a stake in the company do not bear the costs associated with excessive compensation or taking on too much (or too little) risk. Because shareholders are aware of this conflict, they take steps to reduce these costs. The result is called the **net agency cost of equity**. Net agency costs of equity have three components:

- *Monitoring costs* are associated with supervising management and include the expenses of reporting to shareholders and paying the board of directors. Strong corporate governance systems reduce monitoring costs.
- *Bonding costs* relate to assuring shareholders that the managers are working in the shareholders' best interest. Examples of bonding costs include premiums for insurance to guarantee performance and implicit costs associated with non-compete agreements.
- *Residual losses* may occur even with adequate monitoring and bonding provisions because such provisions do not provide a perfect guarantee.

According to agency theory, the use of debt forces managers to be disciplined with regard to how they spend cash because they have less free cash flow to use for their own benefit. It follows that greater amounts of financial leverage tend to reduce agency costs.

**Pecking order theory**, based on asymmetric information, is related to the signals management sends to investors through its financing choices. According to pecking order theory, managers prefer to make financing choices that are least likely to send negative signals to investors. Financing choices under pecking order theory follow a hierarchy based on visibility to investors. Internally generated capital is most preferred, debt is the next-best choice, and external equity is the least preferred financing option. Pecking order theory implies that the capital structure is a by-product of individual financing decisions.

### LOS 31.e: Describe competing stakeholder interests in capital structure decisions.

A company's various stakeholders often have goals that differ from those of management and board members. They may have interests that conflict with those of management in terms of capital structure decisions, especially the issuance of debt. We highlight some of those possible conflicts here.

## Public Debtholders

The best possible outcome for a company's debtholders is that their promised interest payments and principal repayment are made in full and as scheduled. That is, their upside is strictly limited with respect to company performance. Their maximum downside is a loss of 100% if the company is unable to repay any of the debt. We can contrast this with the upside and downside for common equity holders. While the downside for owners of common equity is also a loss of 100% of their investment, their upside could be some multiple of their investment if firm performance is exceptionally good.

This asymmetry of outcomes creates a situation where debtholders prefer that a company issues less debt, rather than more, to decrease the probability of financial distress that may lead to a default on the debt they own. Common stockholders, on the other hand, may prefer greater debt financing even though that increases company risk. In general, this conflict is greater for owners of long-term debt compared with owners of short-term debt. The conflict is less severe for owners of debt that has greater seniority (priority of payment) or is backed by valuable liquid assets.

## Preferred Stockholders

The priority for payments of preferred stock dividends is after debtholders are paid but ahead of common stock dividends. Similar to debt, preferred stock has an upside that is limited to the timely payment of the promised dividends. However, if the firm cannot make the promised payments on its debt, preferred stock dividends will not be paid. Thus the conflict of interest between the owners of common shares and holders of preferred stock is similar to the conflict of interest between common stockholders and debtholders. Preferred stock has no maturity date and therefore can be considered very long term.

## Private Equity or Controlling Shareholders

The interests of a shareholder who holds voting control may differ not only from the interests of debtholders but also from the interests of other common stock investors. The nature of the conflict depends on the specific circumstances. A controlling shareholder may pursue personal interests that will not necessarily increase shareholder value, may have a short-term focus if they intend to sell their shares, and may oppose share issuance that would dilute their holdings or lead to a loss of control.

## Banks and Private Lenders

Unlike holders of a firm's public debt (bonds), banks and private lenders often have access to nonpublic information about a firms' operations. These lenders can more easily restructure debt or adjust terms if problems arise, and they often work with management to ensure that their interests are considered in company decisions regarding investments and the issuance of additional debt.

Private lenders typically hold debt to maturity, while owners of public debt can usually sell that debt if they believe the company's financial health is deteriorating. Banks and

private lenders to small or mid-size companies often work closely with them and have influence on company decisions, because the interests of both are somewhat aligned. That said, the risk tolerance of individual lenders can vary, and some provide more services and have more influence than others.

## Customers and Suppliers

Customers of specialized products have an interest in the financial health and survival of firms that are their key suppliers, similar to the interests of debtholders.

Suppliers typically are short-term creditors of a firm and thus have an interest in the firm's continuing ability to meet its obligations. Some suppliers have invested time and capital in developing specialized products for a firm and will lose significant revenue if that firm fails. Suppliers in general, and suppliers of custom products for a specific company in particular, have significant interests in the customer firm's stability. Suppliers of more commodity-like products typically have many customers and less exposure to the financial problems of a single firm.

## Employees

Employees sometimes own the company's common stock in retirement accounts or employee stock ownership plans. For most employees, the value of their employment with the company is much larger than their stock ownership. Employees who have specialized skills, such that they would face difficulties in finding alternative employment, have a stronger preference for less financial and operational risk, compared with employees who have skills that are more easily transferable.

## Managers and Directors

Senior managers and board members may have significant ownership of a firm's common stock. Senior managers, in particular, may be compensated with stock options that affect their incentives. Owning stock options magnifies the benefits of increases in share values and can therefore increase management's appetite for risk. Because stock options increase in value by more than the underlying shares, managers with significant stock options may prefer a greater level of risk.

Managers may prefer a strategy of repurchasing stock to paying cash dividends. Stock repurchases decrease the number of shares outstanding and tend to increase share prices. Companies may issue debt to raise money for stock repurchases. This effectively increases the proportion of debt in the capital structure and the financial risk of the company.

Another consideration, however, is that senior managers and board members are often very highly paid for the work involved. Because of this, they may prefer that the company take on less risk as they focus primarily on the company's survival and their continued employment.

## Regulators and Government

Some firms, especially financial institutions, are required to maintain minimum proportions of equity financing, effectively restricting their ability to issue debt or pay cash dividends.

Regulated utilities may be limited in the prices they can charge, with allowable prices set in reference to their cost of capital. There may be an advantage to utilities in using debt financing because the cost of debt capital is clear, while the cost of equity must be estimated.

We have seen in times of financial crises that governments may step in to rescue companies judged to be “too big” or “too essential” to fail. In these cases, governments often require the companies to raise more equity, forego dividend payments and share repurchases, and maintain minimum proportions of equity in their capital structures.



## MODULE QUIZ 31.2

*To best evaluate your performance, enter your quiz answers online.*

1. Which of the following is *least likely* an appropriate method for an analyst to estimate a firm’s target capital structure?
  - A. Use the firm’s current proportions of debt and equity based on market values, with an adjustment for recent trends in its capital structure.
  - B. Use average capital structure weights for the firm’s industry, based on book values of debt and equity.
  - C. Use the firm’s current capital structure, based on market values of debt and equity.
2. To determine their target capital structures in practice, it is *least likely* that firms will:
  - A. use the book value of their debt to make financing decisions.
  - B. match the maturities of their debt issues to specific firm investments.
  - C. determine an optimal capital structure based on the expected costs of financial distress.
3. The pecking order theory of financial structure decisions:
  - A. is based on information asymmetry.
  - B. suggests that debt is the first choice for financing an investment of significant size.
  - C. suggests that debt is the riskiest and least preferred source of financing.
4. Compared with managers who do not have significant compensation in the form of stock options, managers who have such compensation will be expected to favor:
  - A. less financial leverage.
  - B. greater firm risk.
  - C. issuance of common stock.

## KEY CONCEPTS

### LOS 31.a

A company’s ability to issue debt is greater with predictable cash flows sufficient to make required debt payments and with liquid tangible assets the company can pledge as collateral for debt.

New companies with few assets and negative or uncertain cash flows will use little to no debt. Growth companies with positive cash flows and decreasing business risk may use debt for up to 20% of their financing. Mature companies with predictable cash flows tend to use debt for more than 20% of their financing, sometimes significantly more.

### LOS 31.b

**MM's propositions with no taxes** are that a company's capital structure is irrelevant, because its WACC and firm value (the discounted present value of its operating earnings) are unchanged by changes in capital structure.

**MM's propositions with taxes** are that a company's WAAC is minimized and its value maximized with 100% debt financing.

**Static trade-off theory adds the expected costs of financial distress to the model.** It indicates that firm value initially increases (and WACC decreases) with additional debt financing, but that company value decreases at some point with additional debt as the increase in the expected costs of financial distress outweigh the increase in tax benefits from additional debt.

### LOS 31.c

For target capital structure weights (based on market values of debt and equity), analysts can use:

- a company's stated target weights.
- a company's current capital structure weights.
- a company's current capital structure weights adjusted for the observed trend in its capital structure weights.
- industry average capital structure weights.

### LOS 31.d

In practice, a company's capital structure will fluctuate around the target due to management's exploitation of market opportunities and market value fluctuations (especially of equity) over time.

Managers typically have goals to maintain a certain minimum credit rating when determining their capital structure policies because the cost of capital is tied to debt ratings. Lower ratings translate into higher costs of capital. Often book values of debt and equity are used in practice because they are used by ratings agencies determining debt ratings.

Pecking order theory is based on information asymmetry between firm management and investors and suggests that management's choice of financing method signals their beliefs about firm value. The theory concludes that retained earnings are the most preferred source of funds, followed by debt financing, and then issuing new equity.

Agency costs of equity, which arise because management and shareholders may have conflicting interests, are reduced by increased debt issuance.

### LOS 31.e

A company's various stakeholders may have interests that conflict with those of management in terms of capital structure decisions, especially the issuance of debt.

While stakeholder issues can depend on specific circumstances, in general, compared with common shareholders:

- Debtholders, preferred stockholders, customers (especially those with specific requirements), suppliers (especially those of firm-specific items), employees (especially those with firm-specific skills), directors and managers without significant stock options, firm regulators who impose minimum equity

requirements, and government entities may have a preference for less financial leverage (risk) and less operational risk.

- Managers and directors holding or receiving significant stock options, some private lenders, some private equity owners, and some shareholders with controlling interests may prefer more financial leverage.

## ANSWER KEY FOR MODULE QUIZZES

### Module Quiz 31.1

1. **A** During the start-up stage a firm is unlikely to have positive earnings and cash flows or significant assets that can be pledged as debt collateral, so firms in this stage are typically financed by equity only. (LOS 31.a)
2. **A** The optimal capital structure minimizes the firm's WACC and maximizes the firm's value (stock price). (LOS 31.b)
3. **C** MM's Proposition I (with no taxes) states that capital structure is irrelevant because the decrease in a firm's WACC from additional debt financing is just offset by the increase in WACC from a decrease in equity financing. The cost of debt is held constant and the cost of equity financing increases as the proportion of *debt* in the capital structure is increased. (LOS 31.b)

### Module Quiz 31.2

1. **B** For an analyst, target capital structure should always be based on market values of debt and equity. The other two choices are appropriate methods for estimating a firm's capital structure for analysis. (LOS 31.c)
2. **C** While it is a useful theoretical concept, in practice determining an optimal capital structure based on the cost savings of debt and the expected costs of financial distress is not feasible. Because debt rating companies often use book values of debt, firms use book values of debt when choosing financing sources. It is common for firms to match debt maturities to the economic lives of specific investments. (LOS 31.d)
3. **A** Pecking order theory is based on information asymmetry and the resulting signals that different financing choices send to investors. It suggests that retained earnings are the first choice for financing an investment and issuing new equity is the least preferred choice. (LOS 31.d)
4. **B** Given the asymmetric returns on stock options, we would expect managers with significant stock options in their compensation to favor greater financial leverage and issuance of debt to increase potential stock price gains. Issuing common stock could decrease the market price of shares, which would decrease the value of stock options. (LOS 31.e)

The following is a review of the Corporate Issuers (2) principles designed to address the learning outcome statements set forth by CFA Institute. Cross-Reference to CFA Institute Assigned Reading #32.

# READING 32: MEASURES OF LEVERAGE

Study Session 10

## EXAM FOCUS

Here we define and calculate various measures of leverage and the firm characteristics that affect the levels of operating and financial leverage. Operating leverage magnifies the effect of changes in sales on operating earnings. Financial leverage magnifies the effect of changes in operating earnings on net income (earnings per share). The breakeven quantity of sales is that quantity of sales for which total revenue just covers total costs. The operating breakeven quantity of sales is the quantity of sales for which total revenue just covers total operating costs. Be sure you understand how a firm's decisions regarding its operating structure and scale and its decisions regarding the use of debt and equity financing (its capital structure) affect its breakeven levels of sales and the uncertainty regarding its operating earnings and net income.

## MODULE 32.1: MEASURES OF LEVERAGE

**LOS 32.a: Define and explain leverage, business risk, sales risk, operating risk, and financial risk and classify a risk.**



*CFA® Program Curriculum, Volume 4, page 126*

Video covering  
this content is  
available online.

**Leverage**, in the sense we use it here, refers to the amount of fixed costs a firm has. These fixed costs may be fixed operating expenses, such as building or equipment leases, or fixed financing costs, such as interest payments on debt. Greater leverage leads to greater variability of the firm's after-tax operating earnings and net income. A given change in sales will lead to a greater change in operating earnings when the firm employs operating leverage; a given change in operating earnings will lead to a greater change in net income when the firm employs financial leverage.



### PROFESSOR'S NOTE

The British refer to leverage as "gearing."

**Business risk** refers to the risk associated with a firm's operating income and is the result of uncertainty about a firm's revenues and the expenditures necessary to produce those revenues. Business risk is the combination of sales risk and operating risk.

- **Sales risk** is the uncertainty about the firm's sales.
- **Operating risk** refers to the additional uncertainty about operating earnings caused by fixed operating costs. The greater the proportion of fixed costs to variable costs, the greater a firm's operating risk.

**Financial risk** refers to the additional risk that the firm's common stockholders must bear when a firm uses fixed cost (debt) financing. When a company finances its

operations with debt, it takes on fixed expenses in the form of interest payments. The greater the proportion of debt in a firm's capital structure, the greater the firm's financial risk.

### **LOS 32.b: Calculate and interpret the degree of operating leverage, the degree of financial leverage, and the degree of total leverage.**

*CFA® Program Curriculum, Volume 4, page 128*

The **degree of operating leverage** (DOL) is defined as the percentage change in operating income (EBIT) that results from a given percentage change in sales:

$$DOL = \frac{\text{percentage change in EBIT}}{\text{percentage change in sales}} = \frac{\frac{\Delta EBIT}{EBIT}}{\frac{\Delta Q}{Q}}$$

To calculate a firm's DOL for a particular level of unit sales,  $Q$ , DOL is:

$$DOL = \frac{Q(P - V)}{Q(P - V) - F}$$

where:

$Q$  = quantity of units sold

$P$  = price per unit

$V$  = variable cost per unit

$F$  = fixed costs

Multiplying, we have:

$$DOL = \frac{S - TVC}{S - TVC - F}$$

where:

$S$  = sales

$TVC$  = total variable costs

$F$  = fixed costs

Note that in this form, the denominator is operating earnings (EBIT).

#### **EXAMPLE: Degree of operating leverage**

Atom Company produced 5,000 units last year that it sold for \$75 each. Atom's fixed costs were \$70,000, and its variable cost per unit was \$50. Calculate and interpret Atom's degree of operating leverage at this level of production.

**Answer:**

$$DOL = \frac{Q(P - V)}{Q(P - V) - F} = \frac{5,000(\$75 - \$50)}{5,000(\$75 - \$50) - \$70,000}$$

$$DOL = \frac{\$125,000}{\$55,000} = 2.2727$$

The result indicates that if Atom Company has a 3% increase in sales, its EBIT will increase by  $2.2727 \times 3\% = 6.82\%$ .

It is important to note that the degree of operating leverage for a company depends on the level of sales. For example, if Atom Company sells 10,000 units, the DOL is decreased:

$$\begin{aligned} \text{DOL(Atom)} &= \frac{Q(P - V)}{[Q(P - V) - F]} = \frac{10,000(\$75 - \$50)}{[10,000(\$75 - \$50) - \$70,000]} \\ &= \frac{250,000}{180,000} = 1.39 \end{aligned}$$

DOL is highest at low levels of sales and declines at higher levels of sales.

The **degree of financial leverage** (DFL) is interpreted as the ratio of the percentage change in net income (or EPS) to the percentage change in EBIT:

$$\text{DFL} = \frac{\text{percentage change in EPS}}{\text{percentage change in EBIT}}$$

For a particular level of operating earnings, DFL is calculated as:

$$\text{DFL} = \frac{\text{EBIT}}{\text{EBIT} - \text{interest}}$$



### PROFESSOR'S NOTE

The terms "earnings per share" (EPS) and "net income" are used interchangeably in this topic review.

#### EXAMPLE: Degree of financial leverage

From the previous example, Atom Company's operating income from selling 5,000 units is \$55,000. Assume that Atom has an annual interest expense of \$20,000. Calculate and interpret Atom's degree of financial leverage.

**Answer:**

$$\text{DFL} = \frac{\text{EBIT}}{\text{EBIT} - I} = \frac{\$55,000}{\$55,000 - \$20,000} = 1.5714$$

The result indicates that if Atom Company has a 3% increase in EBIT, earnings per share will increase by  $1.5714 \times 3\% = 4.71\%$ .



### PROFESSOR'S NOTE

Look back at the formulas for DOL and DFL and convince yourself that if there are no fixed costs, DOL is equal to one, and that if there are no interest costs, DFL is equal to one. Values of one mean no leverage. No fixed costs, no operating leverage. No interest costs, no financial leverage. This should help tie these formulas to the concepts and help you know when you have the formulas right (or wrong). If you plug in zero for fixed costs, DOL should be one, and if you plug in zero for interest, DFL should be one.

The **degree of total leverage** (DTL) combines the degree of operating leverage and financial leverage. DTL measures the sensitivity of EPS to change in sales. DTL is computed as:

$$DTL = DOL \times DFL$$

$$DTL = \frac{\% \Delta EBIT}{\% \Delta sales} \times \frac{\% \Delta EPS}{\% \Delta EBIT} = \frac{\% \Delta EPS}{\% \Delta sales}$$

$$DTL = \frac{Q(P - V)}{Q(P - V) - F - I}$$

$$DTL = \frac{S - TVC}{S - TVC - F - I}$$

### EXAMPLE: Degree of total leverage

Continuing with our previous example, calculate Atom Company's degree of total leverage and determine how much Atom's EPS will increase if its sales increase by 10%.

**Answer:**

$$DTL = DOL \times DFL = 2.2727 \times 1.5714 = 3.5713$$

Alternatively,

$$DTL = \frac{S - TVC}{S - TVC - F - I} = \frac{\$375,000 - \$250,000}{\$375,000 - \$250,000 - \$70,000 - \$20,000} \\ = 3.5714$$

The result indicates that if Atom Company has a 10% increase in sales, earnings per share will increase by  $3.5714 \times 10\% = 35.714\%$ .

### LOS 32.c: Analyze the effect of financial leverage on a company's net income and return on equity.

*CFA® Program Curriculum, Volume 4, page 137*

The use of financial leverage significantly increases the risk and potential reward to common stockholders. The following examples involving Beta Company illustrate how financial leverage affects net income and shareholders' return on equity (ROE).

### EXAMPLE 1: Beta Company financed with 100% equity

Assume that the Beta Company has \$500,000 in assets that are financed with 100% equity. Fixed costs are \$120,000. Beta is expected to sell 100,000 units, resulting in operating income of  $[100,000 (\$4 - \$2)] - \$120,000 = \$80,000$ . Beta's tax rate is 40%. Calculate Beta's net income and return on equity if its EBIT increases or decreases by 10%.

**Answer:**

#### Beta's Return on Equity With 100% Equity Financing

	EBIT Less 10%	Expected EBIT	EBIT Plus 10%
EBIT	\$72,000	\$80,000	\$88,000
Interest expense	0	0	0
Income before taxes	\$72,000	\$80,000	\$88,000
Taxes at 40%	28,800	32,000	35,200
Net income	\$43,200	\$48,000	\$52,800
Shareholders' equity	\$500,000	\$500,000	\$500,000
Return on equity (ROE)	8.64%	9.60%	10.56%

## EXAMPLE 2: Beta Company financed with 50% equity and 50% debt

Continuing the previous example, assume that Beta Company is financed with 50% equity and 50% debt. The interest rate on the debt is 6%. Calculate Beta's net income and return on equity if its EBIT increases or decreases by 10%. Beta's tax rate is 40%.

**Answer:**

### Beta's Return on Equity with 50% Equity Financing

	EBIT Less 10%	Expected EBIT	EBIT Plus 10%
EBIT	\$72,000	\$80,000	\$88,000
Interest expense at 6%	<u>15,000</u>	<u>15,000</u>	<u>15,000</u>
Income before taxes	\$57,000	\$65,000	\$73,000
Taxes at 40%	<u>22,800</u>	<u>26,000</u>	<u>29,200</u>
Net income	\$34,200	\$39,000	\$43,800
Shareholders' equity	\$250,000	\$250,000	\$250,000
Return on equity (ROE)	13.68%	15.60%	17.52%

The interest expense associated with using debt represents a fixed cost that reduces net income. However, the lower net income value is spread over a smaller base of shareholders' equity, serving to magnify the ROE. In all three of the scenarios shown in the two examples, ROE is higher using leverage than it is without leverage.

Further analyzing the differences between the examples, we can see that the use of financial leverage not only increases the *level* of ROE, it also increases the *rate of change* for ROE. In the unleveraged scenario, ROE varies directly with the change in EBIT. For an increase in EBIT of 10%, the ROE increases from 9.60% to 10.56%, for a rate of change of 10%. In the leveraged scenario, ROE is more volatile. For an increase in EBIT of 10%, the ROE increases from 15.60% to 17.52%, for a rate of change of 12.3%.

The use of financial leverage increases the risk of default but also increases the potential return for equity holders.



### PROFESSOR'S NOTE

Recall how this relationship is reflected in the DuPont formula used to analyze ROE. One of the components of the DuPont formula is the equity multiplier (assets/equity), which captures the effect of financial leverage on ROE.

### LOS 32.d: Calculate the breakeven quantity of sales and determine the company's net income at various sales levels.

### LOS 32.e: Calculate and interpret the operating breakeven quantity of sales.

*CFA® Program Curriculum, Volume 4, page 143*

The level of sales that a firm must generate to cover all of its fixed and variable costs is called the breakeven quantity. The **breakeven quantity of sales** is the quantity of sales for which revenues equal total costs, so that net income is zero. We can calculate the breakeven quantity by simply determining how many units must be sold to just cover total fixed costs.

For each unit sold, the **contribution margin**, which is the difference between price and variable cost per unit, is available to help cover fixed costs. We can thus describe the breakeven quantity of sales,  $Q_{BE}$ , as:

$$Q_{BE} = \frac{\text{fixed operating costs} + \text{fixed financing costs}}{\text{price} - \text{variable cost per unit}}$$

### EXAMPLE: Breakeven quantity of sales

Consider the prices and costs for Atom Company and Beta Company shown in the following table. Compute and illustrate the breakeven quantity of sales for each company.

#### Operating Costs for Atom Company and Beta Company

	Atom Company	Beta Company
Price	\$4.00	\$4.00
Variable costs	\$3.00	\$2.00
Fixed operating costs	\$10,000	\$80,000
Fixed financing costs	\$30,000	\$40,000

#### Answer:

For Atom Company, the breakeven quantity is:

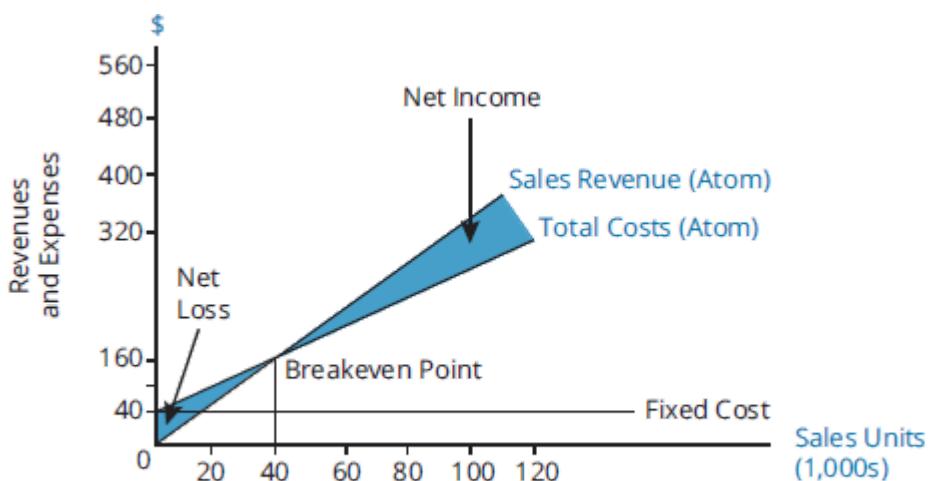
$$Q_{BE}(\text{Atom}) = \frac{\$10,000 + \$30,000}{\$4.00 - \$3.00} = 40,000 \text{ units}$$

Similarly, for Beta Company, the breakeven quantity is:

$$Q_{BE}(\text{Beta}) = \frac{\$80,000 + \$40,000}{\$4.00 - \$2.00} = 60,000 \text{ units}$$

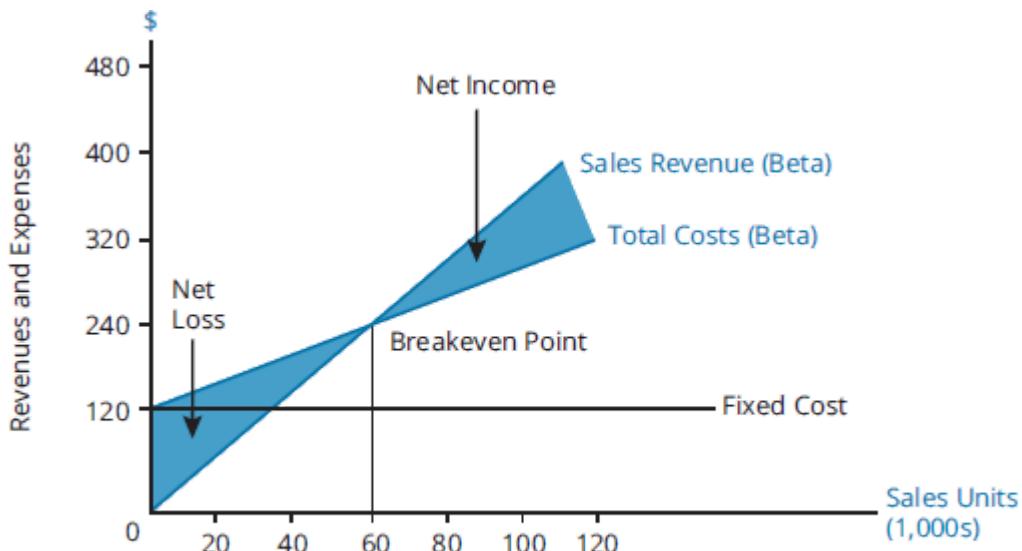
The breakeven quantity and the relationship between sales revenue, total costs, net income, and net loss are illustrated in Figure 32.1 and Figure 32.2.

Figure 32.1: Breakeven Analysis for Atom Company



For Atom Company:  $Q_{BE} = (\$30,000 + \$10,000) / (\$4.00 - \$3.00) = 40,000 \text{ units}$

Figure 32.2: Breakeven Analysis for Beta Company



For Beta Company:  $Q_{BE} = (\$80,000 + \$40,000) / (\$4.00 - \$2.00) = 60,000 \text{ units}$

We can also calculate an **operating breakeven quantity of sales**. In this case, we consider only fixed operating costs and ignore fixed financing costs. The calculation is simply:

$$Q_{OBE} = \frac{\text{fixed operating costs}}{\text{price} - \text{variable cost per unit}}$$

#### EXAMPLE: Operating breakeven quantity of sales

Calculate the operating breakeven quantity of sales for Atom and Beta, using the same data from the previous example.

##### Answer:

For Atom, the operating breakeven quantity of sales is:

$$\$10,000 / (\$4.00 - \$3.00) = 10,000 \text{ units}$$

For Beta, the operating breakeven quantity of sales is:

$$\$80,000 / (\$4.00 - \$2.00) = 40,000 \text{ units}$$

We can summarize the effects of leverage on net income through an examination of Figure 32.1 and Figure 32.2. Other things equal, a firm that chooses operating and financial structures that result in greater total fixed costs will have a higher breakeven quantity of sales. Leverage of either type magnifies the effects of changes in sales on net income. The further a firm's sales are from its breakeven level of sales, the greater the magnifying effects of leverage on net income.

These same conclusions apply to operating leverage and the operating breakeven quantity of sales. One company may choose a larger scale of operations (larger factory), resulting in a greater operating breakeven quantity of sales and greater leverage, other things equal.

Note that the degree of total leverage is calculated for a particular level of sales. The slope of the net income line in Figure 32.1 and Figure 32.2 is related to total leverage but is not the same thing. The degree of total leverage is different for every level of sales.

## MODULE QUIZ 32.1



To best evaluate your performance, enter your quiz answers online.

1. Business risk is the combination of:
  - A. operating risk and financial risk.
  - B. sales risk and financial risk.
  - C. operating risk and sales risk.
2. Which of the following is a key determinant of operating leverage?
  - A. Level and cost of debt.
  - B. The competitive nature of the business.
  - C. The trade-off between fixed and variable costs.
3. Which of the following statements about capital structure and leverage is *most accurate*?
  - A. Financial leverage is directly related to operating leverage.
  - B. Increasing the corporate tax rate will not affect capital structure decisions.
  - C. A firm with low operating leverage has a small proportion of its total costs in fixed costs.
4. Jayco, Inc., sells blue ink for \$4 a bottle. The ink's variable cost per bottle is \$2. Ink has fixed operating costs of \$4,000 and fixed financing costs of \$6,000. What is Jayco's breakeven quantity of sales, in units?
  - A. 2,000.
  - B. 3,000.
  - C. 5,000.
5. Jayco, Inc., sells blue ink for \$4 a bottle. The ink's variable cost per bottle is \$2. Ink has fixed operating costs of \$4,000 and fixed financing costs of \$6,000. What is Jayco's operating breakeven quantity of sales, in units?
  - A. 2,000.
  - B. 3,000.
  - C. 5,000.
6. If Jayco's sales increase by 10%, Jayco's EBIT increases by 15%. If Jayco's EBIT increases by 10%, Jayco's EPS increases by 12%. Jayco's degree of operating leverage (DOL) and degree of total leverage (DTL) are *closest* to:
  - A. 1.2 DOL and 1.5 DTL.
  - B. 1.2 DOL and 2.7 DTL.
  - C. 1.5 DOL and 1.8 DTL.

Use the following data to answer Questions 7 and 8.

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.

1. Jayco's 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.
2. Jayco's degree of total leverage (DTL) is *closest* to:
  - A. 2.00.
  - B. 1.75.
  - C. 1.50.
3. Vischer Concrete has \$1.2 million in assets that are currently financed with 100% equity. Vischer's EBIT is \$300,000, and its tax rate is 30%. If Vischer changes its capital structure (recapitalizes) to include 40% debt, what is Vischer's ROE before and after the change? Assume that the interest rate on debt is 5%.

<u>ROE at 100% equity</u>	<u>ROE at 60% equity</u>
A. 17.5%	26.8%
B. 25.0%	26.8%
C. 25.0%	37.5%

## KEY CONCEPTS

### LOS 32.a

Leverage increases the risk and potential return of a firm's earnings and cash flows.

Operating leverage increases with fixed operating costs.

Financial leverage increases with fixed financing costs.

Sales risk is uncertainty about the firm's sales.

Business risk refers to the uncertainty about operating earnings (EBIT) and results from variability in sales and expenses. Business risk is magnified by operating leverage.

Financial risk refers to the additional variability of EPS compared to EBIT. Financial risk increases with greater use of fixed cost financing (debt) in a company's capital structure.

### LOS 32.b

The degree of operating leverage (DOL) is calculated as  $\frac{Q(P - V)}{Q(P - V) - F}$  and is interpreted as  $\frac{\% \Delta EBIT}{\% \Delta \text{sales}}$ .

The degree of financial leverage (DFL) is calculated as  $\frac{EBIT}{EBIT - I}$  and is interpreted as  $\frac{\% \Delta EPS}{\% \Delta EBIT}$ .

The degree of total leverage (DTL) is the combination of operating and financial leverage and is calculated as DOL  $\times$  DFL and interpreted as  $\frac{\% \Delta EPS}{\% \Delta \text{sales}}$ .

### LOS 32.c

Using more debt and less equity in a firm's capital structure reduces net income through added interest expense but also reduces net equity. The net effect can be to either increase or decrease ROE.

### LOS 32.d

The breakeven quantity of sales is the amount of sales necessary to produce a net income of zero (total revenue just covers total costs) and can be calculated as:

$$\frac{\text{fixed operating costs} + \text{fixed financing costs}}{\text{price} - \text{variable cost per unit}}$$

Net income at various sales levels can be calculated as total revenue (i.e., price  $\times$  quantity sold) minus total costs (i.e., total fixed costs plus total variable costs).

### LOS 32.e

The operating breakeven quantity of sales is the amount of sales necessary to produce an operating income of zero (total revenue just covers total operating costs) and can be calculated as:

$$\frac{\text{fixed operating costs}}{\text{price} - \text{variable cost per unit}}$$

# ANSWER KEY FOR MODULE QUIZ

## Module Quiz 32.1

1. **C** Business risk refers to the risk associated with a firm's operating income and is the result of uncertainty about a firm's revenues and the expenditures necessary to produce those revenues. Business risk is the combination of sales risk (the uncertainty associated with the price and quantity of goods and services sold) and operating risk (the leverage created by the use of fixed costs in the firm's operations). (LOS 32.a)

2. **C** The extent to which costs are fixed determines operating leverage. (LOS 32.b)

3. **C** If fixed costs are a small percentage of total costs, operating leverage is low. Operating leverage is separate from financial leverage, which depends on the amount of debt in the capital structure. Increasing the tax rate would make the after-tax cost of debt cheaper. (LOS 32.b)

4. **C**  $Q_{BE} = \frac{\$4,000 + \$6,000}{\$4.00 - \$2.00} = 5,000 \text{ units}$  (LOS 32.d)

5. **A**  $Q_{OBE} = \frac{\$4,000}{\$4.00 - \$2.00} = 2,000 \text{ units}$  (LOS 32.e)

$$DOL = \frac{15\%}{10\%} = 1.5$$

6. **C**  $DFL = \frac{12\%}{10\%} = 1.2$

$$DTL = DOL \times DFL = 1.5 \times 1.2 = 1.8$$

(LOS 32.b)

$$DOL = \frac{Q(P - V)}{[Q(P - V) - F]} = \frac{10,000(5 - 3)}{[10,000(5 - 3) - 8,000]} = 1.67$$

7. **C**

$$DFL = \frac{EBIT}{EBIT - I} = \frac{12,000}{12,000 - 2,000} = 1.2$$

(LOS 32.b)

8. **A**  $DTL = \frac{Q(P - V)}{[Q(P - V) - F - I]} = \frac{10,000(5 - 3)}{[10,000(5 - 3) - 8,000 - 2,000]} = 2$ , or  
because we calculated the components in Question 7,  $DTL = DOL \times DFL = 1.67 \times 1.2 = 2.0$  (LOS 32.b)

With 100% equity:

EBIT	\$300,000
Interest expense	0
Income before taxes	\$300,000
Taxes at 30%	90,000
Net income	\$210,000
Shareholders' equity	\$1,200,000
ROE = NI/equity	17.5%

9. A With 60% equity:

EBIT	\$300,000
Interest expense (\$480,000 at 5%)	24,000
Income before taxes	\$276,000
Taxes at 30%	82,800
Net income	\$193,200
Shareholders' equity	\$720,000
ROE = NI/equity	26.8%

(LOS 32.c)

## TOPIC QUIZ: CORPORATE ISSUERS

*You have now finished the Corporate Issuers topic section. Please log into your Schweser online dashboard and take the Topic Quiz on Corporate Issuers. The Topic Quiz provides immediate feedback on how effective your study has been for this material. The number of questions on this quiz is approximately the number of questions for the topic on one-half of the actual Level I CFA exam. 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.*

*After you've completed this Topic Quiz, select "Performance Tracker" to view a breakdown of your score. Select "Compare with Others" to display how your score on the Topic Quiz compares to the scores of others who entered their answers.*

The following is a review of the Equity Investments (1) principles designed to address the learning outcome statements set forth by CFA Institute. Cross-Reference to CFA Institute Assigned Reading #33.

# READING 33: MARKET ORGANIZATION AND STRUCTURE

Study Session 11

## EXAM FOCUS

There is a great deal of introductory material in this review. Almost all of the types of securities discussed are covered in detail elsewhere in the curriculum. We introduce the terminology you will need but leave many of the details to the topic reviews specific to each security type. You should understand the concept of purchasing stock on margin and be able to calculate the return on an investment using margin. Be able to differentiate between market and limit orders as well as between quote-driven, order-driven, and brokered markets. Know that market regulation should increase informational, allocational, and operational market efficiency.

## MODULE 33.1: MARKETS, ASSETS, AND INTERMEDIARIES

### LOS 33.a: Explain the main functions of the financial system.

*CFA® Program Curriculum, Volume 4, page 122*

The three main functions of the financial system are to:

1. Allow entities to save and borrow money, raise equity capital, manage risks, trade assets currently or in the future, and trade based on their estimates of asset values.
2. Determine the returns (i.e., interest rates) that equate the total supply of savings with the total demand for borrowing.
3. Allocate capital to its most efficient uses.

The financial system allows the transfer of assets and risks from one entity to another as well as across time. Entities who utilize the financial system include individuals, firms, governments, charities, and others.

## Achievement of Purposes in the Financial System

The financial system allows entities to save, borrow, issue equity capital, manage risks, exchange assets, and to utilize information. The financial system is best at fulfilling these roles when the markets are liquid, transactions costs are low, information is readily available, and when regulation ensures the execution of contracts.

*Savings.* Individuals will save (e.g., for retirement) and expect a return that compensates them for risk and the use of their money. Firms save a portion of their sales to fund future expenditures. Vehicles used for saving include stocks, bonds, certificates of deposit, real assets, and other assets.



Video covering this content is available online.

*Borrowing.* Individuals may borrow in order to buy a house, fund a college education, or for other purposes. A firm may borrow in order to finance capital expenditures and for other activities. Governments may issue debt to fund their expenditures. Lenders can require collateral to protect them in the event of borrower defaults, take an equity position, or investigate the credit risk of the borrower.

*Issuing equity.* Another method of raising capital is to issue equity, where the capital providers will share in any future profits. Investment banks help with issuance, analysts value the equity, and regulators and accountants encourage the dissemination of information.

*Risk management.* Entities face risks from changing interest rates, currency values, commodities values, and defaults on debt, among other things. For example, a firm that owes a foreign currency in 90 days can lock in the price of this foreign currency in domestic currency units by entering into a forward contract. Future delivery of the foreign currency is guaranteed at a domestic-currency price set at inception of the contract. In this transaction, the firm would be referred to as a *hedger*. This hedging allows the firm to enter a market that it would otherwise be reluctant to enter by reducing the risk of the transaction. Hedging instruments are available from exchanges, investment banks, insurance firms, and other institutions.

*Exchanging assets.* The financial system also allows entities to exchange assets. For example, Proctor and Gamble may sell soap in Europe but have costs denominated in U.S. dollars. Proctor and Gamble can exchange their euros from soap sales for dollars in the currency markets.

*Utilizing information.* Investors with information expect to earn a return on that information in addition to their usual return. Investors who can identify assets that are currently undervalued or overvalued in the market can earn extra returns from investing based on their information (when their analysis is correct).

## Return Determination

The financial system also provides a mechanism to determine the rate of return that equates the amount of borrowing with the amount of lending (saving) in an economy. Low rates of return increase borrowing but reduce saving (increase current consumption). High rates of return increase saving but reduce borrowing. The **equilibrium interest rate** is the rate at which the amount individuals, businesses, and governments desire to borrow is equal to the amount that individuals, businesses, and governments desire to lend. Equilibrium rates for different types of borrowing and lending will differ due to differences in risk, liquidity, and maturity.

## Allocation of Capital

With limited availability of capital, one of the most important functions of a financial system is to allocate capital to its most efficient uses. Investors weigh the expected risks and returns of different investments to determine their most preferred investments. As long as investors are well informed regarding risk and return and markets function well, this results in an allocation to capital to its most valuable uses.

### LOS 33.b: Describe classifications of assets and markets.

**Financial assets** include securities (stocks and bonds), derivative contracts, and currencies. **Real assets** include real estate, equipment, commodities, and other physical assets.

Financial securities can be classified as debt or equity. **Debt securities** are promises to repay borrowed funds. **Equity securities** represent ownership positions.

**Public (publicly traded) securities** are traded on exchanges or through securities dealers and are subject to regulatory oversight. Securities that are not traded in public markets are referred to as **private securities**. Private securities are often illiquid and not subject to regulation.

**Derivative contracts** have values that depend on (are derived from) the values of other assets. **Financial derivative contracts** are based on equities, equity indexes, debt, debt indexes, or other financial contracts. **Physical derivative contracts** derive their values from the values of physical assets such as gold, oil, and wheat.

Markets for immediate delivery are referred to as **spot markets**. Contracts for the future delivery of physical and financial assets include forwards, futures, and options. Options provide the buyer the right, but not the obligation, to purchase (or sell) assets over some period or at some future date at predetermined prices.

The **primary market** is the market for newly issued securities. Subsequent sales of securities are said to occur in the **secondary market**.

**Money markets** refer to markets for debt securities with maturities of one year or less. **Capital markets** refer to markets for longer-term debt securities and equity securities that have no specific maturity date.

**Traditional investment markets** refer to those for debt and equity. **Alternative markets** refer to those for hedge funds, commodities, real estate, collectibles, gemstones, leases, and equipment. Alternative assets are often more difficult to value, illiquid, require investor due diligence, and therefore often sell at a discount.

**LOS 33.c: Describe the major types of securities, currencies, contracts, commodities, and real assets that trade in organized markets, including their distinguishing characteristics and major subtypes.**

*CFA® Program Curriculum, Volume 4, page 133*

Assets can be classified as securities, currencies, contracts, commodities, and real assets. Their characteristics and subtypes are as follows.

## Securities

Securities can be classified as fixed-income or equity securities, and individual securities can be combined in pooled investment vehicles. Corporations and governments are the most common issuers of individual securities. The initial sale of a security is called an **issue** when the security is sold to the public.

**Fixed-income securities** typically refer to debt securities that are promises to repay borrowed money in the future. Short-term fixed-income securities generally have a maturity of less than one or two years; long-term term maturities are longer than five to ten years, and intermediate term maturities fall in the middle of the maturity range.

Although the terms are used loosely, *bonds* are generally long term, whereas *notes* are intermediate term. *Commercial paper* refers to short-term debt issued by firms. Governments issue *bills* and banks issue *certificates of deposit*. In *repurchase agreements*, the borrower sells a high-quality asset and has both the right and obligation to repurchase it (at a higher price) in the future. Repurchase agreements can be for terms as short as one day.

*Convertible debt* is debt that an investor can exchange for a specified number of equity shares of the issuing firm.

**Equity securities** represent ownership in a firm and include common stock, preferred stock, and warrants.

- **Common stock** is a residual claim on a firm's assets. Common stock dividends are paid only after interest is paid to debtholders and dividends are paid to preferred stockholders. Furthermore, in the event of firm liquidation, debtholders and preferred stockholders have priority over common stockholders and are usually paid in full before common stockholders receive any payment.
- **Preferred stock** is an equity security with scheduled dividends that typically do not change over the security's life and must be paid before any dividends on common stock may be paid.
- **Warrants** are similar to options in that they give the holder the right to buy a firm's equity shares (usually common stock) at a fixed exercise price prior to the warrant's expiration.

**Pooled investment vehicles** include mutual funds, depositories, and hedge funds. The term refers to structures that combine the funds of many investors in a portfolio of investments. The investor's ownership interests are referred to as *shares, units, depository receipts, or limited partnership interests*.

- **Mutual funds** are pooled investment vehicles in which investors can purchase shares, either from the fund itself (open-end funds) or in the secondary market (closed-end funds).
- **Exchange-traded funds (ETFs)** and **exchange-traded notes (ETNs)** trade like closed-end funds but have special provisions allowing conversion into individual portfolio securities, or exchange of portfolio shares for ETF shares, that keep their market prices close to the value of their proportional interest in the overall portfolio. These funds are sometimes referred to as *depositories*, with their shares referred to as *depository receipts*.
- **Asset-backed securities** represent a claim to a portion of a pool of financial assets such as mortgages, car loans, or credit card debt. The return from the assets is passed through to investors, with different classes of claims (referred to as *tranches*) having different levels of risk.
- **Hedge funds** are organized as limited partnerships, with the investors as the limited partners and the fund manager as the general partner. Hedge funds utilize various strategies and purchase is usually restricted to investors of substantial wealth and investment knowledge. Hedge funds often use leverage. Hedge fund managers are compensated based on the amount of assets under management as well as on their investment results.



Asset-backed securities are described in more detail in Fixed Income. Mutual funds and ETFs are discussed in Portfolio Management. Hedge funds are discussed in Alternative Investments.

## Currencies

**Currencies** are issued by a government's central bank. Some are referred to as **reserve currencies**, which are those held by governments and central banks worldwide. These include the dollar and euro and, secondarily, the British pound, Japanese yen, and Swiss franc. In spot currency markets, currencies are traded for immediate delivery.

## Contracts

**Contracts** are agreements between two parties that require some action in the future, such as exchanging an asset for cash. Financial contracts are often based on securities, currencies, commodities, or security indexes (portfolios). They include futures, forwards, options, swaps, and insurance contracts.

A **forward contract** is an agreement to buy or sell an asset in the future at a price specified in the contract at its inception. An agreement to purchase 100 ounces of gold 90 days from now for \$1,000 per ounce is a forward contract. Forward contracts are not traded on exchanges or in dealer markets.

**Futures contracts** are similar to forward contracts except that they are standardized as to amount, asset characteristics, and delivery time and are traded on an exchange (in a secondary market) so that they are liquid investments.

In a **swap contract**, two parties make payments that are equivalent to one asset being traded (swapped) for another. In a simple *interest rate swap*, floating rate interest payments are exchanged for fixed-rate payments over multiple settlement dates. A *currency swap* involves a loan in one currency for the loan of another currency for a period of time. An *equity swap* involves the exchange of the return on an equity index or portfolio for the interest payment on a debt instrument.

An **option contract** gives its owner the right to buy or sell an asset at a specific exercise price at some specified time in the future. A **call option** gives the option buyer the right (but not the obligation) to buy an asset. A **put option** gives the option buyer the right (but not the obligation) to sell an asset.

Sellers, or writers, of call (put) options receive a payment, referred to as the *option premium*, when they sell the options but incur the obligation to sell (buy) the asset at the specified price if the option owner chooses to exercise it.

Options on currencies, stocks, stock indexes, futures, swaps, and precious metals are traded on exchanges. Customized options contracts are also sold by dealers in the over-the-counter market.

An **insurance contract** pays a cash amount if a future event occurs. They are used to hedge against unfavorable, unexpected events. Examples include life, liability, and automobile insurance contracts. Insurance contracts can sometimes be traded to other parties and often have tax-advantaged payouts.

**Credit default swaps** are a form of insurance that makes a payment if an issuer defaults on its bonds. They can be used by bond investors to hedge default risk. They can also be used by parties that will experience losses if an issuer experiences financial distress and

by others who are speculating that the issuer will experience more or less financial trouble than is currently expected.

## Commodities

**Commodities** trade in spot, forward, and futures markets. They include precious metals, industrial metals, agricultural products, energy products, and credits for carbon reduction.

Futures and forwards allow both hedgers and speculators to participate in commodity markets without having to deliver or store the physical commodities.

## Real Assets

Examples of **real assets** are real estate, equipment, and machinery. Although they have been traditionally held by firms for their use in production, real assets are increasingly held by institutional investors both directly and indirectly.

Buying real assets directly often provides income, tax advantages, and diversification benefits. However, they often entail substantial management costs. Furthermore, because of their heterogeneity, they usually require the investor to do substantial due diligence before investing. They are illiquid because their specialization may result in a limited pool of investors for a particular real asset.

Rather than buying real assets directly, an investor may choose to buy them indirectly through an investment such as a *real estate investment trust* (REIT) or *master limited partnership* (MLP). The investor owns an interest in these vehicles, which hold the assets directly. Indirect ownership interests are typically more liquid than ownership of the assets themselves. Another indirect ownership method is to buy the stock of firms that have large ownership of real assets.

### LOS 33.d: Describe types of financial intermediaries and services that they provide.

*CFA® Program Curriculum, Volume 4, page 145*

**Financial intermediaries** stand between buyers and sellers, facilitating the exchange of assets, capital, and risk. Their services allow for greater efficiency and are vital to a well-functioning economy. Financial intermediaries include brokers and exchanges, dealers, securitizers, depository institutions, insurance companies, arbitrageurs, and clearinghouses.

## Brokers, Dealers, and Exchanges

**Brokers** help their clients buy and sell securities by finding counterparties to trades in a cost efficient manner. They may work for large brokerage firms, for banks, or at exchanges.

**Block brokers** help with the placement of large trades. Typically, large trades are difficult to place without moving the market. For example, a large sell order might cause a security's price to decrease before the order can be fully executed. Block brokers help conceal their clients' intentions so that the market does not move against them.

**Investment banks** help corporations sell common stock, preferred stock, and debt securities to investors. They also provide advice to firms, notably about mergers,

acquisitions, and raising capital.

**Exchanges** provide a venue where traders can meet. Exchanges sometimes act as brokers by providing electronic order matching. Exchanges regulate their members and require firms that list on the exchange to provide timely financial disclosures and to promote shareholder democratization. Exchanges acquire their regulatory power through member agreement or from their governments.

**Alternative trading systems** (ATS), which serve the same trading function as exchanges but have no regulatory function, are also known as **electronic communication networks** (ECNs) or **multilateral trading facilities** (MTFs). ATS that do not reveal current client orders are known as *dark pools*.

**Dealers** facilitate trading by buying for or selling from their own inventory. Dealers provide liquidity in the market and profit primarily from the spread (difference) between the price at which they will buy (bid price) and the price at which they will sell (ask price) the security or other asset.

Some dealers also act as brokers. **Broker-dealers** have an inherent conflict of interest. As brokers, they should seek the best prices for their clients, but as dealers, their goal is to profit through prices or spreads. As a result, traders typically place limits on how their orders are filled when they transact with broker-dealers.

Dealers that trade with central banks when the banks buy or sell government securities in order to affect the money supply are referred to as **primary dealers**.

## Securitizers

**Securitizers** pool large amounts of securities or other assets and then sell interests in the pool to other investors. The returns from the pool, net of the securitizer's fees, are passed through to the investors. By securitizing the assets, the securitizer creates a diversified pool of assets with more predictable cash flows than the individual assets in the pool. This creates liquidity in the assets because the ownership interests are more easily valued and traded. There are also economies of scale in the management costs of large pools of assets and potential benefits from the manager's selection of assets.

Assets that are often securitized include mortgages, car loans, credit card receivables, bank loans, and equipment leases. The primary benefit of securitization is to decrease the funding costs for the assets in the pool. A firm may set up a *special purpose vehicle* (SPV) or *special purpose entity* (SPE) to buy firm assets, which removes them from the firm's balance sheet and may increase their value by removing the risk that financial trouble at the firm will give other investors a claim to the assets' cash flows.

The cash flows from securitized assets can be segregated by risk. The different risk categories are called *tranches*. The senior tranches provide the most certain cash flows, while the junior tranches have greater risk.

## Depository Institutions

Examples of **depository institutions** include banks, credit unions, and savings and loans. They pay interest on customer deposits and provide transaction services such as checking accounts. These financial intermediaries then make loans with the funds, which offer diversification benefits. The intermediaries have expertise in evaluating credit quality and managing the risk of a portfolio of loans of various types.

Other intermediaries, such as payday lenders and factoring companies, lend money to firms and individuals on the basis of their wages, accounts receivable, and other future cash flows. These intermediaries often finance the loans by issuing commercial paper or other debt securities.

Securities brokers provide loans to investors who purchase securities on margin. When this margin lending is to hedge funds and other institutions, the brokers are referred to as *prime brokers*.

The equity owners (stockholders) of banks, brokers, and other intermediaries absorb any loan losses before depositors and other lenders. The more equity capital an intermediary has, the less risk for depositors. Poorly capitalized intermediaries (those with less equity) have less incentive to reduce the risk of their loan portfolios because they have less capital at risk.

## Insurance Companies

**Insurance companies** are intermediaries, in that they collect insurance premiums in return for providing risk reduction to the insured. The insurance firm can do this efficiently because it provides protection to a diversified pool of policyholders, whose risks of loss are typically uncorrelated. This provides more predictable losses and cash flows compared to a single insurance contract, in the same way that a bank's diversified portfolio of loans diversifies the risk of loan defaults.

Insurance firms also provide a benefit to investors by managing the risks inherent in insurance: moral hazard, adverse selection, and fraud. **Moral hazard** occurs because the insured may take more risks once he is protected against losses. **Adverse selection** occurs when those most likely to experience losses are the predominant buyers of insurance. In **fraud**, the insured purposely causes damage or claims fictitious losses so he can collect on his insurance policy.

## Arbitrageurs

In its pure (riskless) form, **arbitrage** refers to buying an asset in one market and reselling it in another at a higher price. By doing so, arbitrageurs act as intermediaries, providing liquidity to participants in the market where the asset is purchased and transferring the asset to the market where it is sold.

In markets with good information, pure arbitrage is rare because traders will favor the markets with the best prices. More commonly, arbitrageurs try to exploit pricing differences for similar instruments. For example, a dealer who sells a call option will often also buy the stock because the call and stock price are highly correlated. Likewise, arbitrageurs will attempt to exploit discrepancies in the pricing of the call and stock. Many (risk) arbitrageurs use complex models for valuation of related securities and for risk control. Creating similar positions using different assets is referred to as *replication*. This is also a form of intermediation because similar risks are traded in different forms and in different markets.

## Clearinghouses and Custodians

**Clearinghouses** act as intermediaries between buyers and sellers in financial markets and provide:

- Escrow services (transferring cash and assets to the respective parties).

- Guarantees of contract completion.
- Assurance that margin traders have adequate capital.
- Limits on the aggregate net order quantity (buy orders minus sell orders) of members.

Through these activities, clearinghouses limit **counterparty risk**, the risk that the other party to a transaction will not fulfill its obligation. In some markets, the clearinghouse ensures only the trades of its member brokers and dealers, who, in turn, ensure the trades of their retail customers.

**Custodians** also improve market integrity by holding client securities and preventing their loss due to fraud or other events that affect the broker or investment manager.

## MODULE 33.2: POSITIONS AND LEVERAGE

### LOS 33.e: Compare positions an investor can take in an asset.

*CFA® Program Curriculum, Volume 4, page 155*



Video covering this content is available online.

An investor who owns an asset, or has the right or obligation under a contract to purchase an asset, is said to have a **long position**. A **short position** can result from borrowing an asset and selling it, with the obligation to replace the asset in the future (a short sale). The party to a contract who must sell or deliver an asset in the future is also said to have a short position. In general, investors who are long benefit from an increase in the price of an asset and those who are short benefit when the asset price declines.

**Hedgers** use short positions in one asset to hedge an existing risk from a long position in another asset that has returns that are strongly correlated with the returns of the asset shorted. For example, wheat farmers may take a short position in (i.e., sell) wheat futures contracts. If wheat prices fall, the resulting increase in the value of the short futures position offsets, partially or fully, the loss in the value of the farmer's crop.



### PROFESSOR'S NOTE

As a rule of thumb, hedgers must "do in the futures market what they must do in the future." Thus, the farmer who must sell wheat in the future can reduce the risk from wheat price fluctuations by selling wheat futures.

The buyer of an option contract is said to be long the option. The seller is short the option and is said to have written the option. Note that an investor who is long (buys) a call option on an asset profits when the value of the underlying asset increases in value, while the party short the option has losses. A long position in a put option on an asset has the right to sell the asset at a specified price and profits when the price of the underlying asset falls, while the party short the option has losses.

In swaps, each party is long one asset and short the other, so the designation of the long and short side is often arbitrary. Usually, however, the side that benefits from an increase in the quoted price or rate is referred to as the long side.

In a currency contract, each party is long one currency and short the other. For example, the buyer of a euro futures contract priced in dollars is long the euro and short the dollar.

## Short Sales and Positions

In a **short sale**, the short seller (1) simultaneously borrows and sells securities through a broker, (2) must return the securities at the request of the lender or when the short sale is closed out, and (3) must keep a portion of the proceeds of the short sale on deposit with the broker. Short sellers hope to profit from a fall in the price of the security or asset sold short, buying at a lower price in the future in order to repay the loan of the asset originally sold at a higher price. The repayment of the borrowed security or other asset is referred to as “covering the short position.”

In a short sale, the short seller must pay all dividends or interest that the lender would have received from the security that has been loaned to the short seller. These payments are called **payments-in-lieu** of dividends or interest. The short seller must also deposit the proceeds of the short sale as collateral to guarantee the eventual repurchase of the security. The broker then earns interest on these funds and may return a portion of this interest to the short seller at a rate referred to as the **short rebate rate**. The short rebate rate is usually only provided to institutional investors and is typically 0.1% less than overnight interest rates. If the security is difficult to borrow, the short rebate rate may be lower or negative. The difference between the interest earned on the proceeds from the short sale and the short rebate paid is the return to the lender of the securities. A short sale may also require the short seller to deposit additional margin in the form of cash or short-term riskless securities.

## Leveraged Positions

The use of borrowed funds to purchase an asset results in a **leveraged position** and the investor is said to be using leverage. Investors who use leverage to buy securities by borrowing from their brokers are said to buy on **margin** and the borrowed funds are referred to as a **margin loan**. The interest rate paid on the funds is the **call money rate**, which is generally higher than the government bill rate. The call money rate is lower for larger investors with better collateral.

At the time of a new margin purchase, investors are required to provide a minimum amount of equity, referred to as the **initial margin requirement**. This requirement may be set by the government, exchange, clearinghouse, or broker. Lower risk in an investor's portfolio will often result in the broker lending more funds.

The use of leverage magnifies both the gains and losses from changes in the value of the underlying asset. The additional risk from the use of borrowed funds is referred to as risk from **financial leverage**.

**LOS 33.f: Calculate and interpret the leverage ratio, the rate of return on a margin transaction, and the security price at which the investor would receive a margin call.**

*CFA® Program Curriculum, Volume 4, page 158*

The **leverage ratio** of a margin investment is the value of the asset divided by the value of the equity position. For example, an investor who satisfies an initial margin requirement of 50% equity has a 2-to-1 leverage ratio so that a 10% increase (decrease) in the price of the asset results in a 20% increase (decrease) in the investor's equity amount.

**EXAMPLE: Margin transaction**

Given the following information:

Shares purchased	1,000
Purchase price per share	\$100
Annual dividend per share	\$2.00
Initial margin requirement	40%
Call money rate	4%
Commission per share	\$0.05
Stock price after one year	\$110

Calculate (1) the leverage ratio and (2) the investor's return on the margin transaction (return on equity) if the stock is sold at the end of one year.

**Answer:**

1. The leverage ratio =  $1 / 0.40 = 2.5$ .
2. The total purchase price is  $1,000 \times \$100 = \$100,000$ . The investor must post initial margin of  $40\% \times \$100,000 = \$40,000$ . The remaining  $\$60,000$  is borrowed. The commission on the purchase is  $1,000 \times \$0.05 = \$50$ . Thus, the total initial equity investment is  $\$40,050$ .

At the end of one year, the stock value is  $1,000 \times \$110 = \$110,000$ , for a gain of  $\$9,950$ . Dividends received are  $1,000 \times \$2.00 = \$2,000$ . Interest paid is  $\$60,000 \times 4\% = \$2,400$ . The commission on the sale is  $1,000 \times \$0.05 = \$50$ .

The gain on the transaction in one year is  $\$9,950 + \$2,000 - \$2,400 - \$50 = \$9,500$ . The return on the equity investment is  $\$9,500 / \$40,050 = 23.72\%$ . The investor's net return is less than the asset total return (10% price appreciation + 2% dividend = 12%) multiplied by the leverage ratio ( $12\% \times 2.5 = 30\%$ ) because of the loan interest and commissions.

We can also solve for the return on the margin transaction with the cash flow functions on a financial calculator. The initial cash outflow is the  $\$40,000$  initial margin +  $\$50$  purchase commission =  $\$40,050$ . The inflow after one year is the  $\$110,000$  stock value +  $\$2,000$  dividends -  $\$60,000$  margin repayment -  $\$2,400$  margin interest -  $\$50$  sale commission =  $\$49,550$ . Using the cash flow functions:  $CF_0 = -40,050$ ;  $CF_1 = 49,550$ ;  $CPT\ IRR = 23.72\%$ .

To ensure that the loan is covered by the value of the asset, an investor must maintain a minimum equity percentage, called the **maintenance margin requirement**, in the account. This minimum is typically 25% of the current position value, but brokers may require a greater minimum equity percentage for volatile stocks.

If the percentage of equity in a margin account falls below the maintenance margin requirement, the investor will receive a **margin call**, a request to bring the equity percentage in the account back up to the maintenance margin percentage. An investor can satisfy this request by depositing additional funds or depositing other unmargined securities that will bring the equity percentage up to the minimum requirement. If the investor does not meet the margin call, the broker must sell the position.

The stock price which results in a margin call can be calculated by using the following formula:

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

where:

$P_0$  = initial purchase price

**EXAMPLE: Margin call price**

If an investor purchases a stock for \$40 per share with an initial margin requirement of 50% and the maintenance margin requirement is 25%, at what price will the investor get a margin call?

**Answer:**

$$\frac{\$40(1 - 0.5)}{1 - 0.25} = \$26.67$$

A margin call is triggered at a price below \$26.67.

In a short sale, the investor must deposit initial margin equal to a percentage of the value of the shares sold short to protect the broker in case the share price increases. An increase in the share price can decrease the margin percentage below the maintenance margin percentage and generate a margin call.



## MODULE QUIZ 33.1, 33.2

*To best evaluate your performance, enter your quiz answers online.*

1. An investor who buys a government bond from a dealer's inventory is said to obtain:
  - A. a real asset in a primary market transaction.
  - B. a financial asset in a primary market transaction.
  - C. a financial asset in a secondary market transaction.
2. Daniel Ferramosco is concerned that a long-term bond he holds might default. He therefore buys a contract that will compensate him in the case of default. What type of contract does he hold?
  - A. Physical derivative contract.
  - B. Primary derivative contract.
  - C. Financial derivative contract.
3. A financial intermediary buys a stock and then resells it a few days later at a higher price. Which intermediary would this *most likely* describe?
  - A. Broker.
  - B. Dealer.
  - C. Arbitrageur.
4. Which of the following is *most* similar to a short position in the underlying asset?
  - A. Buying a put.
  - B. Writing a put.
  - C. Buying a call.
5. An investor buys 1,000 shares of a stock on margin at a price of \$50 per share. The initial margin requirement is 40% and the margin lending rate is 3%. The investor's broker charges a commission of \$0.01 per share on purchases and sales. The stock pays an annual dividend of \$0.30 per share. One year later, the investor sells the 1,000 shares at a price of \$56 per share. The investor's rate of return is *closest* to:
  - A. 12%.
  - B. 27%.
  - C. 36%.

## MODULE 33.3: ORDER EXECUTION AND VALIDITY

**LOS 33.g: Compare execution, validity, and clearing instructions.**



**LOS 33.h: Compare market orders with limit orders.**

*CFA® Program Curriculum, Volume 4, page 161*

Video covering  
this content is  
available online.

Securities dealers provide prices at which they will buy and sell shares.

The **bid price** is the price at which a dealer will buy a security. The **ask or offer price** is

the price at which a dealer will sell a security. The difference between the bid and ask prices is referred to as the **bid-ask spread** and is the source of a dealer's compensation. The bid and ask are quoted for specific trade sizes (**bid size** and **ask size**).



## PROFESSOR'S NOTE

Calculations with bid and ask prices are unlikely to appear on the Level I exam but they do appear at Level II. If you need to work with bid and ask prices, just remember that the price you get will be the one that is *worse for you*.

- Securities: If you are buying, you must pay the higher price. If you are selling, you only receive the lower price.
- Currencies: The bid or ask price you get is the one that gives you less of the currency you are acquiring. This works regardless of which way the exchange rate is quoted.

The quotation in the market is the highest dealer bid and lowest dealer ask from among all dealers in a particular security. More liquid securities have market quotations with bid-ask spreads that are lower (as a percentage of share price) and therefore have lower transactions costs for investors. Traders who post bids and offers are said to *make a market*, while those who trade with them at posted prices are said to *take the market*.

When investors want to buy or sell, they must enter orders that specify the size of the trade and whether to buy or sell. The order can also include *execution instructions* that specify how to trade, *validity instructions* that specify when the order can be filled, and *clearing instructions* that specify how to settle the trade.

## Execution Instructions

The most common orders, in terms of execution instructions, are market or limit orders. A **market order** instructs the broker to execute the trade immediately at the best possible price. A **limit order** places a minimum execution price on sell orders and a maximum execution price on buy orders. For example, a buy order with a limit of \$6 will be executed immediately as long as the shares can be purchased for \$6 or less.

A market order is often appropriate when the trader wants to execute quickly, as when the trader has information she believes is not yet reflected in market prices. The disadvantage of market orders is that they may execute at unfavorable prices, especially if the security has low trading volume relative to the order size. A market buy order may execute at a high price or a market sell order may execute at a low price. Executing at an unfavorable price represents a concession by the trader for immediate liquidity. Unfortunately, these price concessions are unpredictable.

To avoid price execution uncertainty, a trader can place a limit order instead of the market order. The disadvantage of the limit order is that it might not be filled. For example, if a trader places a limit buy order of \$50 and no one is willing to sell at \$50, the order will not be filled. Furthermore, if the stock price rises over time, the trader misses out on the gains.

A limit buy order above the best ask or a limit sell order below the best bid are said to be *marketable* or *aggressively priced* because at least part of the order is likely to execute immediately. If the limit price is between the best bid and the best ask, a limit order is said to be *making a new market* or *inside the market*. Limit orders waiting to execute are called **standing limit orders**.

A limit buy order at the best bid or a limit sell order at the best ask are said to *make the market*. Again, the order might not be filled. A buy order with a limit price below the best

bid, or a sell order with a limit price above the best ask, is said to be *behind the market*. It will likely not execute until security prices move toward the limit price. A limit buy order with a price considerably lower than the best bid, or a limit sell order with a price significantly higher than the best ask, is said to be *far from the market*.

Other execution instructions concern the volume of the trade. **All-or-nothing orders** execute only if the whole order can be filled. Orders can specify the minimum size of a trade, which is beneficial when trading costs depend on the number of executed trades rather than the size of the order.

Trade visibility can also be specified. **Hidden orders** are those for which only the broker or exchange knows the trade size. These are useful for investors that have a large amount to trade and do not want to reveal their intentions. Traders can also specify **display size**, where some of the trade is visible to the market, but the rest is not. These are also referred to as **iceberg orders** because part of most of the order is hidden from view. They allow the investor to advertise some of the trade, with the rest of the trade potentially executed once the visible part has executed. Sometimes entering trades for part of the position the trader wishes to establish is a way to estimate the liquidity of, or the buying interest in, the security in question.

## Validity Instructions

Validity instructions specify when an order should be executed. Most orders are **day orders**, meaning they expire if unfilled by the end of the trading day. **Good til canceled orders** last until they are filled. **Immediate-or-cancel** orders are canceled unless they can be filled immediately. They are also known as **fill-or-kill** orders. **Good-on-close** orders are only filled at the end of the trading day. If they are market orders, they are referred to as **market-on-close** orders. These are often used by mutual funds because their portfolios are valued using closing prices. There are also **good-on-open** orders.

**Stop orders** are those that are not executed unless the stop price has been met. They are often referred to as **stop loss orders** because they can be used to prevent losses or to protect profits. Suppose an investor purchases a stock for \$50. If the investor wants to sell out of the position if the price falls 10% to \$45, he can enter a **stop-sell order** at \$45. If the stock trades down to \$45 or lower, this *triggers* a market order to sell. There is no guarantee that the order will execute at \$45, and a rapidly falling stock could be sold at a price significantly lower than \$45.

A **stop-buy** is entered with a stop (trigger) above the current market price. There are two primary reasons a trader would enter a stop-buy order. (1) A trader with a short position could attempt to limit losses from an increasing stock price with a stop-buy order. (2) It is often said, "You don't get paid for being right until the market agrees with you." With this in mind, an investor who believes a stock is undervalued, but does not wish to own it until there are signs that market participants are being convinced of this undervaluation, may place a stop-buy order at a price some specific percentage above the current price.

Note that stop orders reinforce market momentum. Stop-sell orders execute when market prices are falling, and stop-buy orders execute when the market is rising. Execution prices for stop orders are therefore often unfavorable.

### EXAMPLE: Using stop orders

Raymond Flowers believes that the shares of Acme Corp. that he owns are overvalued currently but knows that stocks often continue to increase above their intrinsic values for some time before correcting. What type of order should Flowers place if he wants to sell his shares when the price begins to fall a significant amount?

**Answer:**

Flowers should enter a good til canceled stop-sell order at a price some percentage below the current level. If, for example, the shares are trading at 40, he could enter a stop-sell order at 36, 10% below the current level. Investors sometimes move these stops up as a stock continues to increase in price. In response to a price increase to 42, Flowers might move his stop-sell order up to 37.80, 10% below the new price. Note that a limit order to sell with a limit price below the current market price would likely execute immediately.

## Clearing Instructions

Clearing instructions tell the trader how to clear and settle a trade. They are usually standing instructions and not attached to an order. Retail trades are typically cleared and settled by the broker, whereas institutional trades may be settled by a custodian or another broker, which might be the trader's prime broker. Using two brokers allows the investor to keep one broker as her prime broker for margin and custodial services while using a variety of other brokers for specialized execution.

One important clearing instruction is whether a sell order is a short sale or long sale. In the former, the broker must confirm that the security can be borrowed and in the latter, that the security can be delivered.

### LOS 33.i: Define primary and secondary markets and explain how secondary markets support primary markets.

*CFA® Program Curriculum, Volume 4, page 167*

**Primary capital markets** refer to the sale of newly issued securities. New equity issues involve either:

- New shares issued by firms whose shares are already trading in the marketplace. These issues are called **seasoned offerings** or **secondary issues**.
- First-time issues by firms whose shares are not currently publicly traded. These are called **initial public offerings** (IPOs).

**Secondary financial markets** are where securities trade after their initial issuance. Placing a buy order on the London Stock Exchange is an order in the secondary market and will result in purchase of existing shares from their current owner.

## Primary Market: Public Offerings

Corporate stock or bond issues are almost always sold with the assistance of an investment banking firm. The investment bank finds investors who agree to buy part of the issue. These are not actual orders but are referred to as **indications of interest**. When the number of shares covered by indications of interest are greater (less) than the number of shares to be offered, the offering price may be adjusted upward (downward). This process of gathering indications of interest is referred to as **book building**. In London, the book builder is referred to as the **book runner**. In Europe, an **accelerated book build** occurs when securities must be issued quickly. To build a book, the investment bank disseminates information about the firm's financials and prospects. The issuer must also make disclosures including how the funds will be used.

The most common way an investment bank assists with a security issuance is through an **underwritten offering**. Here, the investment bank agrees to purchase the entire issue at a price that is negotiated between the issuer and bank. If the issue is undersubscribed, the investment bank must buy the unsold portion. In the case of an IPO, the investment bank also agrees to make a market in the stock for a period after the issuance to provide price support for the issue.

An investment bank can also agree to distribute shares of an IPO on a **best efforts** basis, rather than agreeing to purchase the whole issue. If the issue is undersubscribed, the bank is not obligated to buy the unsold portion.

Note that investment banks have a conflict of interest in an underwritten offer. As the issuer's agents, they should set the price high to raise the most funds for the issuer. But, as underwriters, they would prefer that the price be set low enough that the whole issue sells. This also allows them to allocate portions of an undervalued IPO to their clients. This results in IPOs typically being underpriced. Issuers also could have an interest in underpricing the IPO because of the negative publicity when an undersubscribed IPO initially trades at a price below the IPO price investors pay. An IPO that is oversubscribed and has the expectation of trading significantly above its IPO price is referred to as a hot issue.

## Primary Market: Private Placements and Other Transactions

In a **private placement**, securities are sold directly to qualified investors, typically with the assistance of an investment bank. Qualified investors are those with substantial wealth and investment knowledge. Private placements do not require the issuer to disclose as much information as they must when the securities are being sold to the public. The issuance costs are less with a private placement and the offer price is also lower because the securities cannot be resold in public markets, making them less valuable than shares registered for public trading.

In a **shelf registration**, a firm makes its public disclosures as in a regular offering but then issues the registered securities over time when it needs capital and when the markets are favorable.

A **dividend reinvestment plan** (DRP or DRIP) allows existing shareholders to use their dividends to buy new shares from the firm at a slight discount.

In a **rights offering**, existing shareholders are given the right to buy new shares at a discount to the current market price. Shareholders tend to dislike rights offerings because their ownership is diluted unless they exercise their rights and buy the additional shares. However, rights can be traded separately from the shares themselves in some circumstances.

In addition to firms issuing securities, governments issue short-term and long-term debt, either by auction or through investment banks.

## Importance of the Secondary Market

Secondary markets are important because they provide liquidity and price/value information. Liquid markets are those in which a security can be sold quickly without incurring a discount from the current price. The better the secondary market, the easier

it is for firms to raise external capital in the primary market, which results in a lower cost of capital for firms with shares that have adequate liquidity.

### LOS 33.j: Describe how securities, contracts, and currencies are traded in quote-driven, order-driven, and brokered markets.

*CFA® Program Curriculum, Volume 4, page 171*

The trading of securities in the secondary market has encouraged the development of market structures to facilitate trading. Trading can be examined according to when securities are traded and how they are traded.

Securities markets may be structured as call markets or continuous markets. In **call markets**, the stock is only traded at specific times. Call markets are potentially very liquid when in session because all traders are present, but they are obviously illiquid between sessions. In a call market, all trades, bids, and asks are declared, and then one negotiated price is set that clears the market for the stock. This method is used in smaller markets but is also used to set opening prices and prices after trading halts on major exchanges.

In **continuous markets**, trades occur at any time the market is open. The price is set by either the auction process or by dealer bid-ask quotes.

## Market Structures

There are three main categories of securities markets: *quote-driven markets* where investors trade with dealers, *order-driven markets* where rules are used to match buyers and sellers, and *brokered markets* where investors use brokers to locate a counterparty to a trade.

### *Quote-driven markets*

In **quote-driven markets**, traders transact with dealers (market makers) who post bid and ask prices. Dealers maintain an inventory of securities. Quote-driven markets are thus sometimes called **dealer markets**, **price-driven markets**, or **over-the-counter markets**. Most securities other than stocks trade in quote-driven markets. Trading often takes place electronically.

### *Order-driven markets*

In **order-driven markets**, orders are executed using trading rules, which are necessary because traders are usually anonymous. Exchanges and automated trading systems are examples of order-driven markets. Two sets of rules are used in these markets: order matching rules and trade pricing rules.

**Order matching rules** establish an *order precedence hierarchy*. **Price priority** is one criteria, where the trades given highest priority are those at the highest bid (buy) and lowest ask (sell). If orders are at the same prices, a **secondary precedence rule** gives priority to non-hidden orders and earliest arriving orders. These rules encourage traders to price their trades aggressively, display their entire orders, and trade earlier, thereby improving liquidity.

After orders are created using order matching rules, **trade pricing rules** are used to determine the price. Under the *uniform pricing rule*, all orders trade at the same price,

which is the price that results in the highest volume of trading. The *discriminatory pricing rule* uses the limit price of the order that arrived first as the trade price.

In an electronic crossing network, the typical trader is an institution. Orders are batched together and crossed (matched) at fixed points in time during the day at the average of the bid and ask quotes from the exchange where the stock primarily trades. This pricing rule is referred to as the *derivative pricing rule* because it is derived from the security's main market. The price is not determined by orders in the crossing network.

## **Brokered markets**

In **brokered markets**, brokers find the counterparty in order to execute a trade. This service is especially valuable when the trader has a security that is unique or illiquid. Examples are large blocks of stock, real estate, and artwork. Dealers typically do not carry an inventory of these assets and there are too few trades for these assets to trade in order-driven markets.

## **Market Information**

A market is said to be **pre-trade transparent** if investors can obtain pre-trade information regarding quotes and orders. A market is **post-trade transparent** if investors can obtain post-trade information regarding completed trade prices and sizes.

Buy-side traders value transparency because it allows them to better understand security values and trading costs. Dealers, on the other hand, prefer opaque markets because this provides them with an informational advantage over traders who trade less frequently in the security. Transactions costs and bid-ask spreads are larger in opaque markets.

### **LOS 33.k: Describe characteristics of a well-functioning financial system.**

*CFA® Program Curriculum, Volume 4, page 175*

A well-functioning financial system allows entities to achieve their purposes. More specifically, **complete markets** fulfill the following:

- Investors can save for the future at fair rates of return.
- Creditworthy borrowers can obtain funds.
- Hedgers can manage their risks.
- Traders can obtain the currencies, commodities, and other assets they need.

If a market can perform these functions at low trading costs (including commissions, bid-ask spreads, and price impacts), it is said to be **operationally efficient**. If security prices reflect all the information associated with fundamental value in a timely fashion, then the financial system is **informationally efficient**. A well-functioning financial system has complete markets that are operationally and informationally efficient, with prices that reflect fundamental values.

A well-functioning financial system has financial intermediaries that:

- Organize trading venues, including exchanges, brokerages, and alternative trading systems.
- Supply liquidity.
- Securitize assets so that borrowers can obtain funds inexpensively.

- Manage banks that use depositor capital to fund borrowers.
- Manage insurance firms that pool unrelated risks.
- Manage investment advisory services that assist investors with asset management inexpensively.
- Provide clearinghouses that settle trades.
- Manage depositories that provide for asset safety.

The benefits of a well-functioning financial system are tremendous. Savers can fund entrepreneurs who need capital to fund new companies. Company risks can be shared so that risky companies can be funded. These benefits are enhanced because the transactions can occur among strangers, widening the opportunities for capital formation and risk sharing in the economy.

Furthermore, in informationally efficient markets, capital is allocated to its most productive use. That is, they are **allocationally efficient**. Informational efficiency is brought about by traders who bid prices up and down in response to new information that changes estimates of securities' fundamental values. If markets are operationally efficient, security prices will be more informationally efficient because low trading costs encourage trading based on new information. The existence of accounting standards and financial reporting requirements also reduces the costs of obtaining information and increases security values.

### **LOS 33.l: Describe objectives of market regulation.**

*CFA® Program Curriculum, Volume 4, page 178*

Without market regulation, many problems could persist in financial markets:

- *Fraud and theft*: In complex financial markets, the potential for theft and fraud increases because investment managers and others can take advantage of unsophisticated investors. Furthermore, if returns are often random, it is difficult for investors to determine if their agents (e.g., investment managers and brokers) are performing well.
- *Insider trading*: If investors believe traders with inside information will exploit them, they will exit the market and liquidity will be reduced.
- *Costly information*: If obtaining information is relatively expensive, markets will not be as informationally efficient and investors will not invest as much.
- *Defaults*: Parties might not honor their obligations in markets.

To solve these problems, market regulation should:

- Protect unsophisticated investors so that trust in the markets is preserved.
- Require minimum standards of competency and make it easier for investors to evaluate performance. The CFA Program and the Global Investment Performance Standards are part of this effort.
- Prevent insiders from exploiting other investors.
- Require common financial reporting requirements (e.g., those of the International Accounting Standards Board) so that information gathering is less expensive.
- Require minimum levels of capital so that market participants will be able to honor their long-term commitments. This is especially important for insurance companies and pension funds that individuals depend on for their financial future. With capital

at stake, market participants have more incentive to be careful about the risks they take.

Regulation can be provided by governments as well as industry groups. For example, most exchanges, clearinghouses, and dealer trade organizations are self-regulating organizations (SROs), meaning that they regulate their members. Governments sometimes delegate regulatory authority to SROs.

When they fail to address the problems mentioned previously, financial markets do not function well. Liquidity declines, firms shun risky projects, new ideas go unfunded, and economic growth slows.



## MODULE QUIZ 33.3

*To best evaluate your performance, enter your quiz answers online.*

1. A stock is selling at \$50. An investor's valuation model estimates its intrinsic value to be \$40. Based on her estimate, she would *most likely* place:
  - A. a short-sale order.
  - B. a stop order to buy.
  - C. a market order to buy.
2. Which of the following limit buy orders would be the *most likely* to go unexecuted?
  - A. A marketable order.
  - B. An order behind the market.
  - C. An order making a new market.
3. New issues of securities are transactions in:
  - A. the primary market.
  - B. the secondary market.
  - C. the seasoned market.
4. In which of the following types of markets do stocks trade any time the market is open?
  - A. Exchange markets.
  - B. Call markets.
  - C. Continuous markets.
5. A market is said to be informationally efficient if it features:
  - A. market prices that reflect all available information about the value of the securities traded.
  - B. timely and accurate information about current supply and demand conditions.
  - C. many buyers and sellers that are willing to trade at prices above and below the prevailing market price.
6. Which of the following would *least likely* be an objective of market regulation?
  - A. Reduce burdensome accounting standards.
  - B. Make it easier for investors to evaluate performance.
  - C. Prevent investors from using inside information in securities trading.

## KEY CONCEPTS

### LOS 33.a

The three main functions of the financial system are to:

1. Allow entities to save, borrow, issue equity capital, manage risks, exchange assets, and utilize information.
2. Determine the return that equates aggregate savings and borrowing.
3. Allocate capital efficiently.

## **LOS 33.b**

Assets and markets can be classified as:

- Financial assets (e.g., securities, currencies, derivatives) versus real assets (e.g., real estate, equipment).
- Debt securities versus equity securities.
- Public securities that trade on exchanges or through dealers versus private securities.
- Physical derivative contracts (e.g., on grains or metals) versus financial derivative contracts (e.g., on bonds or equity indexes).
- Spot versus future delivery markets.
- Primary markets (issuance of new securities) versus secondary markets (trading of previously issued securities).
- Money markets (short-term debt instruments) versus capital markets (longer-term debt instruments and equities).
- Traditional investment markets (bonds, stocks) versus alternative investment markets (e.g., real estate, hedge funds, fine art).

## **LOS 33.c**

The major types of assets are securities, currencies, contracts, commodities, and real assets.

Securities include fixed income (e.g., bonds, notes, commercial paper), equity (common stock, preferred stock, warrants), and pooled investment vehicles (mutual funds, exchange-traded funds, hedge funds, asset-backed securities).

Contracts include futures, forwards, options, swaps, and insurance contracts.

Commodities include agricultural products, industrial and precious metals, and energy products and are traded in spot, forward, and futures markets.

Most national currencies are traded in spot markets and some are also traded in forward and futures markets.

## **LOS 33.d**

Financial intermediaries perform the following roles:

- Brokers, exchanges, and alternative trading systems connect buyers and sellers of the same security at the same location and time. They provide a centralized location for trading.
- Dealers match buyers and sellers of the same security at different points in time.
- Arbitrageurs connect buyers and sellers of the same security at the same time but in different venues. They also connect buyers and sellers of non-identical securities of similar risk.
- Securitizers and depository institutions package assets into a diversified pool and sell interests in it. Investors obtain greater liquidity and choose their desired risk level.
- Insurance companies create a diversified pool of risks and manage the risk inherent in providing insurance.
- Clearinghouses reduce counterparty risk and promote market integrity.

### **LOS 33.e**

A long position in an asset represents current or future ownership. A long position benefits when the asset increases in value.

A short position represents an agreement to sell or deliver an asset or results from borrowing an asset and selling it (i.e., a short sale). A short position benefits when the asset decreases in value.

When an investor buys a security by borrowing from a broker, the investor is said to buy on margin and has a leveraged position. The risk of investing borrowed funds is referred to as financial leverage. More leverage results in greater risk.

### **LOS 33.f**

The leverage ratio is the value of the asset divided by the value of the equity position. Higher leverage ratios indicate greater risk.

The return on a margin transaction is the increase in the value of the position after deducting selling commissions and interest charges, divided by the amount of funds initially invested, including purchase commissions.

The maintenance margin is the minimum percentage of equity that a margin investor is required to maintain in his account. If the investor's equity falls below the maintenance margin, the investor will receive a margin call. The stock price that will result in a margin call is:

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

where:

$P_0$  = initial purchase price

### **LOS 33.g**

Execution instructions specify how to trade. Market orders and limit orders are examples of execution instructions.

Validity instructions specify when an order can be filled. Day orders, good til canceled orders, and stop orders are examples of validity instructions.

Clearing instructions specify how to settle a trade.

### **LOS 33.h**

A market order is an order to execute the trade immediately at the best possible price. A market order is appropriate when the trader wants to execute a transaction quickly. The disadvantage of a market order is that it may execute at an unfavorable price.

A limit order is an order to trade at the best possible price, subject to the price satisfying the limit condition. A limit order avoids price execution uncertainty. The disadvantage of a limit order is that it may not be filled. A buy (sell) order with a limit of \$18 will only be executed if the security can be bought (sold) at a price of \$18 or less (more).

### **LOS 33.i**

New issues of securities are sold in primary capital markets. Secondary financial markets are where securities trade after their initial issuance.

In an underwritten offering, the investment bank guarantees that the issue will be sold at a price that is negotiated between the issuer and bank. In a best efforts offering, the bank acts only as a broker.

In a private placement, a firm sells securities directly to qualified investors, without the disclosures of a public offering.

A liquid secondary market makes it easier for firms to raise external capital in the primary market, which results in a lower cost of capital for firms.

### LOS 33.j

There are three main categories of securities markets:

1. Quote-driven markets: Investors trade with dealers that maintain inventories of securities, currencies, or contracts.
2. Order-driven markets: Order-matching and trade-pricing rules are used to match the orders of buyers and sellers.
3. Brokered markets: Brokers locate a counterparty to take the other side of a buy or sell order.

In call markets, securities are only traded at specific times. In continuous markets, trades occur at any time the market is open.

### LOS 33.k

A well-functioning financial system has the following characteristics:

- Complete markets: Savers receive a return, borrowers can obtain capital, hedgers can manage risks, and traders can acquire needed assets.
- Operational efficiency: Trading costs are low.
- Informational efficiency: Prices reflect fundamental information quickly.
- Allocational efficiency: Capital is directed to its highest valued use.

### LOS 33.1

The objectives of market regulation are to:

- Protect unsophisticated investors.
- Establish minimum standards of competency.
- Help investors to evaluate performance.
- Prevent insiders from exploiting other investors.
- Promote common financial reporting requirements so that information gathering is less expensive.
- Require minimum levels of capital so that market participants will be able to honor their commitments and be more careful about their risks.

## ANSWER KEY FOR MODULE QUIZZES

### Module Quiz 33.1, 33.2

1. C Bonds are financial assets. Real assets are physical things such as a commodity or a factory. Buying a bond from a dealer is a secondary market transaction. A primary

market transaction is an issuance of securities by an entity that is raising funds. (Module 33.1, LOS 33.b)

2. **C** Daniel holds a derivative contract that has a value determined by another financial contract; in this case, the long-term bond. (Module 33.1, LOS 33.c)
3. **B** This situation best describes a dealer. A dealer buys an asset for its inventory in the hopes of reselling it later at a higher price. Brokers stand between buyers and sellers of the same security at the same location and time. Arbitrageurs trade in the same security simultaneously in different markets. (Module 33.1, LOS 33.d)
4. **A** Buying a put is most similar to a short position in the underlying asset because the put increases in value if the underlying asset value decreases. The writer of a put and the holder of a call have a long exposure to the underlying asset because their positions increase in value if the underlying asset value increases. (Module 33.2, LOS 33.e)
5. **B** The total purchase price is  $1,000 \times \$50 = \$50,000$ . The investor must post initial margin of  $40\% \times \$50,000 = \$20,000$ . The remaining  $\$30,000$  is borrowed. The commission on the purchase is  $1,000 \times \$0.01 = \$10$ . Thus, the initial equity investment is  $\$20,010$ .

In one year, the sales price is  $1,000 \times \$56 = \$56,000$ . Dividends received are  $1,000 \times \$0.30 = \$300$ . Interest paid is  $\$30,000 \times 3\% = \$900$ . The commission on the sale is  $1,000 \times \$0.01 = \$10$ . Thus, the ending value is  $\$56,000 - \$30,000 + \$300 - \$900 - \$10 = \$25,390$ .

The return on the equity investment is  $\$25,390 / \$20,010 - 1 = 26.89\%$ . (Module 33.2, LOS 33.f)

### Module Quiz 33.3

1. **A** If the investor believes the stock is overvalued in the market, the investor should place a short-sale order, which would be profitable if the stock moves toward her value estimate. (LOS 33.g, 33.h)
2. **B** A behind-the-market limit order would be least likely executed. In the case of a buy, the limit buy order price is below the best bid. It will likely not execute until security prices decline. A marketable buy order is the most likely to trade because it is close to the best ask price. In an order that is making a new market or inside the market, the limit buy order price is between the best bid and ask. (LOS 33.h)
3. **A** The primary market refers to the market for newly issued securities. (LOS 33.i)
4. **C** Continuous markets are defined as markets where stocks can trade any time the market is open. Some exchange markets are call markets where orders are accumulated and executed at specific times. (LOS 33.j)
5. **A** Informational efficiency means the prevailing price reflects all available information about the value of the asset, and the price reacts quickly to new information. (LOS 33.k)
6. **A** Market regulation should require financial reporting standards so that information gathering is less expensive and the informational efficiency of the markets is enhanced. (LOS 33.l)

The following is a review of the Equity Investments (1) principles designed to address the learning outcome statements set forth by CFA Institute. Cross-Reference to CFA Institute Assigned Reading #34.

# READING 34: SECURITY MARKET INDEXES

Study Session 11

## EXAM FOCUS

Security market indexes are used to measure the performance of markets and investment managers. Understand the construction, calculation, and weaknesses of price-weighted, market capitalization-weighted, and equal-weighted indexes. Be familiar with the various security indexes and their potential weaknesses.

## MODULE 34.1: INDEX WEIGHTING METHODS

### LOS 34.a: Describe a security market index.

*CFA® Program Curriculum, Volume 4, page 196*

A **security market index** is used to represent the performance of an asset class, security market, or segment of a market. They are usually created as portfolios of individual securities, which are referred to as the **constituent securities** of the index. An index has a numerical value that is calculated from the market prices (actual when available, or estimated) of its constituent securities at a point in time. An index return is the percentage change in the index's value over a period of time.



Video covering this content is available online.

### LOS 34.b: Calculate and interpret the value, price return, and total return of an index.

*CFA® Program Curriculum, Volume 4, page 196*

An index return may be calculated using a **price index** or a **return index**. A price index uses only the prices of the constituent securities in the return calculation. A rate of return that is calculated based on a price index is referred to as a **price return**.

A return index includes both prices and income from the constituent securities. A rate of return that is calculated based on a return index is called a **total return**. If the assets in an index produce interim cash flows such as dividends or interest payments, the total return will be greater than the price return.

Once returns are calculated for each period, they then can be compounded together to arrive at the return for the measurement period:

$$R_p = (1 + R_{S1})(1 + R_{S2})(1 + R_{S3})(1 + R_{S4}) \dots (1 + R_{Sk}) - 1$$

where:

$R_p$  = portfolio return during the measurement period

$k$  = total number of subperiods

$R_{Sk}$  = portfolio return during the subperiod  $k$

For example, if the returns for the first two periods were 0.50% and 1.04%, they would be geometrically linked to produce 1.55%:

$$R_p = (1 + R_{S1})(1 + R_{S2}) - 1 = (1.005)(1.0104) - 1 = 0.0155 \text{ or } 1.55\%$$

If the starting index value is 100, its value after two periods would be  $100 \times 1.0155 = 101.55$ .

### LOS 34.c: Describe the choices and issues in index construction and management.

*CFA® Program Curriculum, Volume 4, page 200*

Index providers must make several decisions:

- What is the *target market* the index is intended to measure?
- Which securities from the target market should be included?
- How should the securities be weighted in the index?
- How often should the index be rebalanced?
- When should the selection and weighting of securities be re-examined?

The target market may be defined very broadly (e.g., stocks in the United States) or narrowly (e.g., small-cap value stocks in the United States). It may also be defined by geographic region or by economic sector (e.g., cyclical stocks). The constituent stocks in the index could be all the stocks in that market or just a representative sample. The selection process may be determined by an objective rule or subjectively by a committee.

### LOS 34.d: Compare the different weighting methods used in index construction.

*CFA® Program Curriculum, Volume 4, page 200*

Weighting schemes for stock indexes include price weighting, equal weighting, market capitalization weighting, float-adjusted market capitalization weighting, and fundamental weighting.

A **price-weighted index** is simply an arithmetic average of the prices of the securities included in the index. The divisor of a price-weighted index is adjusted for stock splits and changes in the composition of the index when securities are added or deleted, such that the index value is unaffected by such changes.

The advantage of a price-weighted index is that its computation is simple. One disadvantage is that a given percentage change in the price of a higher priced stock has a greater impact on the index's value than does an equal percentage change in the price of a lower priced stock. Put another way, higher priced stocks have more weight in the calculation of a price-weighted index. Additionally, a stock's weight in the index going forward changes if the firm splits its stock, repurchases stock, or issues stock dividends, as all of these actions will affect the price of the stock and therefore its weight in the index. A portfolio that has an equal number of shares in each of the constituent stocks will have price returns (ignoring dividends) that will match the returns of a price-weighted index.

Two major price-weighted indexes are the Dow Jones Industrial Average (DJIA) and the Nikkei Dow Jones Stock Average. The DJIA is a price-weighted index based on 30 U.S.

stocks. The Nikkei Dow is constructed from the prices of 225 stocks that trade in the first section of the Tokyo Stock Exchange.

An **equal-weighted index** is calculated as the arithmetic average return of the index stocks and, for a given time period, would be matched by the returns on a portfolio that had equal dollar amounts invested in each index stock. As with a price-weighted index, an advantage of an equal-weighted index is its simplicity.

One complication with an equal-weighted index return is that a matching portfolio would have to be adjusted periodically (rebalanced) as prices change so that the values of all security positions are made equal each period. The portfolio rebalancing required to match the performance of an equal-weighted index creates high transactions costs that would decrease portfolio returns.

Another concern with an equal-weighted index is that the weights placed on the returns of the securities of smaller capitalization firms are greater than their proportions of the overall market value of the index stocks. Conversely, the weights on the returns of large capitalization firms in the index are smaller than their proportions of the overall market value of the index stocks.

The Value Line Composite Average and the Financial Times Ordinary Share Index are well-known examples of equal-weighted indexes.

A **market capitalization-weighted index** (or **value-weighted index**) has weights based on the market capitalization of each index stock (current stock price multiplied by the number of shares outstanding) as a proportion of the total market capitalization of all the stocks in the index. A market capitalization-weighted index return can be matched with a portfolio in which the value of each security position in the portfolio is the same proportion of the total portfolio value as the proportion of that security's market capitalization to the total market capitalization of all of the securities included in the index. This weighting method more closely represents changes in aggregate investor wealth than price weighting. Because the weight of an index stock is based on its market capitalization, a market capitalization-weighted index does not need to be adjusted when a stock splits or pays a stock dividend.

An alternative to using a firm's market capitalization to calculate its weight in an index is to use its **market float**. A firm's market float is the total value of the shares that are actually available to the investing public and excludes the value of shares held by controlling stockholders because they are unlikely to sell their shares. For example, the float for Microsoft would exclude shares owned by Bill Gates and Paul Allen (the founders) and those of certain other large shareholders as well. The market float is often calculated excluding those shares held by corporations or governments as well. Sometimes the market float calculation excludes shares that are not available to foreign buyers and is then referred to as the **free float**. The reason for this is to better match the index weights of stocks to their proportions of the total value of all the shares of index stocks that are actually available to investors.

A **float-adjusted market capitalization-weighted index** is constructed like a market capitalization-weighted index. The weights, however, are based on the proportionate value of each firm's shares that are available to investors to the total market value of the shares of index stocks that are available to investors. Firms with relatively large percentages of their shares held by controlling stockholders will have less weight than they have in an unadjusted market-capitalization index.

The advantage of market capitalization-weighted indexes of either type is that index security weights represent proportions of total market value. The primary disadvantage of value-weighted indexes is that the relative impact of a stock's return on the index increases as its price rises and decreases as its price falls. This means that stocks that are possibly overvalued are given disproportionately high weights in the index and stocks that are possibly undervalued are given disproportionately low weights. Holding a portfolio that tracks a value-weighted index is, therefore, similar to following a momentum strategy, under which the most successful stocks are given the greatest weights and poor performing stocks are underweighted.

The Standard and Poor's 500 (S&P 500) Index Composite is an example of a market capitalization-weighted index.

An index that uses **fundamental weighting** uses weights based on firm fundamentals, such as earnings, dividends, or cash flow. In contrast to market capitalization index weights, these weights are unaffected by the share prices of the index stocks (although related to them over the long term). Fundamental weights can be based on a single measure or some combination of fundamental measures.

An advantage of a fundamental-weighted index is that it avoids the bias of market capitalization-weighted indexes toward the performance of the shares of overvalued firms and away from the performance of the shares of undervalued firms. A fundamental-weighted index will actually have a value tilt, overweighting firms with high value-based metrics such as book-to-market ratios or earnings yields. Note that a firm with a high earnings yield (total earnings to total market value) relative to other index firms will by construction have a higher weight in an earnings-weighted index because, among index stocks, its earnings are high relative to its market value.

#### **LOS 34.e: Calculate and analyze the value and return of an index given its weighting method.**

*CFA® Program Curriculum, Volume 4, page 200*

## Price Weighting

A price-weighted index adds the market prices of each stock in the index and divides this total by the number of stocks in the index. The divisor, however, must be adjusted for stock splits and other changes in the index portfolio to maintain the continuity of the series over time.

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

### **EXAMPLE: Price-weighted index**

Given the information for the three stocks presented in the following figure, calculate a price-weighted index return over a one-month period.

#### **Index Firm Data**

	Share Price December 31, 20X6	Share Price January 31, 20X7
Stock X	\$10	\$20
Stock Y	\$20	\$15
Stock Z	\$60	\$40

**Answer:**

The price-weighted index is  $(10 + 20 + 60) / 3 = 30$  as of December 31 and  $(20 + 15 + 40) / 3 = 25$  as of January 31. Hence, the price-weighted 1-month percentage return is:

$$\frac{25}{30} - 1 = -16.7\%$$

**EXAMPLE: Adjusting a price-weighted index for stock splits**

At the market close on day 1, Stock A has a price of \$10, Stock B has a price of \$20, and Stock C has a price of \$90. The value of a price-weighted index of these three stocks is  $(10 + 20 + 90) / 3 = 40$  at the close of trading. If Stock C splits 2-for-1, effective on day 2, what is the new denominator for the index?

**Answer:**

The effect of the split on the price of Stock C, in the absence of any change from the price at the end of day 1, would be to reduce it to  $\$90 / 2 = \$45$ . The index denominator will be adjusted so that the index value would remain at 40 if there were no changes in the stock prices other than to adjust for the split. The new denominator,  $d$ , must satisfy  $(10 + 20 + 45) / d = 40$  and equals 1.875.

The returns on a price-weighted index could be matched by purchasing an equal number of shares of each stock represented in the index. Because the index is price weighted, a percentage change in a high-priced stock will have a relatively greater effect on the index than the same percentage change in a low-priced stock.

## Market Capitalization Weighting

A market capitalization-weighted index is calculated by summing the total value (current stock price multiplied by the number of shares outstanding) of all the stocks in the index. This sum is then divided by a similar sum calculated during the selected base period. The ratio is then multiplied by the index's base value (typically 100).

For example, if the total market values of the index portfolio on December 31 and January 31 are \$80 million and \$95 million, respectively, the index value at the end of January is:

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

$$\text{current index value} = \frac{\$95 \text{ million}}{\$80 \text{ million}} \times 100 = 118.75$$

Thus, the market capitalization-weighted index percentage return is:

$$(118.75 / 100) - 1 = 18.75\%$$

The following example of price-weighting versus market value-weighting shows how these two indexes are calculated and how they differ.

## EXAMPLE: Price-weighted vs. market capitalization-weighted indexes

Consider the three firms described in the following table. Compare the effects on a price-weighted index and a market capitalization-weighted index if Stock A doubles in price or if Stock C doubles in price. Assume the period shown in the table is the base period for the market capitalization-weighted index and that its base value is 100.

### Index Firm Data

Company	Number of Shares Outstanding (000s)	Stock Price	Capitalization (000s)
A	100	\$100	\$10,000
B	1,000	\$10	\$10,000
C	20,000	\$1	\$20,000

### Answer:

The price-weighted index equals:

$$\frac{100 + 10 + 1}{3} = 37$$

If Stock A doubles in price to \$200, the price-weighted index value is:

$$\frac{200 + 10 + 1}{3} = 70.33$$

If Stock C doubles in price to \$2, the price-weighted index value is:

$$\frac{100 + 10 + 2}{3} = 37.33$$

If Stock A doubles in value, the index goes up 33.33 points, while if Stock C doubles in value, the index only goes up 0.33 points. Changes in the value of the firm with the highest stock price have a disproportionately large influence on a price-weighted index.

For a market capitalization-weighted index, the base period market capitalization is  $(100,000 \times \$100) + (1,000,000 \times \$10) + (20,000,000 \times \$1) = \$40,000,000$ .

If Stock A doubles in price to \$200, the index goes to:

$$\frac{100,000 \times \$200 + 1,000,000 \times \$10 + 20,000,000 \times \$1}{\$40,000,000} \times 100 = 125$$

If Stock C doubles in price to \$2, the index goes to:

$$\frac{100,000 \times \$100 + 1,000,000 \times \$10 + 20,000,000 \times \$2}{\$40,000,000} \times 100 = 150$$

In the market capitalization-weighted index, the returns on Stock C have the greatest influence on the index return because Stock C's market capitalization is larger than that of Stock A or Stock B.

## Equal Weighting

An equal-weighted index places an equal weight on the returns of all index stocks, regardless of their prices or market values. A \$2 change in the price of a \$20 stock has the same effect on the index as a \$30 change in the price of a \$300 stock regardless of the

size of the company. The return of an equal-weighted index over a given period is often calculated as a simple average of the returns of the index stocks.

#### EXAMPLE: Equally weighted index

Calculate the equal-weighted index value for the three stocks described in the following table, assuming an initial index value of 131.

#### Equal-Weighted Index Data

Stock	Initial Price	Current Price	Price Change
A	\$12	\$15	+25.0%
B	\$52	\$48	-7.7%
C	\$38	\$45	+18.4%

Answer:

$$\text{change in index} = \frac{25\% - 7.7\% + 18.4\%}{3} = 11.9\%$$

$$\text{new index value} = 131(1 + 0.119) = 146.59$$

Note that for a total return index, period returns would include any dividends paid over the period.



#### MODULE QUIZ 34.1

To best evaluate your performance, enter your quiz answers online.

1. Choices that must be made when constructing a security market index *least likely* include whether to:
  - A. use a nominal or interval scale.
  - B. measure the performance of an entire market or market segment.
  - C. weight the securities equally or by some firm-specific characteristic.

Use the information in the following table to answer Questions 2 through 4.

	As of January 1		As of December 31	
	Share Price	Number of Shares Outstanding (thousands)	Share Price	Number of Shares Outstanding (thousands)
Stock A	\$22	1,500	\$28	1,500
Stock B	\$40	10,000	\$50	10,000
Stock C	\$34	3,000	\$30	3,000

2. The 1-year return on a price-weighted index of these three stocks is *closest* to:
  - A. 12.5%.
  - B. 13.5%.
  - C. 18.0%.
3. The 1-year return on an equal-weighted index of these three stocks is *closest* to:
  - A. 12.0%.
  - B. 12.5%.
  - C. 13.5%.
4. The 1-year return on a market capitalization-weighted index of these stocks is *closest* to:

- A. 12.5%.
  - B. 13.5%.
  - C. 18.0%.
5. Market float of a stock is *best* described as its:
- A. total outstanding shares.
  - B. shares that are available to domestic investors.
  - C. outstanding shares, excluding those held by controlling shareholders.
6. For which of the following indexes will rebalancing occur *most* frequently?
- A. A price-weighted index.
  - B. An equal-weighted index.
  - C. A market capitalization-weighted index.

## MODULE 34.2: USES AND TYPES OF INDEXES

### LOS 34.f: Describe rebalancing and reconstitution of an index.



Video covering  
this content is  
available online.

*CFA® Program Curriculum, Volume 4, page 209*

**Rebalancing** refers to adjusting the weights of securities in a portfolio to their target weights after price changes have affected the weights. For index calculations, rebalancing to target weights on the index securities is done on a periodic basis, usually quarterly. Because the weights in price- and value-weighted indexes (portfolios) are adjusted to their correct values by changes in prices, rebalancing is an issue primarily for equal-weighted indexes. As noted previously, the weights on security returns in an (initially) equal-weighted portfolio are not equal as securities prices change over time. Therefore, rebalancing the portfolio at the end of each period used to calculate index returns is necessary for the portfolio return to match the index return.

**Index reconstitution** refers to periodically adding and deleting securities that make up an index. Securities are deleted if they no longer meet the index criteria and are replaced by other securities that do. Indexes are reconstituted to reflect corporate events such as bankruptcy or delisting of index firms and are at the subjective judgment of a committee.

When a security is added to an index, its price tends to rise as portfolio managers seeking to track that index in a portfolio buy the security. The prices of deleted securities tend to fall as portfolio managers sell them. Note that additions and deletions also require that the weights on the returns of other index stocks be adjusted to conform to the desired weighting scheme.

### LOS 34.g: Describe uses of security market indexes.

*CFA® Program Curriculum, Volume 4, page 211*

Security market indexes have several uses:

- *Reflection of market sentiment.* Indexes provide a representative market return and thus reflect investor confidence. Although the Dow Jones Industrial Average is a popular index, it reflects the performance of only 30 stocks and thus may not be a good measure of sentiment with regard to the broader market.
- *Benchmark of manager performance.* An index can be used to evaluate the performance of an active manager. Because portfolio performance depends to a large degree on its chosen style, the benchmark should be consistent with the

manager's investment approach and style to assess the manager's skill accurately. The index stocks should be those that the manager will actually choose from. For example, a value manager should be compared against a value index, not a broad market index, because portfolio securities will be selected from among value stocks.

- *Measure of market return and risk.* In asset allocation, estimates of the expected return and standard deviation of returns for various asset classes are based on historical returns for an index of securities representing that asset class.
- *Measure of beta and risk-adjusted return.* The use of the capital asset pricing model (CAPM) to determine a stock's expected return requires an estimate of its beta and the return on the market. Index portfolio returns are used as a proxy for the returns on the market portfolio, both in estimating a stock's beta, and then again in calculating its expected return based on its systematic (beta) risk. Expected returns can then be compared to actual stock returns to determine systematic risk-adjusted returns.
- *Model portfolio for index funds.* Investors who wish to invest passively can invest in an index fund, which seeks to replicate the performance of a market index. There are index mutual funds and index exchange-traded funds, as well as private portfolios that are structured to match the return of an index.

### **LOS 34.h: Describe types of equity indexes.**

*CFA® Program Curriculum, Volume 4, page 213*

Investors can use a variety of equity market indexes. These equity indexes can be classified as follows:

- *Broad market index.* Provides a measure of a market's overall performance and usually contains more than 90% of the market's total value. For example, the Wilshire 5000 Index contains more than 6,000 equity securities and is, therefore, a good representation of the overall performance of the U.S. equity market.
- *Multi-market index.* Typically constructed from the indexes of markets in several countries and is used to measure the equity returns of a geographic region (e.g., Latin America indexes), markets based on their stage of economic development (e.g., emerging markets indexes), or the entire world (e.g., MSCI World Index).
- *Multi-market index with fundamental weighting.* Uses market capitalization-weighting for the country indexes but then weights the country index returns in the global index by a fundamental factor (e.g., GDP). This prevents a country with previously high stock returns from being overweighted in a multi-market index.
- *Sector index.* Measures the returns for an industry sector such as health care, financial, or consumer goods firms. Investors can use these indexes in cyclical analysis because some sectors do better than others in various phases of the business cycle. Sector indexes can be for a particular country or global. These indexes are used to evaluate portfolio managers and to construct index portfolios.
- *Style index.* Measures the returns to market capitalization and value or growth strategies. Some indexes reflect a combination of the two (e.g., small-cap value fund). Because there is no widely accepted definition of large-cap, mid-cap, or small-cap stocks, different indexes use different definitions. These definitions may be specified values of market capitalization or relative definitions, such as defining

large-cap stocks as the largest 500 firms in a given market. In constructing value stock and growth stock indexes, price-to-earnings ratios or dividend yields are often used to identify value and growth stocks. Over time, stocks can migrate from one classification to another. For example, a successful small-cap company might grow to become a mid-cap or large-cap company. This causes style indexes to typically have higher turnover of constituent firms than broad market indexes.

### **LOS 34.i: Describe types of fixed-income indexes.**

*CFA® Program Curriculum, Volume 4, page 216*

Fixed-income securities vary widely with respect to their coupon rates, ratings, maturities, and embedded options such as convertibility to common stock. Consequently, a wide variety of fixed-income indexes is available. Like equity indexes, fixed-income indexes are created for various sectors, geographic regions, and levels of country economic development. They can also be constructed based on type of issuer or collateral, coupon, maturity, default risk, or inflation protection. Broad market indexes, sector indexes, style indexes, and other specialized indexes are available.

Investors should be aware of several issues with the construction of fixed-income indexes:

- *Large universe of securities.* The fixed-income security universe is much broader than the universe of stocks. Fixed-income securities are issued not just by firms, but also by governments and government agencies. Each of these entities may also issue various types of fixed-income securities. Also, unlike stocks, bonds mature and must be replaced in fixed-income indexes. As a result, turnover is high in fixed-income indexes.
- *Dealer markets and infrequent trading.* Fixed-income securities are primarily traded by dealers, so index providers must depend on dealers for recent prices. Because fixed-income securities are typically illiquid, a lack of recent trades may require index providers to estimate the value of index securities from recent prices of securities with similar characteristics.

The large number of fixed-income securities results in large differences in the number of index securities among fixed-income indexes. Illiquidity, transactions costs, and high turnover of constituent securities make it both difficult and expensive for fixed-income portfolio managers to replicate a fixed-income index.

### **LOS 34.j: Describe indexes representing alternative investments.**

*CFA® Program Curriculum, Volume 4, page 219*

Alternative assets are of interest to investors because of their potential diversification benefits. Three of the most widely held alternative assets are commodities, real estate, and hedge funds.

**Commodity indexes** represent futures contracts on commodities such as grains, livestock, metals, and energy. Examples include the Thomson Reuters/Core Commodity CRB Index (previously the Commodity Research Bureau Index) and the S&P GSCI (previously the Goldman Sachs Commodity Index).

The issues in commodity indexes relevant for investors are as follows:

- *Weighting method.* Commodity index providers use a variety of weighting schemes. Some use equal weighting, others weight commodities by their global production values, and others use fixed weights that the index provider determines. As a result, different indexes have significantly different commodity exposures and risk and return characteristics. For example, one index may have a large exposure to the prices of energy commodities while another has a large exposure to the prices of agricultural products.
- *Futures vs. actual.* Commodity indexes are based on the prices of commodity futures contracts, not the spot prices of commodities. Commodity futures contracts reflect the risk-free rate of return, changes in futures prices, and the roll yield. Furthermore, the contracts mature and must be replaced over time by other contracts. For these reasons, the return on commodity futures differs from the returns on a long position in the commodity itself.

**Real estate indexes** can be constructed using returns based on appraisals of properties, repeat property sales, or the performance of Real Estate Investment Trusts (REITs). REITs are similar to closed-end mutual funds in that they invest in properties or mortgages and then issue ownership interests in the pool of assets to investors. While real properties are quite illiquid, REIT shares trade like any common shares and many offer very good liquidity to investors. FTSE International produces a family of REIT indexes.

Hedge funds pool investor money and invest in nontraditional assets, using leverage (borrowed money or derivative contracts) and both long and short positions. Most **hedge fund indexes** equally weight the returns of the hedge funds included in the index.

Hedge funds are largely unregulated and are not required to report their performance to index providers. Consequently, some funds will report to one index but not another. The performance of different indexes can thus vary substantially.

Furthermore, it is often the case that those funds that report are the funds that have been successful, as the poorly performing funds do not want to publicize their performance. Funds that have reported in the past but have recently had poor returns may stop reporting their performance. The result is an upward bias in index returns, with hedge funds appearing to be better investments than they actually are.



## PROFESSOR'S NOTE

Commodities (including the components of return on a commodity investment), real estate, and hedge funds (including hedge fund performance biases) are discussed further in Alternative Investments.

### LOS 34.k: Compare types of security market indexes.

*CFA® Program Curriculum, Volume 4, page 213*

The following table summarizes some of the noteworthy characteristics of various global indexes. Notice from the table that most security market indexes are market capitalization-weighted and often adjusted for the float (securities actually available for purchase). The number of securities in many of these indexes can vary.

Index	Reflects	Number of Constituent Securities	Weighting Method	Notes
Dow Jones Industrial Average	Large U.S. stocks	30	Price	Stocks are chosen by Wall Street Journal editors
Nikkei Stock Average	Large Japanese stocks	225	Modified price	Price weighted and adjusted for high-priced shares
TOPIX	All stocks on the Tokyo Stock Exchange First Section	Variable	Market capitalization, adjusted for float	Has a large number of small illiquid stocks making it hard to replicate. Contains 93% of the market cap of Japanese equities
MSCI All Country World Index	Stocks in 23 developed and 24 emerging markets	Variable	Market capitalization, adjusted for float	Available in both U.S. dollars and local currency
S&P Developed Ex-U.S. BMI Energy Sector Index	Global energy stocks outside the United States	Variable	Market capitalization, adjusted for float	Is the model portfolio for an ETF
Barclays Capital Global Aggregate Bond Index	Global investment-grade bonds	Variable	Market capitalization	Formerly compiled by Lehman Brothers
Markit iBoxx Euro High-Yield Bond Indexes	Below investment-grade bonds	Variable	Market capitalization	Represents liquid portion of market and rebalanced monthly
FTSE EPRA/NAREIT Global Real Estate Index	Global real estate	Variable	Market capitalization, adjusted for float	Represents publicly traded REITs
HFRX Global Hedge Fund Index	Global hedge funds	Variable	Asset weighted	Contains a variety of hedge fund strategies and is weighted based on the amount invested in each hedge fund
HFRX Equal Weighted Strategies EUR Index	Global hedge funds	Variable	Equal weighted	Contains same strategy funds as HFRX Global Hedge Fund Index and is equal weighted
Morningstar Style Indexes	U.S. stocks grouped by value/growth and market cap	Variable	Market capitalization, adjusted for float	Nine categories classified by combinations of three cap categories and three value/growth categories



## MODULE QUIZ 34.2

To best evaluate your performance, enter your quiz answers online.

- The publisher of an index that includes 50 corporate bonds removes from the index three bonds that are nearing maturity and one whose issuer has defaulted and selects four actively traded bonds to replace them in the index. This bond index is said to have been:
  - redefined.
  - rebalanced.
  - reconstituted.
- Which of the following would *most likely* represent an inappropriate use of an index?
  - As a reflection of market sentiment.
  - Comparing a small-cap manager against a broad market.
  - Using the CAPM to determine the expected return and beta.
- An index of 200 mid-cap growth stocks is *best* described as:

- A. a style index.
  - B. a sector index.
  - C. a broad market index.
4. Which of the following is *least accurate* regarding fixed-income indexes?
    - A. Replicating the return on a fixed-income security index is difficult for investors.
    - B. There is a great deal of heterogeneity in the composition of fixed-income security indexes.
    - C. Due to the large universe of fixed-income security issues, data for fixed-income securities are relatively easy to obtain.
  5. Which of the following indexes of alternative investments is *most likely* to be calculated from derivatives prices?
    - A. Real estate index.
    - B. Commodity index.
    - C. Hedge fund index.
  6. Most of the widely used global security indexes are:
    - A. price weighted.
    - B. equal weighted.
    - C. market capitalization weighted.

## KEY CONCEPTS

### LOS 34.a

A security market index represents the performance of an asset class, security market, or segment of a market. The performance of the market or segment over a period of time is represented by the percentage change in (i.e., the return on) the value of the index.

### LOS 34.b

A price index uses only the prices of the constituent securities in the return calculation. The rate of return is called a price return.

A total return index uses both the price of and the income from the index securities in the return calculation.

### LOS 34.c

Decisions that index providers must make when constructing and managing indexes include:

- The target market the index will measure.
- Which securities from the target market to include.
- The appropriate weighting method.
- How frequently to rebalance the index to its target weights.
- How frequently to re-examine the selection and weighting of securities.

### LOS 34.d

A price-weighted index is the arithmetic mean of the prices of the index securities. The divisor, which is initially equal to the number of securities in the index, must be adjusted for stock splits and changes in the composition of the index over time.

An equal-weighted index assigns the same weight to each of its constituent securities.

A market capitalization-weighted index gives each constituent security a weight equal to its proportion of the total market value of all securities in the index. Market

capitalization can be adjusted for a security's market float or free float to reflect the fact that not all outstanding shares are available for purchase.

A fundamental-weighted index uses weights that are independent of security prices, such as company earnings, revenue, assets, or cash flow.

### LOS 34.e

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

$$\text{Market capitalization-weighted index} =$$

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

$$\begin{aligned}\text{Equal-weighted index} &= (1 + \text{average percentage change in index stocks}) \\ &\quad \times \text{initial index value}\end{aligned}$$

### LOS 34.f

Index providers periodically rebalance the weights of the constituent securities. This is most important for equal-weighted indexes.

Reconstitution refers to changing the securities that are included in an index. This is necessary when securities mature or when they no longer have the required characteristics to be included.

### LOS 34.g

Indexes are used for the following purposes:

- Reflection of market sentiment.
- Benchmark of manager performance.
- Measure of market return.
- Measure of beta and excess return.
- Model portfolio for index funds.

### LOS 34.h

Broad market equity indexes represent the majority of stocks in a market.

Multi-market equity indexes contain the indexes of several countries. Multi-market equity indexes with fundamental weighting use market capitalization weighting for the securities within a country's market but then weight the countries within the global index by a fundamental factor.

Sector indexes measure the returns for a sector (e.g., health care) and are useful because some sectors do better than others in certain business cycle phases. These indexes are used to evaluate portfolio managers and as models for sector investment funds.

Style indexes measure the returns to market capitalization and value or growth strategies. Stocks tend to migrate among classifications, which causes style indexes to have higher constituent turnover than broad market indexes.

### LOS 34.i

Fixed-income indexes can be classified by issuer, collateral, coupon, maturity, credit risk (e.g., investment grade versus high-yield), and inflation protection. They can be delineated as broad market, sector, style, or other specialized indexes. Indexes exist for various sectors, regions, and levels of development.

The fixed-income security universe is much broader than the equity universe, and fixed-income indexes have higher turnover. Index providers must depend on dealers for fixed-income security prices, and the securities are often illiquid. Fixed-income security indexes vary widely in their numbers of constituent securities and can be difficult and expensive to replicate.

#### LOS 34.j

Indexes have been developed to represent markets for alternative assets such as commodities, real estate, and hedge funds.

Issues in creating commodity indexes include the weighting method (different indexes can have vastly different commodity weights and resulting risk and return) and the fact that commodity indexes are based on the performance of commodity futures contracts, not the actual commodities, which can result in different performance for a commodity index versus the actual commodity.

Real estate indexes include appraisal indexes, repeat property sales indexes, and indexes of real estate investment trusts.

Because hedge funds report their performance to index providers voluntarily, the performance of different hedge fund indexes can vary substantially and index returns have an upward bias.

#### LOS 34.k

Security market indexes available from commercial providers represent a variety of asset classes and reflect target markets that can be classified by:

- Geographic location, such as country, regional, or global indexes.
- Sector or industry, such as indexes of energy producers.
- Level of economic development, such as emerging market indexes.
- Fundamental factors, such as indexes of value stocks or growth stocks.

## ANSWER KEY FOR MODULE QUIZZES

### Module Quiz 34.1

1. A To be useful, a security market index must have a numerical value. Selecting the target market and determining the weighting method are among the choices that must be made when constructing a securities index. (LOS 34.a, 34.c)

2. A  $\frac{22 + 40 + 34}{3} = 32, \frac{28 + 50 + 30}{3} = 36, \frac{36}{32} - 1 = 0.125 = 12.5\%$   
(LOS 34.b, 34.d, 34.e)

3. C  $\left[ \left( \frac{28}{22} - 1 \right) + \left( \frac{50}{40} - 1 \right) + \left( \frac{30}{34} - 1 \right) \right] \left( \frac{1}{3} \right) = 0.135 = 13.5\%$   
(LOS 34.b, 34.d, 34.e)

4. C Total portfolio value January 1:

$$22(1,500) + 40(10,000) + 34(3,000) = \$535,000$$

Total portfolio value December 31:

$$28(1,500) + 50(10,000) + 30(3,000) = \$632,000$$

$$\frac{632}{535} - 1 = 0.1813 \approx 18\%$$

From a base value of 100, the December 31 index value would be

$$\frac{632}{535} \times 100 = 118.13.$$

(LOS 34.b, 34.d, 34.e)

5. **C** Market float represents shares available to the investing public and excludes shares held by controlling shareholders. Free float is a narrower measure that also excludes shares that are not available to foreign investors. (LOS 34.d)
6. **B** An equal-weighted index will be rebalanced most frequently because as stock prices change, their representation in the index needs to be adjusted. Price-weighted and market capitalization-weighted indexes do not usually need rebalancing. (LOS 34.d)

## Module Quiz 34.2

1. **C** Changing the constituent securities of an index is referred to as reconstituting the index. Rebalancing refers to adjusting the index weights to their target levels. (LOS 34.f)
2. **B** Comparing a small-cap manager against a broad market would be an inappropriate use of an index. A benchmark should be consistent with the manager's investment approach and style. A manager's performance will depend to a large degree on its chosen style. (LOS 34.g)
3. **A** An index for mid-cap growth stocks is best described as a style index. Sector indexes typically measure returns for a specific industry or sector of the economy (e.g., utilities or financial services firms). (LOS 34.h)
4. **C** Fixed-income securities are largely traded by dealers and trade infrequently. Data are therefore difficult to obtain. (LOS 34.i)
5. **B** Commodity indexes are typically calculated from prices of commodity futures contracts. (LOS 34.j)
6. **C** Most global security indexes are market capitalization-weighted with a float adjustment to reflect the amount of shares available to investors. (LOS 34.k)

The following is a review of the Equity Investments (1) principles designed to address the learning outcome statements set forth by CFA Institute. Cross-Reference to CFA Institute Assigned Reading #35.

# READING 35: MARKET EFFICIENCY

Study Session 11

## EXAM FOCUS

The informational efficiency of market prices is a very important concept to a portfolio manager. When markets are truly efficient, careful analysis and security selection using publicly available information will not lead to positive risk-adjusted returns on average. For the exam, you must understand the three forms of market efficiency and know the evidence from tests of each form of market efficiency. Focus your attention on the implications of this evidence about the value of technical and fundamental analysis and about the role of portfolio managers in the investment process. Finally, be familiar with market anomalies listed and the perspective provided by behavioral finance.

## MODULE 35.1: MARKET EFFICIENCY

**LOS 35.a: Describe market efficiency and related concepts, including their importance to investment practitioners.**



*CFA® Program Curriculum, Volume 4, page 237*

Video covering  
this content is  
available online.

An **informationally efficient capital market** is one in which the current price of a security fully, quickly, and rationally reflects all available information about that security. This is really a statistical concept. An academic might say, "Given all available information, current securities prices are unbiased estimates of their values, so that the expected return on any security is just the equilibrium return necessary to compensate investors for the risk (uncertainty) regarding its future cash flows." This concept is often put more intuitively as, "You can't beat the market."

In a perfectly efficient market, investors should use a **passive investment** strategy (i.e., buying a broad market index of stocks and holding it) because **active investment** strategies will underperform due to transactions costs and management fees. However, to the extent that market prices are inefficient, active investment strategies can generate positive risk-adjusted returns.

One method of measuring a market's efficiency is to determine the time it takes for trading activity to cause information to be reflected in security prices (i.e., the lag from the time information is disseminated to the time prices reflect the value implications of that information). In some very efficient markets, such as foreign currency markets, this lag can be as short as a minute. If there is a significant lag, informed traders can use the information to potentially generate positive risk-adjusted returns.

Note that market prices should not be affected by the release of information that is well anticipated. Only new information (information that is unexpected and changes expectations) should move prices. The announcement that a firm's earnings were up 45% over the last quarter may be good news if the expected increase was 20%. On the other

hand, this may be bad news if a 70% increase was anticipated or no news at all if market participants correctly anticipated quarterly earnings.

### **LOS 35.b: Contrast market value and intrinsic value.**

*CFA® Program Curriculum, Volume 4, page 237*

The **market value** of an asset is its current price. The **intrinsic value** or **fundamental value** of an asset is the value that a rational investor with full knowledge about the asset's characteristics would willingly pay. For example, a bond investor would fully know and understand a bond's coupon, maturity, default risk, liquidity, and other characteristics and would use these to estimate its intrinsic value.

In markets that are highly efficient, investors can typically expect market values to reflect intrinsic values. If markets are not completely efficient, active managers will buy assets for which they think intrinsic values are greater than market values and sell assets for which they think intrinsic values are less than market values.

Intrinsic values cannot be known with certainty and are estimated by investors who will have differing estimates of an asset's intrinsic value. The more complex an asset, the more difficult it is to estimate its intrinsic value. Furthermore, intrinsic value is constantly changing as new (unexpected) information becomes available.

### **LOS 35.c: Explain factors that affect a market's efficiency.**

*CFA® Program Curriculum, Volume 4, page 240*

Markets are generally neither perfectly efficient nor completely inefficient. The degree of informational efficiency varies across countries, time, and market types. The following factors affect the degree of market efficiency.

**Number of market participants.** The larger the number of investors, analysts, and traders who follow an asset market, the more efficient the market. The number of participants can vary through time and across countries. For example, some countries prevent foreigners from trading in their markets, reducing market efficiency.

**Availability of information.** The more information is available to investors, the more efficient the market. In large, developed markets such as the New York Stock Exchange, information is plentiful and markets are quite efficient. In emerging markets, the availability of information is lower, and consequently, market prices are relatively less efficient. Some assets, such as bonds, currencies, swaps, forwards, mortgages, and money market securities that trade in over-the-counter (OTC) markets, may have less available information.

Access to information should not favor one party over another. Therefore, regulations such as the U.S. Securities and Exchange Commission's Regulation FD (fair disclosure) require that firms disclose the same information to the public that they disclose to stock analysts. Traders with material inside information about a firm are prohibited from trading on that information.

**Impediments to trading.** **Arbitrage** refers to buying an asset in one market and simultaneously selling it at a higher price in another market. This buying and selling of assets will continue until the prices in the two markets are equal. Impediments to arbitrage, such as high transactions costs or lack of information, will limit arbitrage activity and allow some price inefficiencies (i.e., mispricing of assets) to persist.

Short selling improves market efficiency. The sales pressure from short selling prevents assets from becoming overvalued. Restrictions on short selling, such as an inability to borrow stock cheaply, can reduce market efficiency.

**Transaction and information costs.** To the extent that the costs of information, analysis, and trading are greater than the potential profit from trading misvalued securities, market prices will be inefficient. It is generally accepted that markets are efficient if, after deducting costs, there are no risk-adjusted returns to be made from trading based on publicly available information.

#### **LOS 35.d: Contrast weak-form, semi-strong-form, and strong-form market efficiency.**

*CFA® Program Curriculum, Volume 4, page 244*

Professor Eugene Fama originally developed the concept of market efficiency and identified three forms of market efficiency. The difference among them is that each is based on a different set of information.

1. **Weak-form market efficiency.** The weak form of the efficient markets hypothesis (EMH) states that current security prices *fully reflect all currently available security market data*. Thus, past price and volume (market) information will have no predictive power about the future direction of security prices because price changes will be independent from one period to the next. In a weak-form efficient market, an investor cannot achieve positive risk-adjusted returns on average by using technical analysis.
2. **Semi-strong-form market efficiency.** The semi-strong form of the EMH holds that security prices rapidly adjust without bias to the arrival of all new public information. As such, current security prices *fully reflect all publicly available information*. The semi-strong form says security prices include all past security market information and nonmarket information available to the public. The implication is that an investor cannot achieve positive risk-adjusted returns on average by using fundamental analysis.
3. **Strong-form market efficiency.** The strong form of the EMH states that security prices *fully reflect all information from both public and private sources*. The strong form includes all types of information: past security market information, public, and private (inside) information. This means that no group of investors has monopolistic access to information relevant to the formation of prices, and none should be able to consistently achieve positive abnormal returns.

Given the prohibition on insider trading in most markets, it would be unrealistic to expect markets to reflect all private information. The evidence supports the view that markets are not strong-form efficient.



#### **PROFESSOR'S NOTE**

As a base level knowledge of the EMH, you should know that the weak form is based on past security market information; the semi-strong form is based on all public information (including market information); and the strong form is based on both public information and inside or private information.

#### **LOS 35.e: Explain the implications of each form of market efficiency for fundamental analysis, technical analysis, and the choice between active and passive portfolio management.**

**Abnormal profit (or risk-adjusted returns)** calculations are often used to test market efficiency. To calculate abnormal profits, the expected return for a trading strategy is calculated given its risk, using a model of expected returns such as the CAPM or a multifactor model. If returns are, on average, greater than equilibrium expected returns, we can reject the hypothesis of efficient prices with respect to the information on which the strategy is based.

The results of tests of the various forms of market efficiency have implications about the value of technical analysis, fundamental analysis, and portfolio management in general.

**Technical analysis** seeks to earn positive risk-adjusted returns by using historical price and volume (trading) data. Tests of weak-form market efficiency have examined whether technical analysis produces abnormal profits. Generally, the evidence indicates that technical analysis does not produce abnormal profits, so we cannot reject the hypothesis that markets are weak-form efficient. However, technical analysis has been shown to have success in emerging markets, and there are so many possible technical analysis trading strategies that they cannot all be tested. As noted previously, the success of any technical analysis strategy should be evaluated considering the costs of information, analysis, and trading.

**Fundamental analysis** is based on public information such as earnings, dividends, and various accounting ratios and estimates. The semi-strong form of market efficiency suggests that all public information is already reflected in stock prices. As a result, investors should not be able to earn abnormal profits by trading on this information.

One method of testing the semi-strong form is an **event study**. Event studies examine abnormal returns before and after the release of new information that affects a firm's intrinsic value, such as earnings announcements or dividend changes. The null hypothesis is that investors should not be able to earn positive abnormal returns on average by trading based on firm events because prices will rapidly reflect news about a firm's prospects. The evidence in developed markets indicates that markets are generally semi-strong form efficient. However, there is evidence of semi-strong form inefficiency in some emerging markets.

The evidence that developed markets are generally semi-strong form efficient raises questions about the usefulness of fundamental analysis. It must be fundamental analysis, however, that results in informationally efficient market prices. Fundamental analysis can also be of use to those exceptionally skilled investors who can generate abnormal profits through its use and to those who act rapidly before new information is reflected in prices.



### PROFESSOR'S NOTE

Markets can be weak-form efficient without being semi-strong or strong-form efficient. If markets are semi-strong form efficient, they must be weak-form efficient because public information includes market information, but semi-strong form efficient markets need not be strong-form efficient.

## Active vs. Passive Portfolio Management

If markets are semi-strong form efficient, investors should invest passively (i.e., invest in an index portfolio that replicates the returns on a market index). Indeed, the evidence

shows that most mutual fund managers cannot outperform a passive index strategy over time.

If so, what is the role of a portfolio manager? Even if markets are efficient, portfolio managers can add value by establishing and implementing portfolio risk and return objectives and by assisting clients with portfolio diversification, asset allocation, and tax management.

### **LOS 35.f: Describe market anomalies.**

*CFA® Program Curriculum, Volume 4, page 250*

An anomaly is something that deviates from the common rule. Tests of the EMH are frequently called *anomaly studies*, so in the efficient markets literature, a **market anomaly** is something that would lead us to reject the hypothesis of market efficiency.

Just by chance, some variables will be related to abnormal returns over a given period, although in fact these relationships are unlikely to persist over time. Thus, analysts using historical data can find patterns in security returns that appear to violate market efficiency but are unlikely to recur in the future. If the analyst uses a 5% significance level and examines the relationship between stock returns and 40 variables, two of the variables are expected to show a statistically significant relationship with stock returns by random chance. Recall that the significance level of a hypothesis test is the probability that the null hypothesis (efficiency here) will be rejected purely by chance, even when it is true. Investigating data until a statistically significant relation is found is referred to as **data mining** or **data snooping**. Note that 1,000 analysts, each testing different hypotheses on the same data set, could produce the same results as a single researcher who performed 1,000 hypothesis tests.

To avoid data-mining bias, analysts should first ask if there is an economic basis for the relationships they find between certain variables and stock returns and then test the discovered relationships with a large sample of data to determine if the relationships are persistent and present in various subperiods.

### *Anomalies in time-series data*

**Calendar anomalies.** The **January effect** or **turn-of-the-year effect** is the finding that during the first five days of January, stock returns, especially for small firms, are significantly higher than they are the rest of the year. In an efficient market, traders would exploit this profit opportunity in January, and in so doing, eliminate it.

Possible explanations for the January effect are **tax-loss selling**, as investors sell losing positions in December to realize losses for tax purposes and then repurchase stocks in January, pushing their prices up, and **window dressing**, as portfolio managers sell risky stocks in December to remove them from their year-end statements and repurchase them in January. Evidence indicates that each of these explains only a portion of the January effect. However, after adjustments are made for risk, the January effect does not appear to persist over time.

Other calendar anomalies that were found at one time but no longer appear to persist are the *turn-of-the-month effect* (stock returns are higher in the days surrounding month end), the *day-of-the-week effect* (average Monday returns are negative), the *weekend effect* (positive Friday returns are followed by negative Monday returns), and the *holiday effect* (pre-holiday returns are higher).

**Overreaction and momentum anomalies.** The **overreaction effect** refers to the finding that firms with poor stock returns over the previous three or five years (losers) have better subsequent returns than firms that had high stock returns over the prior period. This pattern has been attributed to investor overreaction to both unexpected good news and unexpected bad news. This pattern is also present for bonds and in some international markets. **Momentum effects** have also been found where high short-term returns are followed by continued high returns. This pattern is present in some international markets as well.

Both the overreaction and momentum effects violate the weak form of market efficiency because they provide evidence of a profitable strategy based only on market data. Some researchers argue that the evidence of overreaction to new information is due to the nature of the statistical tests used and that evidence of momentum effects in securities prices reflects rational investor behavior.

### *Anomalies in cross-sectional data*

The **size effect** refers to initial findings that small-cap stocks outperform large-cap stocks. This effect could not be confirmed in later studies, suggesting that either investors had traded on, and thereby eliminated, this anomaly or that the initial finding was simply a random result for the time period examined.

The **value effect** refers to the finding that **value stocks** [those with lower price-to-earnings (P/E), lower market-to-book (M/B), and higher dividend yields] have outperformed **growth stocks** (those with higher P/E, higher M/B, and lower dividend yields). This violates the semi-strong form of market efficiency because the information necessary to classify stocks as value or growth is publicly available. However, some researchers attribute the value effect to greater risk of value stocks that is not captured in the risk adjustment procedure used in the studies.

### *Other anomalies*

**Closed-end investment funds.** The shares of **closed-end investment funds** trade at prices that sometimes deviate from the **net asset value** (NAV) of the fund shares, often trading at large discounts to NAV. Such large discounts are an anomaly because, by arbitrage, the value of the pool of assets should be the same as the market price for closed-end shares. Various explanations have been put forth to explain this anomaly, including management fees, taxes on future capital gains, and share illiquidity. None of these explanations fully explains the pricing discrepancy. However, transactions costs would eliminate any profits from exploiting the unexplained portion of closed-end fund discounts.

**Earnings announcements.** An **earnings surprise** is that portion of announced earnings that was not expected by the market. Positive earnings surprises (earnings higher than expected) precede periods of positive risk-adjusted post-announcement stock returns, and negative surprises lead to predictable negative risk-adjusted returns. The anomaly is that the adjustment process does not occur entirely on the announcement day. Investors could exploit this anomaly by buying positive earnings surprise firms and selling negative earnings surprise firms. Some researchers argue that evidence of predictable abnormal returns after earnings surprises is a result of estimating risk-adjusted returns incorrectly in the tests and that transactions costs would eliminate any abnormal profits from attempting to exploit this returns anomaly.

**Initial public offerings.** IPOs are typically underpriced, with the offer price below the market price once trading begins. However, the long-term performance of IPO shares as a group is below average. This suggests that investors overreact, in that they are too optimistic about a firm's prospects on the offer day. Some believe this is not an anomaly, but rather a result of the statistical methodologies used to estimate abnormal returns.



## PROFESSOR'S NOTE

The initial underpricing of IPOs is also discussed in the topic review of Market Organization and Structure.

**Economic fundamentals.** Research has found that stock returns are related to known economic fundamentals such as dividend yields, stock volatility, and interest rates. However, we would expect stock returns to be related to economic fundamentals in efficient markets. The relationship between stock returns and dividend yields is also not consistent over all time periods.

### *Implications for investors*

The majority of the evidence suggests that reported anomalies are not violations of market efficiency but are due to the methodologies used in the tests of market efficiency. Furthermore, both underreaction and overreaction have been found in the markets, meaning that prices are efficient on average. Other explanations for the evidence of anomalies are that they are transient relations, too small to profit from, or simply reflect returns to risk that the researchers have failed to account for.

The bottom line for investors is that portfolio management based on previously identified anomalies will likely be unprofitable. Investment management based solely on anomalies has no sound economic basis.

### **LOS 35.g: Describe behavioral finance and its potential relevance to understanding market anomalies.**

*CFA® Program Curriculum, Volume 4, page 257*

**Behavioral finance** examines the actual decision-making processes of investors. Many observers have concluded that investors are not the rational utility-maximizing decision makers with complete information that traditional finance assumes they are. Investors appear to exhibit bias in their decision making, base decisions on the actions of others, and not evaluate risk in the way traditional models assume they do.

Various types of investor irrationality have been proposed as explanations for reported pricing anomalies. Whether widespread investor irrationality is the underlying cause of reported returns anomalies is an open question. Market efficiency does not require an assumption that every investor acts rationally in accordance with traditional finance theory. Semi-strong form market efficiency requires that investors cannot earn positive abnormal returns on average (beat the market) using public information. The evidence on market efficiency certainly suggests that this is the case. Evidence that some investors exhibit bias, or other deviations from perfect rationality, in their investment decision making does not necessarily mean that market prices themselves are irrational, at least not in ways that lead to violations of market efficiency.

Observed investor behaviors and biases that are considered evidence of irrational behavior include:

- **Loss aversion**, which refers to the tendency of investors to be more risk averse when faced with potential losses than they are when faced with potential gains. Put another way, investors dislike a loss more than they like a gain of an equal amount.
- **Investor overconfidence**, which is a tendency of investors to overestimate their abilities to analyze security information and identify differences between securities' market prices and intrinsic values.
- **Herding**, which is a tendency of investors to act in concert on the same side of the market, acting not on private analysis, but mimicking the investment actions of other investors.

An **information cascade** results when investors mimic the decisions of others. The idea is that uninformed or less-informed traders watch the actions of informed traders and follow their investment actions. If those who act first are more knowledgeable investors, others following their actions may, in fact, be part of the process of incorporating new information into securities prices and actually move market prices toward their intrinsic values, improving informational efficiency.

Behavioral finance can explain how securities' market prices can deviate from rational prices and be biased estimates of intrinsic value. If investor rationality is viewed as a prerequisite for market efficiency, then markets are not efficient. If market efficiency only requires that investors cannot consistently earn abnormal risk-adjusted returns, then research supports the belief that markets are efficient.



## MODULE QUIZ 35.1

*To best evaluate your performance, enter your quiz answers online.*

1. In an informationally efficient capital market:
  - active managers can generate abnormal profits.
  - security prices quickly reflect new information.
  - investors react to all information releases rapidly.
2. The intrinsic value of an asset:
  - changes through time as new information is released.
  - is the price at which the asset can be bought or sold at a given point in time.
  - can be easily determined with a financial calculator, given investor risk preferences.
3. In terms of market efficiency, short selling *most likely*:
  - leads to excess volatility, which reduces market efficiency.
  - promotes market efficiency by making assets less likely to become overvalued.
  - has little effect on market efficiency because short sellers face the risk of unlimited losses.
4. The weak-form EMH asserts that stock prices fully reflect which of the following types of information?
  - Market only.
  - Market and public.
  - Public and private.
5. Research has revealed that the performance of professional money managers tends to be:
  - equal to the performance of a passive investment strategy.
  - inferior to the performance of a passive investment strategy.
  - superior to the performance of a passive investment strategy.
6. Which of the following *best* describes the majority of the evidence regarding anomalies in stock returns?
  - Weak-form market efficiency holds, but semi-strong form efficiency does not.

- B. Neither weak-form nor semi-strong form market efficiency holds.
  - C. Reported anomalies are not violations of market efficiency but are the result of research methodologies.
7. Investors who exhibit loss aversion *most likely*:
- A. have symmetric risk preferences.
  - B. are highly risk averse.
  - C. dislike losses more than they like equal gains.

## KEY CONCEPTS

### **LOS 35.a**

In an informationally efficient capital market, security prices reflect all available information fully, quickly, and rationally. The more efficient a market is, the quicker its reaction will be to new information. Only unexpected information should elicit a response from traders.

If the market is fully efficient, active investment strategies cannot earn positive risk-adjusted returns consistently, and investors should therefore use a passive strategy.

### **LOS 35.b**

An asset's market value is the price at which it can currently be bought or sold.

An asset's intrinsic value is the price that investors with full knowledge of the asset's characteristics would place on the asset.

### **LOS 35.c**

Large numbers of market participants and greater information availability tend to make markets more efficient.

Impediments to arbitrage and short selling and high costs of trading and gathering information tend to make markets less efficient.

### **LOS 35.d**

The weak form of the efficient markets hypothesis (EMH) states that security prices fully reflect all past price and volume information.

The semi-strong form of the EMH states that security prices fully reflect all publicly available information.

The strong form of the EMH states that security prices fully reflect all public and private information.

### **LOS 35.e**

If markets are weak-form efficient, technical analysis does not consistently result in abnormal profits.

If markets are semi-strong form efficient, fundamental analysis does not consistently result in abnormal profits. However, fundamental analysis is necessary if market prices are to be semi-strong form efficient.

If markets are strong-form efficient, active investment management does not consistently result in abnormal profits.

Even if markets are strong-form efficient, portfolio managers can add value by establishing and implementing portfolio risk and return objectives and assisting with portfolio diversification, asset allocation, and tax minimization.

### LOS 35.f

A market anomaly is something that deviates from the efficient market hypothesis. Most evidence suggests anomalies are not violations of market efficiency but are due to the methodologies used in anomaly research, such as data mining or failing to adjust adequately for risk.

Anomalies that have been identified in time-series data include calendar anomalies such as the January effect (small firm stock returns are higher at the beginning of January), overreaction anomalies (stock returns subsequently reverse), and momentum anomalies (high short-term returns are followed by continued high returns).

Anomalies that have been identified in cross-sectional data include a size effect (small-cap stocks outperform large-cap stocks) and a value effect (value stocks outperform growth stocks).

Other identified anomalies involve closed-end investment funds selling at a discount to NAV, slow adjustments to earnings surprises, investor overreaction to and long-term underperformance of IPOs, and a relationship between stock returns and prior economic fundamentals.

### LOS 35.g

Behavioral finance examines whether investors behave rationally, how investor behavior affects financial markets, and how cognitive biases may result in anomalies. Behavioral finance describes investor irrationality but does not necessarily refute market efficiency as long as investors cannot consistently earn abnormal risk-adjusted returns.

## ANSWER KEY FOR MODULE QUIZ

### Module Quiz 35.1

1. **B** In informationally efficient capital markets, new information is quickly reflected in security prices. Investors react only to unexpected information releases because information releases that are expected will already be reflected in securities prices. Active strategies will underperform in an efficient market because they have greater transactions and management costs than passive strategies and will not consistently create positive abnormal returns after adjusting for risk. (LOS 35.a)
2. **A** Intrinsic value changes as new information arrives in the marketplace. It cannot be known with certainty and can only be estimated. The price of an asset at a given point in time is its market value, which will differ from its intrinsic value if markets are not fully efficient. (LOS 35.b)
3. **B** Short selling promotes market efficiency because the sales pressure from short selling can reduce the prices of assets that have become overvalued. (LOS 35.c)
4. **A** Weak-form EMH states that stock prices fully reflect all market (i.e., price and volume) information. (LOS 35.d)

5. **B** Tests indicate that mutual fund performance has been inferior to that of a passive index strategy. (LOS 35.e)
6. **C** The majority of evidence is that anomalies are not violations of market efficiency but are due to the research methodologies used. Portfolio management based on anomalies will likely be unprofitable after transactions costs are considered. (LOS 35.f)
7. **C** Loss aversion refers to the tendency of investors to be more risk averse when faced with potential losses and less risk averse when faced with potential gains. That is, they dislike losses more than they like gains of an equal amount. Their risk preferences are asymmetric. (LOS 35.g)

The following is a review of the Equity Investments (2) principles designed to address the learning outcome statements set forth by CFA Institute. Cross-Reference to CFA Institute Assigned Reading #36.

# READING 36: OVERVIEW OF EQUITY SECURITIES

Study Session 12

## EXAM FOCUS

Equities have higher returns than bonds and bills, but also higher risk. Know the characteristics of common and preferred equity types, as well as the methods of investing in foreign stock. Understand the difference between the book value of equity and market value of equity and what this difference represents.

## MODULE 36.1: TYPES OF EQUITY INVESTMENTS

### LOS 36.a: Describe characteristics of types of equity securities.

*CFA® Program Curriculum, Volume 4, page 277*

**Common shares** are the most common form of equity and represent an ownership interest. Common shareholders have a residual claim (after the claims of debtholders and preferred stockholders) on firm assets if the firm is liquidated and govern the corporation through voting rights. Firms are under no obligation to pay dividends on common equity; the firm determines what dividend will be paid periodically. Common stockholders are able to vote for the board of directors, on merger decisions, and on the selection of auditors. If they are unable to attend the annual meeting, shareholders can vote by **proxy** (having someone else vote as they direct them, on their behalf).



Video covering this content is available online.

In a **statutory voting** system, each share held is assigned one vote in the election of each member of the board of directors. Under **cumulative voting**, shareholders can allocate their votes to one or more candidates as they choose. For example, consider a situation where a shareholder has 100 shares and three directors will be elected. Under statutory voting, the shareholder can vote 100 shares for his director choice in each election. Under cumulative voting, the shareholder has 300 votes, which can be cast for a single candidate or spread across multiple candidates. The three receiving the greatest number of votes are elected. Cumulative voting makes it possible for a minority shareholder to have more proportional representation on the board. The way the math works, a holder of 30% of the firm's shares could choose three of ten directors with cumulative voting but could elect no directors under statutory voting.

**Preference shares** (or **preferred stock**) have features of both common stock and debt. As with common stock, preferred stock dividends are not a contractual obligation, and the shares usually do not mature. Like debt, preferred shares typically make fixed periodic payments to investors and do not usually have voting rights. Preference shares may be callable, giving the firm the right to repurchase the shares at a pre-specified call

price. They may also be putable, giving the shareholder the right to sell the preference shares back to the issuer at a specified price.

**Cumulative preference shares** are usually promised fixed dividends, and any dividends that are not paid must be made up before common shareholders can receive dividends. The dividends of **non-cumulative preference shares** do not accumulate over time when they are not paid, but dividends for any period must be paid before common shareholders can receive dividends.

Preferred shares have a stated par value and pay a percentage dividend based on the par value of the shares. An \$80 par value preferred with a 10% dividend pays a dividend of \$8 per year. Investors in **participating preference shares** receive extra dividends if firm profits exceed a predetermined level and may receive a value greater than the par value of the preferred stock if the firm is liquidated. **Non-participating preference shares** have a claim equal to par value in the event of liquidation and do not share in firm profits. Smaller and riskier firms whose investors may be concerned about the firm's future often issue participating preferred stock so investors can share in the upside potential of the firm.

**Convertible preference shares** can be exchanged for common stock at a conversion ratio determined when the shares are originally issued. It has the following advantages:

- The preferred dividend is higher than a common dividend.
- If the firm is profitable, the investor can share in the profits by converting his shares into common stock.
- The conversion option becomes more valuable when the common stock price increases.
- Preferred shares have less risk than common shares because the dividend is stable and they have priority over common stock in receiving dividends and in the event of liquidation of the firm.

Because of their upside potential, convertible preferred shares are often used to finance risky venture capital and private equity firms. The conversion feature compensates investors for the additional risk they take when investing in such firms.

### **LOS 36.b: Describe differences in voting rights and other ownership characteristics among different equity classes.**

*CFA® Program Curriculum, Volume 4, page 277*

A firm may have different classes of common stock (e.g., "Class A" and "Class B" shares). One class may have greater voting power and seniority if the firm's assets are liquidated. The classes may also be treated differently with respect to dividends, stock splits, and other transactions with shareholders. Information on the ownership and voting rights of different classes of equity shares can be found in the company's filings with securities regulators, such as the Securities and Exchange Commission in the United States.

### **LOS 36.c: Compare and contrast public and private equity securities.**

*CFA® Program Curriculum, Volume 4, page 282*

The discussion so far has centered on equity that is publicly traded. **Private equity** is usually issued to institutional investors via private placements. Private equity markets are smaller than public markets but are growing rapidly.

Compared to public equity, private equity has the following characteristics:

- Less liquidity because no public market for the shares exists.
- Share price is negotiated between the firm and its investors, not determined in a market.
- More limited firm financial disclosure because there is no government or exchange requirement to do so.
- Lower reporting costs because of less onerous reporting requirements.
- Potentially weaker corporate governance because of reduced reporting requirements and less public scrutiny.
- Greater ability to focus on long-term prospects because there is no public pressure for short-term results.
- Potentially greater return for investors once the firm goes public.

The three main types of private equity investments are venture capital, leveraged buyouts, and private investments in public equity.

**Venture capital** refers to the capital provided to firms early in their life cycles to fund their development and growth. Venture capital financing at various stages of a firm's development is referred to as *seed* or *start-up*, *early stage*, or *mezzanine* financing. Investors can be family, friends, wealthy individuals, or private equity funds. Venture capital investments are illiquid and investors often have to commit funds for three to ten years before they can cash out (exit) their investment. Investors hope to profit when they can sell their shares after (or as part of) an initial public offering or to an established firm.

In a **leveraged buyout** (LBO), investors buy all of a firm's equity using debt financing (leverage). If the buyers are the firm's current management, the LBO is referred to as a **management buyout** (MBO). Firms in LBOs usually have cash flow that is adequate to service the issued debt or have undervalued assets that can be sold to pay down the debt over time.

In a **private investment in public equity** (PIPE), a public firm that needs capital quickly sells private equity to investors. The firm may have growth opportunities, be in distress, or have large amounts of debt. The investors can often buy the stock at a sizeable discount to its market price.



## MODULE QUIZ 36.1

*To best evaluate your performance, enter your quiz answers online.*

1. The advantage of participating preferred shares versus non-participating preferred shares is that participating preferred shares can:
  - A. obtain voting rights.
  - B. receive extra dividends.
  - C. be converted into common stock.
2. Which of the following *best* describes the benefit of cumulative share voting?
  - A. It provides significant minority shareholders with proportional representation on the board.
  - B. It prevents minority shareholders from exercising excessive control.
  - C. If cumulative dividends are not paid, preferred shareholders are given voting rights.

3. Compared to public equity, which of the following is *least likely* to characterize private equity?
- Lower reporting costs.
  - Potentially weaker corporate governance.
  - Lower returns because of its less liquid market.

## MODULE 36.2: FOREIGN EQUITIES AND EQUITY RISK

### LOS 36.d: Describe methods for investing in non-domestic equity securities.



*CFA® Program Curriculum, Volume 4, page 285*

Video covering  
this content is  
available online.

When capital flows freely across borders, markets are said to be *integrated*. The world's financial markets have become more integrated over time, especially as a result of improved communications and trading technologies. However, barriers to global capital flows still exist. Some countries restrict foreign ownership of their domestic stocks, primarily to prevent foreign control of domestic companies and to reduce the variability of capital flows in and out of their countries.

An increasing number of countries have dropped foreign capital restrictions. Studies have shown that reducing capital barriers improves equity market performance. Furthermore, companies are increasingly turning to foreign investors for capital by listing their stocks on foreign stock exchanges or by encouraging foreign ownership of shares.

From the firm's perspective, listing on foreign stock exchanges increases publicity for the firm's products and the liquidity of the firm's shares. Foreign listing also increases firm transparency due to the stricter disclosure requirements of many foreign markets.

**Direct investing** in the securities of foreign companies simply refers to buying a foreign firm's securities in foreign markets. Some obstacles to direct foreign investment are that:

- The investment and return are denominated in a foreign currency.
- The foreign stock exchange may be illiquid.
- The reporting requirements of foreign stock exchanges may be less strict, impeding analysis.
- Investors must be familiar with the regulations and procedures of each market in which they invest.

Other methods for investing in foreign companies are provided by global depository receipts (GDRs), American depository receipts (ADRs), global registered shares (GRSs), and baskets of listed depository receipts (BLDRs).

**Depository receipts** (DRs) represent ownership in a foreign firm and are traded in the markets of other countries in local market currencies. A bank deposits shares of the foreign firm and then issues receipts representing ownership of a specific number of the foreign shares. The **depository bank** acts as a custodian and manages dividends, stock splits, and other events. Although the investor does not have to convert to the foreign currency, the value of the DR is affected by exchange rate changes, as well as firm fundamentals, economic events, and any other factors that affect the value of any stock.

If the firm is involved with the issue, the depository receipt is a **sponsored DR**; otherwise, it is an **unsponsored DR**. A sponsored DR provides the investor voting rights

and is usually subject to greater disclosure requirements. In an unsponsored DR, the depository bank retains the voting rights.

**Global depository receipts** (GDRs) are issued outside the United States and the issuer's home country. Most GDRs are traded on the London and Luxembourg exchanges.

Although not listed on U.S. exchanges, they are usually denominated in U.S. dollars and can be sold to U.S. institutional investors. GDRs are not subject to the capital flow restrictions imposed by governments and thus offer the firm and the investor greater opportunities for foreign investment. The firm usually chooses to list the GDR in a market where many investors are familiar with the firm.

**American depository receipts** (ADRs) are denominated in U.S. dollars and trade in the United States. The security on which the ADR is based is the **American depository share** (ADS), which trades in the firm's domestic market. Some ADRs allow firms to raise capital in the United States or use the shares to acquire other firms. Most require U.S. Securities and Exchange Commission (SEC) registration, but some are privately placed (Rule 144A or Regulation S receipts).

The four types of ADRs, with different levels of trading availability and firm requirements, are summarized in Figure 36.1.

**Figure 36.1: Types of ADRs**

	Level I	Level II	Level III	Rule 144A
Trading location	Over-the-counter (OTC)	NYSE, Nasdaq, and AMEX	NYSE, Nasdaq, and AMEX	Private
SEC registration required	Yes	Yes	Yes	No
Ability to raise capital in United States	No	No	Yes	Yes
Firm listing expenses	Low	High	High	Low

**Global registered shares** (GRS) are traded in different currencies on stock exchanges around the world.

A **basket of listed depository receipts** (BLDR) is an exchange-traded fund (ETF) that is a collection of DRs. ETF shares trade in markets just like common stocks.

**LOS 36.e: Compare the risk and return characteristics of different types of equity securities.**

*CFA® Program Curriculum, Volume 4, page 290*

The returns on equity investments consist of price changes, dividend payments, and, in the case of equities denominated in a foreign currency, gains or losses from changes in exchange rates. A Japanese investor who invests in euro-denominated shares will have greater yen-based returns if the euro appreciates relative to the yen.

Gains from dividends and the reinvestment of dividends have been an important part of equity investors' long-term returns. For example, \$1 invested in U.S. stocks in 1900 would have been worth \$834 in real terms in 2011 with dividends reinvested but only \$8.10 with price appreciation alone. Over the same time period, the terminal wealth for bonds and bills would have been \$9.30 and \$2.80, respectively.<sup>1</sup>

The risk of equity securities is most commonly measured as the standard deviation of returns. Preferred stock is less risky than common stock because preferred stock pays a known, fixed dividend to investors that is a large part of the return, whereas common dividends are variable and can vary with earnings. Also, preferred stockholders receive their distributions before common shareholders and have a claim in liquidation equal to the par value of their shares that has priority over the claims of common stock owners. Because it is less risky, preferred stock has a lower average return than common stock.

Cumulative preferred shares have less risk than non-cumulative preferred shares because they retain the right to receive any missed dividends before any common stock dividends can be paid.

For both common and preferred shares, putable shares are less risky and callable shares are more risky compared to shares with neither option. Putable shares are less risky because if the market price drops, the investor can put the shares back to the firm at a fixed price (assuming the firm has the capital to honor the put). Because of this feature, putable shares usually pay a lower dividend yield than non-putable shares.

Callable shares are the most risky because if the market price rises, the firm can call the shares, limiting the upside potential of the shares. Callable shares, therefore, usually have higher dividend yields than non-callable shares.

**LOS 36.f: Explain the role of equity securities in the financing of a company's assets.**

*CFA® Program Curriculum, Volume 4, page 292*

Equity capital is used for the purchase of long-term assets, equipment, research and development, and expansion into new businesses or geographic areas. Equity securities provide the firm with "currency" that can be used to buy other companies or that can be offered to employees as incentive compensation. Having publicly traded equity securities provides liquidity, which may be especially important to firms that need to meet regulatory requirements, capital adequacy ratios, and liquidity ratios.

**LOS 36.g: Contrast the market value and book value of equity securities.**

*CFA® Program Curriculum, Volume 4, page 293*

The primary goal of firm management is to increase the book value of the firm's equity and thereby increase the market value of its equity. The **book value of equity** is the value of the firm's assets on the balance sheet minus its liabilities. It increases when the firm has positive net income and retained earnings that flow into the equity account. When management makes decisions that increase income and retained earnings, they increase the book value of equity.

The **market value of equity** is the total value of a firm's outstanding equity shares based on market prices and reflects the expectations of investors about the firm's future performance. Investors use their perceptions of the firm's risk and the amounts and timing of future cash flows to determine the market value of equity. The market value and book value of equity are seldom equal. Although management may be maximizing the book value of equity, this may not be reflected in the market value of equity because book value does not reflect investor expectations about future firm performance.

## LOS 36.h: Compare a company's cost of equity, its (accounting) return on equity, and investors' required rates of return.

CFA® Program Curriculum, Volume 4, page 293

A key ratio used to determine management efficiency is the **accounting return on equity**, usually referred to simply as the **return on equity** (ROE). ROE is calculated as net income available to common (net income minus preferred dividends) divided by the average book value of common equity over the period:

$$\text{ROE}_t = \frac{\text{NI}_t}{\text{average } \text{BV}_t} = \frac{\text{NI}_t}{(\text{BV}_t + \text{BV}_{t-1})/2}$$

Alternatively, ROE is often calculated using only beginning-of-year book value of equity (i.e., book value of equity for end of year  $t - 1$ ):

$$\text{ROE}_t = \frac{\text{NI}_t}{\text{BV}_{t-1}}$$

The first method is more appropriate when it is the industry convention or when book value is volatile. The latter method is more appropriate when examining ROE for a number of years or when book value is stable.

Higher ROE is generally viewed as a positive for a firm, but the reason for an increase should be examined. For example, if book value is decreasing more rapidly than net income, ROE will increase. This is not, however, a positive for the firm. A firm can also issue debt to repurchase equity, thereby decreasing the book value of equity. This would increase the ROE but also make the firm's shares riskier due to the increased financial leverage (debt).



### PROFESSOR'S NOTE

The DuPont formula discussed in the topic review of Financial Analysis Techniques can help the analyst determine the reasons for changes in ROE.

The book value of equity reflects a firm's financial decisions and operating results since its inception, whereas the market value of equity reflects the market's consensus view of a firm's future performance. The **price-to-book ratio** (also called the **market-to-book ratio**) is the market value of a firm's equity divided by the book value of its equity. The more optimistic investors are about the firm's future growth, the greater its price-to-book ratio. The price-to-book ratio is used as a measure of relative value. Often, firms with low price-to-book ratios are considered *value stocks*, while firms with high price-to-book ratios are considered *growth stocks*.

#### EXAMPLE: ROE, market, and book value of equity calculations

Given the following data for O'Grady Industries, calculate the return on average equity for 20X9 and the total market value of equity, the book value per share, and the price-to-book ratio at the end of 20X9.

Fiscal Year-End Dec. 31	20X9	20X8
Total stockholder's equity	18,503	17,143
Net income available to common	3,526	3,056
Stock price	\$16.80	\$15.30
Shares outstanding	3,710	2,790

**Answer:**

The return on average equity for 20X9 is:

$$\begin{aligned} \text{ROE}_t &= \frac{\text{NI}_t}{\text{average } \text{BV}_t} = \frac{\text{NI}_t}{(\text{BV}_t + \text{BV}_{t-1})/2} \\ &= \frac{\$3,526}{(\$18,503 + \$17,143)/2} = 19.78\% \end{aligned}$$

The total market value of the firm's equity at the end of 20X9 is:

$$\$16.80 \times 3,710 = \$62,328$$

The book value per share at the end of 20X9 is:

$$= \frac{\$18,503}{3,710} = \$4.99$$

The price-to-book ratio at the end of 20X9 is:

$$= \frac{\$16.80}{\$4.99} = 3.37$$

## Investors' Required Return and the Cost of Equity

A firm's **cost of equity** is the expected equilibrium total return (including dividends) on its shares in the market. It is usually estimated in practice using a dividend discount model or the capital asset pricing model. At any point in time, a decrease in share price will increase the expected return on the shares and an increase in share price will decrease expected returns, other things equal. Because the intrinsic value of a firm's shares is the discounted present value of its future cash flows, an increase (decrease) in the required return used to discount future cash flows will decrease (increase) intrinsic value.

Investors also estimate the expected market returns on equity shares and compare this to the minimum return they will accept for bearing the risk inherent in a particular stock.

If an investor estimates the expected return on a stock to be greater than her minimum required rate of return on the shares, given their risk, then the shares are an attractive investment. Investors can have different required rates of return for a given risk, different estimates of a firm's future cash flows, and different estimates of the risk of a firm's equity shares. A firm's cost of equity can be interpreted as the minimum rate of return required by investors (in the aggregate) to compensate them for the risk of the firm's equity shares.



## MODULE QUIZ 36.2

To best evaluate your performance, enter your quiz answers online.

1. Global depository receipts are most often denominated in:
  - A. the currency of the country where they trade and issued outside the United States.
  - B. U.S. dollars and issued in the United States.
  - C. U.S. dollars and issued outside the United States.
2. Which of the following types of preferred shares has the *most* risk for investors?
  - A. Putable shares.
  - B. Callable shares.
  - C. Non-putable, non-callable shares.
3. Which of the following *best* describes the book value of equity?
  - A. Management should attempt to maximize book value of equity.
  - B. Book value of equity decreases when retained earnings increase.
  - C. Book value of equity reflects investors' perceptions of the firm's future.
4. Which of the following causes of an increase in return on equity is *most likely* a positive sign for a firm's equity investors?
  - A. A firm issues debt to repurchase equity.
  - B. Net income is increasing at a faster rate than book value of equity.
  - C. Net income is decreasing at a slower rate than book value of equity.

## KEY CONCEPTS

### LOS 36.a

Common shareholders have a residual claim on firm assets and govern the corporation through voting rights. Common shares have variable dividends which the firm is under no legal obligation to pay.

Preferred stock typically does not mature, does not have voting rights, and has dividends that are fixed in amount but are not a contractual obligation of the firm.

Cumulative preferred shares require any dividends that were missed in the past (dividends in arrears) to be paid before common shareholders receive any dividends. Participating preferred shares receive extra dividends if firm profits exceed a pre-specified level and a value greater than the par value if the firm is liquidated. Convertible preferred stock can be converted to common stock at a pre-specified conversion ratio.

Callable shares allow the firm the right to repurchase the shares at a pre-specified price. Putable shares give the shareholder the right to sell the shares back to the firm at a pre-specified price.

### LOS 36.b

Some companies' equity shares are divided into different classes, such as Class A and Class B shares. Different classes of common equity may have different voting rights and priority in liquidation.

### LOS 36.c

Compared to publicly traded firms, private equity firms have lower reporting costs, greater ability to focus on long-term prospects, and potentially greater return for investors once the firm goes public. However, private equity investments are illiquid, firm financial disclosure may be limited, and corporate governance may be weaker.

## **LOS 36.d**

Investors who buy foreign stock directly on a foreign stock exchange receive a return denominated in a foreign currency, must abide by the foreign stock exchange's regulations and procedures, and may be faced with less liquidity and less transparency than is available in the investor's domestic markets. Investors can often avoid these disadvantages by purchasing depository receipts for the foreign stock that trade on their domestic exchange.

Global depository receipts are issued outside the United States and outside the issuer's home country. American depository receipts are denominated in U.S. dollars and are traded on U.S. exchanges.

Global registered shares are common shares of a firm that trade in different currencies on stock exchanges throughout the world.

Baskets of listed depository receipts are exchange-traded funds that invest in depository receipts.

## **LOS 36.e**

Equity investor returns consist of dividends, capital gains or losses from changes in share prices, and any foreign exchange gains or losses on shares traded in a foreign currency. Compounding of reinvested dividends has been an important part of an equity investor's long-term return.

Preferred stock is less risky than common stock because preferred stock pays a known, fixed dividend to investors; preferred stockholders must receive dividends before common stock dividends can be paid; and preferred stockholders have a claim equal to par value if the firm is liquidated. Putable shares are the least risky and callable shares are the most risky. Cumulative preferred shares are less risky than non-cumulative preferred shares, as any dividends missed must be paid before a common stock dividend can be paid.

## **LOS 36.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 36.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 36.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 36.1

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 36.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 36.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 36.c)

### Module Quiz 36.2

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 36.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 36.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 36.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 36.h)

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<sup>1</sup> Ryan C. Fuhrmann, CFA, and Asjeet S. Lamba, CFA, *Overview of Equity Securities*, CFA Program Level I 2020 Curriculum, Volume 5 (CFA Institute, 2019).

The following is a review of the Equity Investments (2) principles designed to address the learning outcome statements set forth by CFA Institute. Cross-Reference to CFA Institute Assigned Reading #37.

# READING 37: INTRODUCTION TO INDUSTRY AND COMPANY ANALYSIS

Study Session 12

## EXAM FOCUS

This topic provides a great deal of material on industry analysis. Understand the effects of business cycles and the stage of an industry's life cycle. Porter's five forces and two competitive strategies are very important to know. Beyond these, make sure that you know the effects on price competition and profitability of the items considered in industry analysis and of the various firm characteristics discussed.

## MODULE 37.1: INDUSTRY ANALYSIS

### LOS 37.a: Explain uses of industry analysis and the relation of industry analysis to company analysis.



*CFA® Program Curriculum, Volume 4, page 308*

Video covering this content is available online.

Industry analysis is important for company analysis because it provides a framework for understanding the firm. Analysts will often focus on a group of specific industries so that they can better understand the business conditions the firms in those industries face.

Understanding a firm's business environment can provide insight about the firm's potential growth, competition, and risks. For a credit analyst, industry conditions can provide important information about whether a firm will be able to meet its obligations during the next recession.

In an active management strategy, industry analysis can identify industries that are undervalued or overvalued in order to weight them appropriately. Some investors engage in **industry rotation**, which is overweighting or underweighting industries based on the current phase of the business cycle. A firm's industry has been found to be as important as its home country in determining its performance.

In performance attribution analysis, the sources of portfolio return are determined relative to a benchmark. The industry representation within a portfolio is often a significant component of attribution analysis.

### LOS 37.b: Compare methods by which companies can be grouped.

*CFA® Program Curriculum, Volume 4, page 309*

One way to group companies into an industry is by the *products and services* they offer. For example, the 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 use a firm's **principal business activity** (the largest source of sales or earnings) to classify firms. Examples of these systems are discussed in the following and include the Global Industry Classification Standard (GICS), Russell Global Sectors (RGS), and Industry Classification Benchmark.

Firms can also be classified by their *sensitivity to business cycles*. This system has two main classifications: cyclical and non-cyclical firms.

*Statistical methods*, such as cluster analysis, can also be used. This method groups firms that historically have had highly correlated returns. The groups (i.e., industries) formed will then have lower returns correlations between groups.

This method has several limitations:

- Historical correlations may not be the same as future correlations.
- The groupings of firms may differ over time and across countries.
- The grouping of firms is sometimes non-intuitive.
- The method is susceptible to statistical error (i.e., firms can be grouped by a relationship that occurs by chance, or not grouped together when they should be).

**LOS 37.c: Explain the factors that affect the sensitivity of a company to the business cycle and the uses and limitations of industry and company descriptors such as "growth," "defensive," and "cyclical."**

*CFA® Program Curriculum, Volume 4, page 309*

A **cyclical firm** is one whose earnings are highly dependent on the stage of the business cycle. These firms have high earnings volatility and high operating leverage. Their products are often expensive, non-necessities 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.

In contrast, a **non-cyclical firm** produces goods and services for which demand is relatively stable over the business cycle. Examples of non-cyclical industries include health care, utilities, telecommunications, and consumer staples.

Sectors can also be classified by their sensitivity to the phase of the business cycle. Cyclical sector examples include energy, financials, technology, materials, and consumer discretionary. Non-cyclical sector examples include health care, utilities, and consumer staples.

Non-cyclical industries can be further separated into defensive (stable) or growth industries. **Defensive industries** are those that are least affected by the stage of the business cycle and include utilities, consumer staples (such as food producers), and basic services (such as drug stores). **Growth industries** have demand so strong they are largely unaffected by the stage of the business cycle.

Descriptors such as "growth," "defensive," and "cyclical" should be used with caution. The term **growth cyclical** is used to describe firms with strong long-term growth potential that have revenue that is quite sensitive to economic cycles. Cyclical industries, which are supposed to be dependent on the business cycle, often include growth firms that are less dependent on the business cycle. Non-cyclical industries can be affected by severe recessions, as was the case in the 2008–09 downturn. Defensive industries may not

always be safe investments. For example, grocery stores are classified as defensive, but they are subject to intense price competition that reduces earnings. Defensive industries may also contain some truly defensive and some growth firms. Because business cycle phases differ across countries and regions, two cyclical firms operating in different countries may be simultaneously experiencing different cyclical effects on earnings growth.

**LOS 37.d: Describe current industry classification systems, and identify how a company should be classified, given a description of its activities and the classification system.**

*CFA® Program Curriculum, Volume 4, page 313*

Classifying firms by industry provides a method of examining trends and firm valuations. It also allows analysts to compare firms in different countries on a similar basis. The following are the industry classification systems currently available to investors.

### ***Commercial classifications***

Several index providers classify firms. Some use three levels of classification, while others use four levels. The providers generally use firm fundamentals such as revenue to classify firms. Although the nomenclature differs among providers, the broadest category is generally the sector level, followed by industry and sub-industry.

Commercial industry classifications include the Global Industry Classification Standard developed by Standard & Poor's and MSCI Barra, Russell Global Sectors, and the Industry Classification Benchmark developed by Dow Jones and FTSE.

Sectors and firm compositions representative of those used by commercial providers are as follows.

*Basic materials and processing* firms produce:

- Building materials.
- Chemicals.
- Paper and forest products.
- Containers and packaging.
- Metals, minerals, and mining.

*Consumer discretionary* firms are cyclical and sell goods and services in industries such as:

- Automotive.
- Apparel.
- Hotels and restaurants.

*Consumer staples* firms are less cyclical and sell goods and services in industries such as:

- Food.
- Beverage.
- Tobacco.
- Personal care products.

*Energy* firms are involved in:

- Energy exploration.
- Refining.
- Production.
- Energy equipment.
- Energy services.

*Financial services* firms include firms involved in:

- Banking.
- Insurance.
- Real estate financing.
- Asset management.
- Brokerage.

*Health care* includes:

- Pharmaceuticals.
- Biotech.
- Medical devices.
- Health care equipment.
- Medical supplies.
- Health care services.

*Industrial and producer durables* firms produce capital goods for commercial services industries including:

- Heavy machinery and equipment.
- Aerospace.
- Defense.
- Transportation.
- Commercial services and supplies.

*Real estate* firms are involved in the development, management, and operation of real properties, including:

- Real estate investment trusts (REITs).
- Real estate services firms.

*Technology* firms sell or produce:

- Computers.
- Software.
- Semiconductors.
- Communications equipment.
- Internet services.
- Electronic entertainment.
- Consulting and services.

*Telecommunications* firms include wired and wireless service providers. *Utilities* includes electric, gas, and water utilities. Some industry classification providers include telecommunication and utilities in the same group, while others separate them.

To classify a firm accurately, an analyst should have detailed knowledge about the firm and the delineation of industry classifications.

## ***Government classifications***

Several government bodies also provide industry classification of firms. They frequently do so to organize the economic data they publish. A main thrust of their systems is to make comparisons of industries consistent across time and country. The main systems are similar to each other.

- *International Standard Industrial Classification of All Economic Activities (ISIC)* was produced by the United Nations in 1948 to increase global comparability of data.
- *Statistical Classification of Economic Activities in the European Community* is similar to the ISIC but is designed for Europe.
- *Australian and New Zealand Standard Industrial Classification* was jointly developed by those countries.
- *North American Industry Classification System (NAICS)* was jointly developed by the United States, Canada, and Mexico.

The methodologies that government providers use in their compilation of industry groups differ from those used by commercial providers. Most governments do not identify individual firms in a group, so an analyst cannot know the groups' exact composition. Commercial providers identify the constituent firms. Government systems are updated less frequently; for example, the NAICS is updated every five years. Governments do not distinguish between small and large firms, for-profit and not-for-profit organizations, or private and public firms. Commercial providers only include for-profit and public firms and can delineate by the size of the firm.

An analyst should not assume that two firms in the same narrowest industry classification can be compared with each other for fundamental analysis and valuation. Instead, the analyst should construct *peer groups*.

### **LOS 37.e: Explain how a company's industry classification can be used to identify a potential "peer group" for equity valuation.**

*CFA® Program Curriculum, Volume 4, page 318*

A **peer group** is a set of similar companies an analyst will use for valuation comparisons. More specifically, a peer group will consist of companies with similar business activities, demand drivers, cost structure drivers, and availability of capital.

To form a peer group, an analyst will often start by identifying companies in the same industry classification, using the commercial classification providers previously described. Usually, the analyst will use other information to verify that the firms in an industry are indeed peers. An analyst might include a company in more than one peer group.

The following are steps an analyst would use to form a peer group:

- Use commercial classification providers to determine which firms are in the same industry.
- Examine firms' annual reports to see if they identify key competitors.
- Examine competitors' annual reports to see if other competitors are named.

- Use industry trade publications to identify competitors.
- Confirm that comparable firms have similar sources of sales and earnings, have similar sources of demand, and are in similar geographic markets.
- Adjust financial statements of non-financial companies for any financing subsidiary data they include.

### **LOS 37.f: Describe the elements that need to be covered in a thorough industry analysis.**

*CFA® Program Curriculum, Volume 4, page 321*

A thorough industry analysis should include the following elements:

- Evaluate the relationships between macroeconomic variables and industry trends using information from industry groups, firms in the industry, competitors, suppliers, and customers.
- Estimate industry variables using different approaches and scenarios.
- Compare with other analysts' forecasts of industry variables to confirm the validity of the analysis and potentially find industries that are misvalued as a result of consensus forecasts.
- Determine the relative valuation of different industries.
- Compare the valuations of industries across time to determine the volatility of their performance over the long run and during different phases of the business cycle. This is useful for long-term investing as well as short-term industry rotation based on the current economic environment.
- Analyze industry prospects based on **strategic groups**, which are groups of firms that are distinct from the rest of the industry due to the delivery or complexity of their products or barriers to entry. For example, full-service hotels are a distinct market segment within the hotel industry.
- Classify industries by **life-cycle stage**, whether it is embryonic, growth, shakeout, mature, or declining.
- Position the industry on the **experience curve**, which shows the cost per unit relative to output. The curve declines because of increases in productivity and economies of scale, especially in industries with high fixed costs.
- Consider the forces that affect industries, which include demographic, macroeconomic, governmental, social, and technological influences.
- Examine the forces that determine competition within an industry.

### **LOS 37.g: Describe the principles of strategic analysis of an industry.**

*CFA® Program Curriculum, Volume 4, page 321*

Industries differ markedly in profitability because of differences in economic fundamentals, industry structure, and degree of competition. In some industries, competition is intense and few firms earn economic profits. **Economic profits**, the return on invested capital minus its cost, are greater than 20% in some industries and negative in others. The degree of economic profits depends in part on pricing power (elasticity of demand for the firm's products). An analyst should understand that industry conditions and profits can change dramatically over time, so industry analysis should be forward-looking.

One component of an analyst's industry analysis should be **strategic analysis**, which examines how an industry's competitive environment influences a firm's strategy. The analysis framework developed by Michael Porter<sup>1</sup> delineates five forces that determine industry competition.

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 large 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.



## MODULE QUIZ 37.1

To best evaluate your performance, enter your quiz answers online.

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 a peer group.
3. An analyst should *most likely* include two firms in the same peer group for analysis if the firms:
  - A. are both grouped in the same industry classification.
  - B. are similar in size, industry life-cycle stage, and cyclicalities.
  - C. derive their revenue and earnings from similar business activities.
4. The industry experience curve shows the cost per unit relative to:
  - A. output.
  - B. age of firms.
  - C. industry life-cycle stage.
5. Which of the following is *least likely* an element of an industry strategic analysis?
  - A. Market correlations.
  - B. Demographic influences.
  - C. Influence of industry capacity on pricing.
6. 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.

## MODULE 37.2: PRICING POWER AND COMPANY ANALYSIS

**LOS 37.h: Explain the effects of barriers to entry, industry concentration, industry capacity, and market share stability on pricing power and price competition.**



*CFA® Program Curriculum, Volume 4, page 324*

Video covering  
this content is  
available online.

### Barriers to Entry

High barriers to entry benefit existing industry firms because they prevent new competitors from competing for market share and reducing the existing firms' return on capital. In industries with low barriers to entry, firms have little pricing power and competition reduces existing firms' return on capital. To assess the ease of entry, the analyst should determine how easily a new entrant to the industry could obtain the capital, intellectual property, and customer base needed to be successful. One method of determining the ease of entry is to examine the composition of the industry over time. If the same firms dominate the industry today as ten years ago, entry is probably difficult.

High barriers to entry do not necessarily mean firm pricing power is high. Industries with high barriers to entry may have strong price competition among existing firms. This

is more likely when the products sold are undifferentiated and commodity-like or when high barriers to exit result in overcapacity. For example, an automobile factory may have a low value in an alternative use, making firm owners less likely to exit the industry. They continue to operate even when losing money, hoping to turn things around, which can result in industry overcapacity and intense price competition.

Low barriers to entry do not ensure success for new entrants. Barriers to entry may change over time, and so might the competitive environment.

## Industry Concentration

High industry concentration does not guarantee pricing power.

- Absolute market share may not matter as much as a firm's market share relative to its competitors. A firm may have a 50% market share, but if a single competitor has the other 50%, their 50% share would not result in a great degree of pricing power. Return on capital is limited by intense competition between the two firms.
- Conversely, a firm that has a 10% market share when no competitor has more than 2% may have a good degree of pricing power and high return on capital.
- If industry products are undifferentiated and commodity-like, then consumers will switch to the lowest-priced producer. The more importance consumers place on price, the greater the competition in an industry. Greater competition leads to lower return on capital.
- Industries with greater product differentiation in regard to features, reliability, and service after the sale will have greater pricing power. Return on capital can be higher for firms that can better differentiate their products.
- If the industry is capital intensive, and therefore costly to enter or exit, overcapacity can result in intense price competition.

Tobacco, alcohol, and confections are examples of highly concentrated industries in which firms' pricing power is relatively strong. Automobiles, aircraft, and oil refining are examples of highly concentrated industries with relatively weak pricing power.

Although industry concentration does not guarantee pricing power, a fragmented market does usually result in strong competition. When there are many industry members, firms cannot coordinate pricing, firms will act independently, and because each member has such a small market share, any incremental increase in market share may make a price decrease profitable.

## Industry Capacity

Industry capacity has a clear impact on pricing power. Undercapacity, a situation in which demand exceeds supply at current prices, results in pricing power and higher return on capital. Overcapacity, with supply greater than demand at current prices, will result in downward pressure on price and lower return on capital.

An analyst should be familiar with the industry's current capacity and its planned investment in additional capacity. Capacity is fixed in the short run and variable in the long run. In other words, given enough time, producers will build enough factories and raise enough capital to meet demand at a price close to minimum average cost. However, producers may overshoot the optimal industry capacity, especially in cyclical markets. For example, producers may start to order new equipment during an economic expansion

to increase capacity. By the time they bring the additional production on to the market, the economy may be in a recession with decreased demand. A diligent analyst can look for signs that the planned capacity increases of all producers (who may not take into account the capacity increases of other firms) sum to more output than industry demand will support.

Capacity is not necessarily physical. For example, an increase in demand for insurance can be more easily and quickly met than an increase in demand for a product requiring physical capacity, such as electricity or refined petroleum products.

If capacity is physical and specialized, overcapacity can exist for an extended period if producers expand too much over the course of a business cycle. Specialized physical capacity may have a low liquidation value and be costly to reallocate to a different product. Non-physical capacity (e.g., financial capital) can be reallocated more quickly to new industries than physical capacity.

## Market Share Stability

An analyst should examine whether firms' market shares in an industry have been stable over time. Market shares that are highly variable likely indicate a highly competitive industry in which firms have little pricing power. More stable market shares likely indicate less intense competition in the industry.

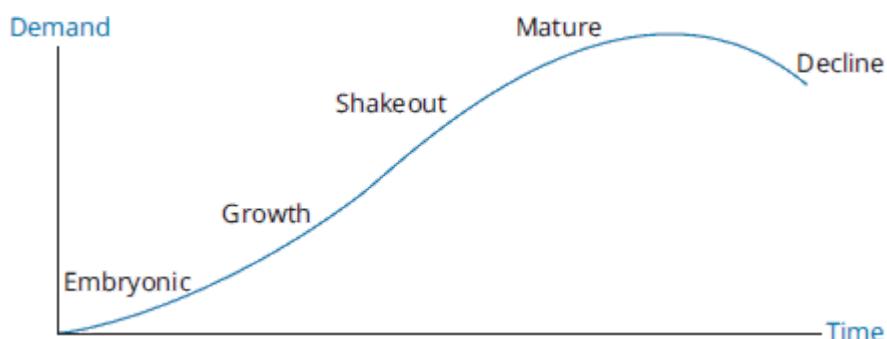
Factors that affect market share stability include barriers to entry, introductions of new products and innovations, and the **switching costs** that customers face when changing from one firm's products to another. Switching costs, such as the time and expense of learning to use a competitor's product, tend to be higher for specialized or differentiated products. High switching costs contribute to market share stability and pricing power.

**LOS 37.i: Describe industry life-cycle models, classify an industry as to life-cycle stage, and describe limitations of the life-cycle concept in forecasting industry performance.**

*CFA® Program Curriculum, Volume 4, page 332*

**Industry life cycle** analysis should be a component of an analyst's strategic analysis. An industry's stage in the cycle has an impact on industry competition, growth, and profits. An industry's stage will change over time, so the analyst must monitor the industry on an ongoing basis. The five phases of the industry life-cycle model are illustrated in Figure 37.1.

**Figure 37.1: Stages of the Industry Life Cycle**



In the **embryonic stage**, the industry has just started. The characteristics of this stage are as follows:

- *Slow growth*: customers are unfamiliar with the product.
- *High prices*: the volume necessary for economies of scale has not been reached.
- *Large investment required*: to develop the product.
- *High risk of failure*: most embryonic firms fail.

In the **growth stage**, industry growth is rapid. The characteristics of this stage are as follows:

- *Rapid growth*: new consumers discover the product.
- *Limited competitive pressures*: the threat of new firms coming into the market peaks during the growth phase, but rapid growth allows firms to grow without competing on price.
- *Falling prices*: economies of scale are reached and distribution channels increase.
- *Increasing profitability*: due to economies of scale.

In the **shakeout stage**, industry growth and profitability are slowing due to strong competition. The characteristics of this stage are as follows:

- *Growth has slowed*: demand reaches saturation level with few new customers to be found.
- *Intense competition*: industry growth has slowed, so firm growth must come at the expense of competitors.
- *Increasing industry overcapacity*: firm investment exceeds increases in demand.
- *Declining profitability*: due to overcapacity.
- *Increased cost cutting*: firms restructure to survive and attempt to build brand loyalty.
- *Increased failures*: weaker firms liquidate or are acquired.

In the **mature stage**, there is little industry growth and firms begin to consolidate. The characteristics of this stage are as follows:

- *Slow growth*: market is saturated and demand is only for replacement.
- *Consolidation*: market evolves to an oligopoly.
- *High barriers to entry*: surviving firms have brand loyalty and low cost structures.
- *Stable pricing*: firms try to avoid price wars, although periodic price wars may occur during recessions.
- *Superior firms gain market share*: the firms with better products may grow faster than the industry average.

In the **decline stage**, industry growth is negative. The characteristics of this stage are as follows:

- *Negative growth*: due to development of substitute products, societal changes, or global competition.
- *Declining prices*: competition is intense and there are price wars due to overcapacity.
- *Consolidation*: failing firms exit or merge.

An analyst should determine whether a firm is “acting its age” or stage of industry development. Growth firms should be reinvesting in operations in an attempt to increase product offerings, increase economies of scale, and build brand loyalty. They are not yet worried about cost efficiency. They should not pay out cash flows to investors but save them for internal growth. On the other hand, mature firms focus on cost efficiency because demand is largely from replacement. They find few opportunities to introduce new products. These firms should typically pay out cash to investors as dividends or stock repurchases because cash flows are strong but internal growth is limited. An analyst should be concerned about firms that do not act their stage, such as a mature firm that is investing in low-return projects for the sake of increasing firm size.

Although life-cycle analysis is a useful tool, industries do not always conform to its framework. Life-cycle stages may not be as long or short as anticipated, or they might be skipped altogether. An industry’s product may become obsolete quickly due to technological change, government regulation, societal change, or demographics. Life-cycle analysis is likely most useful during stable periods, not during periods of upheaval when conditions are changing rapidly. Furthermore, some firms will experience growth and profits that are dissimilar to others in their industries due to competitive advantages or disadvantages.

**LOS 37.j: Describe macroeconomic, technological, demographic, governmental, social, and environmental influences on industry growth, profitability, and risk.**

*CFA® Program Curriculum, Volume 4, page 336*

The external influences on industry growth, profitability, and risk should be a component of an analyst’s strategic analysis. These external factors include macroeconomic, technological, demographic, governmental, and social influences.

*Macroeconomic factors* can be cyclical or structural (longer-term) trends, most notably economic output as measured by GDP or some other measure. 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. An example of a structural economic factor is the education level of the work force. More education can increase workers’ productivity and real wages, which in turn can increase their demand for consumer goods.

*Technology* can change an industry dramatically through the introduction of new or improved products. Computer hardware is an example of an industry that has undergone dramatic transformation. Radical improvements in circuitry were assisted by transformations in other industries, including the computer software and telecommunications industries. Another example of an industry that has been changed by technology is photography, which has largely moved from film to digital media.

*Demographic factors* include age distribution and population size, as well as other changes in the composition of the population. As a large segment of the population reaches their twenties, residential construction, furniture, and related industries see increased demand. An aging of the overall population can mean significant growth for the health care industry and developers of retirement communities. For example, the aging of the post-World War II Baby Boomers is an example of demographics that will increase demand in these industries.

*Governments* have an important and widespread effect on businesses through various channels, including taxes and regulation. The level of tax rates certainly affects industries, but analysts should also be aware of the differential taxation applied to some goods. For example, tobacco is heavily taxed in the United States. Specific regulations apply to many industries. Entry into the health care industry, for example, is controlled by governments that license doctors and other providers. Governments can also empower self-regulatory organizations, such as stock exchanges that regulate their members. Some industries, such as the U.S. defense industry, depend heavily on government purchases of goods and services.

*Social influences* relate to how people work, play, spend their money, and conduct their lives; these factors can have a large impact on industries. For example, when women entered the U.S. workforce, the restaurant industry benefitted because there was less cooking at home. Child care, women's clothing, and other industries were also dramatically affected.

*Environmental influences*, such as climate change and concerns about environmental sustainability of some industries, continue to grow in importance as a factor in industry growth and profitability. Three primary considerations are as follows:

1. Consumer perceptions about industries and specific companies can have a significant impact on growth and profitability.
2. Increased government regulation of some industries will produce profound changes in how they operate and the drivers of demand for products in those industries.
3. Changing weather patterns and shortages of water and energy will affect various industries, such as agriculture and utilities.

Some examples of industries and businesses affected by environmental factors are the following:

- Perceptions that raising cattle may be cruel to animals, produces significant greenhouse gases, and require a disproportionately large amount of resources is changing that industry. Other businesses, notably producers of plant-based meat substitutes, have experienced tremendous growth.
- Other types of agriculture will likely be significantly affected by environmental concerns and resource shortages—and quite possibly by the near-term effects of climate change.
- Airlines have been criticized for their large contribution to carbon emissions.
- The automobile industry is changing rapidly, with government regulation increasing and some outright bans on internal combustion vehicles in favor of electric-powered vehicles on the horizon. There is an associated perception that oil producers will find themselves facing a much smaller industry.
- Relatedly, the electric vehicle segment of the auto and truck industry is growing rapidly, along with battery manufacture, the construction of vehicle charging stations, and the alternative energy industry in general.
- Energy producers may face increasing regulation, especially related to fracking and the release of natural gas into the atmosphere.
- New businesses (and possibly industries) focused on combating climate change, improving sustainability, and reducing the negative effects of economic activity on the environment will likely experience rapid growth in the coming decades.

## **LOS 37.k: Compare characteristics of representative industries from the various economic sectors.**

*CFA® Program Curriculum, Volume 4, page 343*

To illustrate the long list of factors to be considered in industry analysis, we use the following strategic analysis of the candy/confections industry.

- *Major firms:* Cadbury, Hershey, Mars, and Nestle.
- *Barriers to entry and success:* Very high. Low capital and technological barriers, but consumers have strong brand loyalty.
- *Industry concentration:* Very concentrated. Largest four firms dominate global market share.
- *Influence of industry capacity on pricing:* None. Pricing is determined by strength of brand, not production capacity.
- *Industry stability:* Very stable. Market share changes slowly.
- *Life cycle:* Very mature. Growth is driven by population changes.
- *Competition:* Low. Lack of unbranded candy makers in market reduces competition. Consumer decision is based on brand awareness, not price.
- *Demographic influences:* Not applicable.
- *Government influence:* Low. Industry is largely unregulated, but regulation arising from concerns about obesity is possible.
- *Social influence:* Not applicable.
- *Technological influence:* Very low. Limited impact from technology.
- *Business cycle sensitivity:* Non-cyclical and defensive. Demand for candy is very stable.

## **LOS 37.l: Describe the elements that should be covered in a thorough company analysis.**

*CFA® Program Curriculum, Volume 4, page 346*

Having gained understanding of an industry's external environment, an analyst can then focus on **company analysis**. This involves analyzing the firm's financial condition, products and services, and **competitive strategy**. Competitive strategy is how a firm responds to the opportunities and threats of the external environment. The strategy may be defensive or offensive.

Porter has identified two important competitive strategies that can be employed by firms within an industry: a **cost leadership (low-cost) strategy** or a **product or service differentiation strategy**. According to Porter, a firm must decide to focus on one of these two areas to compete effectively.

In a *low-cost 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. If industry competition is intense, pricing can be aggressive or even predatory. In **predatory pricing**, the firm hopes to drive out competitors and later increase prices. Although there are often laws prohibiting predatory pricing, it can be hard to prove if the firm's costs are not easily traced to a particular product. A low-cost

strategy 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 buyers place on product differentiation. The price premium should also be sustainable over time. Successful differentiators will have outstanding marketing research teams and creative personnel.

A company analysis should include the following elements:

- Firm overview, including information on operations, governance, and strengths and weaknesses.
- Industry characteristics.
- Product demand.
- Product costs.
- Pricing environment.
- Financial ratios, with comparisons to other firms and over time.
- Projected financial statements and firm valuation.

A firm's return on equity (ROE) should be part of the financial analysis. The ROE is a function of profitability, total asset turnover, and financial leverage (debt).



## PROFESSOR'S NOTE

The DuPont formula discussed in the topic review of Financial Analysis Techniques can help an analyst understand what drives ROE.

Analysts often use **spreadsheet modeling** to analyze and forecast company fundamentals. The problem with this method is that the models' complexity can make their conclusions seem precise. However, estimation is performed with error that can compound over time. As a check on a spreadsheet model's output, an analyst should consider which factors are likely to be different going forward and how this will affect the firm. Analysts should also be able to explain the assumptions of a spreadsheet model.



## MODULE QUIZ 37.2

*To best evaluate your performance, enter your quiz answers online.*

1. Greater pricing power is *most likely* to result from greater:
  - A. unused capacity.
  - B. market concentration.
  - C. volatility in market share.
2. Which of the following statements *best* describes the relationship between pricing power and ease of entry and exit? Greater ease of entry:
  - A. and greater ease of exit decrease pricing power.
  - B. and greater ease of exit increase pricing power.
  - C. decreases pricing power and greater ease of exit increases pricing power.
3. Industry overcapacity and increased cost cutting characterize which stage of the industry life cycle?
  - A. Growth.
  - B. Shakeout.
  - C. Maturity.
4. In which of these characteristics is the oil producing industry *most likely* similar to the home building industry?

- A. Industry concentration.
  - B. Demographic influences.
  - C. Business cycle sensitivity.
5. Which of the following is *least likely* a significant external influence on industry growth?
- A. Social influences.
  - B. Macroeconomic factors.
  - C. Supplier bargaining power.
6. Which of the following *best* describes a low-cost competitive strategy?
- A. Volume sold is typically modest.
  - B. Managerial incentives promote operational efficiency.
  - C. Success depends heavily on creative marketing and product development.

## KEY CONCEPTS

### LOS 37.a

Industry analysis is necessary for understanding a company's business environment before engaging in analysis of the company. The industry environment can provide information about the firm's potential growth, competition, risks, appropriate debt levels, and credit risk.

Industry valuation can be used in an active management strategy to determine which industries to overweight or underweight in a portfolio.

Industry representation is often a component in a performance attribution analysis of a portfolio's return.

### LOS 37.b

Firms can be grouped into industries according to their products and services or business cycle sensitivity, or through statistical methods that group firms with high historical correlation in returns.

### LOS 37.c

A cyclical firm has earnings that are highly dependent on the business cycle. A non-cyclical firm has earnings that are less dependent on the business cycle. Industries can also be classified as cyclical or non-cyclical. Non-cyclical industries or firms can be classified as defensive (demand for the product tends not to fluctuate with the business cycle) or growth (demand is so strong that it is largely unaffected by the business cycle).

Limitations of descriptors such as growth, defensive, and cyclical include the facts that cyclical industries often include growth firms; even non-cyclical industries can be affected by severe recessions; defensive industries are not always safe investments; business cycle timing differs across countries and regions; and the classification of firms is somewhat arbitrary.

### LOS 37.d

Industry classification systems from commercial providers include the Global Industry Classification Standard (Standard & Poor's and MSCI Barra), Russell Global Sectors, and the Industry Classification Benchmark (Dow Jones and FTSE).

Industry classification systems developed by government agencies include the International Standard Industrial Classification (ISIC), the North American Industry

Classification System (NAICS), and systems designed for the European Union and Australia/New Zealand.

### **LOS 37.e**

A peer group should consist of companies with similar business activities, demand drivers, cost structure drivers, and availability of capital. To form a peer group, the analyst will often start by identifying companies in the same industry, but the analyst should use other information to verify that the firms in an industry are comparable.

### **LOS 37.f**

A thorough industry analysis should:

- Evaluate the relationships between macroeconomic variables and industry trends.
- Estimate industry variables using different approaches and scenarios.
- Check estimates against those from other analysts.
- Compare the valuation for different industries.
- Compare the valuation for industries across time to determine risk and rotation strategies.
- Analyze industry prospects based on strategic groups.
- Classify industries by their life-cycle stage.
- Position the industry on the experience curve.
- Consider demographic, macroeconomic, governmental, social, and technological influences.
- Examine the forces that determine industry competition.

### **LOS 37.g**

Strategic analysis of an industry involves analyzing the competitive forces that determine the possibility of economic profits.

Porter's five forces that determine industry competition are:

1. Rivalry among existing competitors.
2. Threat of entry.
3. Threat of substitutes.
4. Power of buyers.
5. Power of suppliers.

### **LOS 37.h**

High barriers to entry prevent new competitors from taking away market share, but they do not guarantee pricing power or high return on capital, especially if the products are undifferentiated or barriers to exit result in overcapacity. Barriers to entry may change over time.

While market fragmentation usually results in strong competition and low return on capital, high industry concentration may not guarantee pricing power. If industry products are undifferentiated, consumers will switch to the cheapest producer.

Overcapacity may result in price wars.

Capacity is fixed in the short run and variable in the long run. Undercapacity typically results in pricing power. Producers may overinvest in new capacity, especially in cyclical

industries or if the capacity is physical and specialized. Non-physical capacity comes into production and can be reallocated more quickly than physical capacity.

Highly variable market shares indicate a highly competitive industry. Stable market shares suggest less intense competition. High switching costs contribute to market share stability.

### **LOS 37.i**

Phases of the industry life-cycle model are the embryonic, growth, shakeout, maturity, and decline stages.

- Embryonic stage: Slow growth; high prices; large investment required; high risk of failure.
- Growth stage: Rapid growth; little competition; falling prices; increasing profitability.
- Shakeout stage: Slowing growth; intense competition; industry overcapacity; declining profitability; cost cutting; increased failures.
- Mature stage: Slow growth; consolidation; high barriers to entry; stable pricing; superior firms gain market share.
- Decline stage: Negative growth; declining prices; consolidation.

A limitation of life-cycle analysis is that life-cycle stages may not be as long or short as anticipated or might be skipped altogether due to technological change, government regulation, societal change, or demographics. Firms in the same life-cycle stage will experience dissimilar growth and profits due to their competitive positions.

### **LOS 37.j**

Macroeconomic influences on industries include long-term trends in factors such as GDP growth, interest rates, and inflation, as well as structural factors such as the education level of the workforce.

Demographic influences include the size and age distribution of the population.

Government factors include tax rates, regulations, empowerment of self-regulatory organizations, and government purchases of goods and services.

Social influences relate to how people interact and conduct their lives.

Technology can dramatically change an industry through the introduction of new or improved products.

Environmental influences continue to grow in importance as a factor in industry growth and profitability.

### **LOS 37.k**

The elements of an industry strategic analysis are the major firms, barriers to entry, industry concentration, influence of industry capacity on pricing, industry stability, life cycle, competition, demographic influences, government influence, social influence, technological influence, and whether the industry is growth, defensive, or cyclical.

### **LOS 37.l**

Company analysis should include an overview of the firm, industry characteristics, and analysis of product demand, product costs, the pricing environment, the firm's financial

ratios, and projected financial statements and firm valuation. The analysis should describe the company's competitive strategy.

Companies can employ a cost leadership (low-cost) strategy or a product or service differentiation strategy. A cost leadership 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. A differentiating firm's products and services should be distinctive in terms of type, quality, or delivery.

## ANSWER KEY FOR MODULE QUIZZES

### Module Quiz 37.1

1. **B** The classification systems provided by S&P/MSCI Barra, Russell, and Dow Jones/FTSE classify firms according to the product or service they produce. (LOS 37.d)
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 37.c)
3. **C** Firms should be included in a peer group if their business activities are comparable. An analyst may begin with available industry classifications when forming peer groups but should refine them based on factors including the firms' sources of demand and earnings and the geographic markets in which they operate. (LOS 37.e)
4. **A** The experience curve shows the cost per unit relative to output. Unit cost declines at higher output volume because of increases in productivity and economies of scale, especially in industries with high fixed costs. (LOS 37.f)
5. **A** Elements of an industry strategic analysis include the major firms, barriers to entry/success, industry concentration, influence of industry capacity on pricing, industry stability, life cycle, competition, demographic influences, government influence, social influence, technological influence, and whether the industry is growth, defensive, or cyclical. (LOS 37.g)
6. **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 37.g)

### Module Quiz 37.2

1. **B** Greater concentration (a small number of firms control a large part of the market) typically reduces competition and results in greater pricing power. Greater unused capacity in an industry, especially if chronic, results in greater price competition and less pricing power. Greater stability in market share is typically associated with greater pricing power. (LOS 37.h)
2. **C** In industries with greater ease of entry, firms have little pricing power because new competitors can take away market share. High costs of exiting result in

overcapacity and likely price wars. Greater ease of exit (i.e., low costs of exit) increases pricing power. (LOS 37.h)

3. **B** The shakeout stage is characterized by slowed growth, intense competition, industry overcapacity, increased cost cutting, declining profitability, and increased failures. (LOS 37.i)
  4. **C** Oil production and home building are both highly cyclical industries. Oil production is dominated by a small number of large global firms, while home construction is characterized by a large number of relatively smaller firms. Demographics have more influence on housing construction (e.g., the rate of new household formation) than on oil production. (LOS 37.k)
  5. **C** Supplier bargaining power is best characterized as a force internal to the industry. External influences on industry growth, profitability, and risk include macroeconomic, technological, demographic, governmental, and social influences. (LOS 37.j)
  6. **B** Firms that use a low-cost strategy should have managerial incentives suitable to create efficient operations. In a low-cost strategy, the firm seeks to generate high enough sales volume to make a superior return. Marketing and product development are key elements of a differentiation strategy. (LOS 37.l)
- 

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

The following is a review of the Equity Investments (2) principles designed to address the learning outcome statements set forth by CFA Institute. Cross-Reference to CFA Institute Assigned Reading #38.

# READING 38: EQUITY VALUATION: CONCEPTS AND BASIC TOOLS

Study Session 12

## EXAM FOCUS

This topic review discusses the use of discounted cash flow models, price multiples, and asset-based models for stock valuation. Know when the various models are appropriate, how to apply them, and their advantages and disadvantages. This topic is foundational material for all three levels of the CFA exams. Be sure you understand these fundamental concepts.

## MODULE 38.1: DIVIDENDS, SPLITS, AND REPURCHASES

**LOS 38.a: Evaluate whether a security, given its current market price and a value estimate, is overvalued, fairly valued, or undervalued by the market.**



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this content is  
available online.

*CFA® Program Curriculum, Volume 4, page 363*

Recall from the topic review of 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 38.b: Describe major categories of equity valuation models.**

*CFA® Program Curriculum, Volume 4, page 364*

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 38.c: Describe regular cash dividends, extra dividends, stock dividends, stock splits, reverse stock splits, and share repurchases.**

*CFA® Program Curriculum, Volume 4, page 366*

**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.

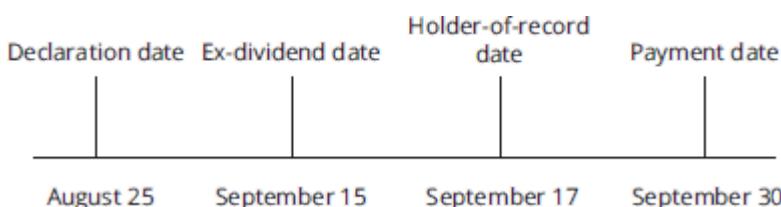
A **share repurchase** is a transaction in which a company buys outstanding shares of its own common stock. Share repurchases are an alternative to cash dividends as a way of distributing cash to shareholders, and they have the same effect on shareholders' wealth as cash dividends of the same size. A 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 38.d: Describe dividend payment chronology.

*CFA® Program Curriculum, Volume 4, page 366*

The dates relevant to dividend payments are shown in Figure 38.1.

**Figure 38.1: 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 38.1

*To best evaluate your performance, enter your quiz answers online.*

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. a multiplier model.
  - B. an asset-based model.
  - C. a 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:
  - A. the declaration date.
  - B. the ex-dividend date.
  - C. the holder-of-record date.

## MODULE 38.2: DIVIDEND DISCOUNT MODELS

**LOS 38.e: Explain the rationale for using present value models to value equity and describe the dividend discount and free-cash-flow-to-equity models.**



Video covering  
this content is  
available online.

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:

$$\text{stock value} = \$0.93 + \$11.88 = \$12.81$$

**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:

$$D_1 = \$1.50(1.08) = \$1.62$$

$$D_2 = \$1.50(1.08)^2 = \$1.75$$

$$D_3 = \$1.50(1.08)^3 = \$1.89$$

$$\text{PV of dividends} = \$1.62 / 1.12 + \$1.75 / (1.12)^2 + \$1.89 / (1.12)^3 = \$4.19$$

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:

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

FCFE can also be calculated as:

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

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 ( $\beta_i$ ), 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.

Recall from the topic review of Cost of Capital that 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 38.f: Calculate the intrinsic value of a non-callable, non-convertible preferred stock.**

*CFA® Program Curriculum, Volume 4, page 373*

**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 38.g: 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.

### EXAMPLE: Gordon growth model valuation

Calculate the value of a stock that paid a \$1.50 dividend last year, if dividends are expected to grow at 8% forever and the required return on equity is 12%.

**Answer:**

Determine  $D_1$ :  $D_0(1 + g_c) = \$1.50(1.08) = \$1.62$

Calculate the stock's value =  $D_1 / (k_e - g_c)$   
 $= \$1.62 / (0.12 - 0.08)$   
 $= \$40.50$

## 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.

#### EXAMPLE: Amount of estimated stock value due to dividend growth

Using the data from the previous example, calculate how much of the estimated stock value is due to dividend growth.

**Answer:**

The estimated stock value with a growth rate of zero is:

$$V_0 = D / k = \$1.50 / 0.12 = \$12.50$$

The amount of the estimated stock value due to estimated dividend growth is:

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

## *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  $(1 - \text{dividend payout ratio})$  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 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**.

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

where  $P_n = \frac{D_{n+1}}{k_e - g_c}$  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 that will grow at the constant rate.
- Use the constant growth value to calculate the stock value at the end of the high-growth period.
- Add the PVs of all dividends to the PV of the terminal value of the stock.

#### 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:

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

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

Although we increase  $D_1$  by the high growth rate of 15% to get  $D_2$ ,  $D_2$  will grow at the constant growth rate of 5% for the foreseeable future. This property of  $D_2$  allows us to use the constant growth model formula with  $D_2$  to get  $P_1$ , a time = 1 value for all the (infinite) dividends expected from time = 2 onward.

$$P_1 = \frac{D_2}{k_e - g_c} = \frac{1.32}{0.11 - 0.05} = 22.00$$

Finally, we can sum the present values of dividend 1 and of  $P_1$  to get the present value of all the expected future dividends during both the high- and constant growth periods:

$$\frac{1.15 + 22.00}{1.11} = \$20.86$$



#### PROFESSOR'S NOTE

Many finance textbooks solve multiple stage growth problems like this one by using the first dividend that has grown at the constant long-term rate to calculate the terminal value, one period after the dividend we have used. Except for rounding, this results in the same current stock value. In fact, the constant growth model can be employed using any dividend during the assumed constant growth period.

A common mistake with multistage growth problems is to calculate the future value,  $P_1$  in this example, and then to either forget to discount it back to the present or to discount over the number of periods until the constant growth dividend is paid (two in this example) rather than using the correct number of periods for discounting the constant growth value (one period in the example). Don't make these mistakes because question writers like to present these common errors as answer choices.

### **LOS 38.h: Identify characteristics of companies for which the constant growth or a multistage dividend discount model is appropriate.**

*CFA® Program Curriculum, Volume 4, page 375*

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 38.2**

*To best evaluate your performance, enter your quiz answers online.*

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 38.3: RELATIVE VALUATION MEASURES

**LOS 38.i: 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.**



Video covering  
this content is  
available online.

*CFA® Program Curriculum, Volume 4, page 385*

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 (sales, book value, earnings, etc.). 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 38.j: 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.**

*CFA® Program Curriculum, Volume 4, page 385*

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:**

$$\text{expected P/E ratio: } 0.3 / (0.13 - 0.06) = 4.3$$

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:

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

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 38.k: 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:

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

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 Study Session on fixed income valuation, 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:  $\$40 \times 200,000 = \$8,000,000$ .

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.

$$EV/EBITDA = \$9,550,000 / \$1,000,000 \approx 9.6.$$

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 38.l: Describe asset-based valuation models and their use in estimating equity value.

*CFA® Program Curriculum, Volume 4, page 397*

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	<u>\$120,000</u>
Total assets	\$200,000
Accounts payable	\$5,000
Notes payable	\$30,000
Term loans	\$45,000
Common stockholder equity	<u>\$120,000</u>
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 38.m: Explain advantages and disadvantages of each category of valuation model.

*CFA® Program Curriculum, Volume 4, page 369*

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 38.3

*To best evaluate your performance, enter your quiz answers online.*

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 38.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 38.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 38.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 38.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 38.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 38.f

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 38.g

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:

$$g = b \times \text{ROE}$$

where:

$b$  = earnings retention rate =  $1 - \text{dividend payout rate}$

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:

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

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 38.h

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 38.i

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 38.j

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 38.k

Enterprise value (EV) measures total company value:

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

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 38.1

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.

## LOS 38.m

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.

## ANSWER KEY FOR MODULE QUIZZES

### Module Quiz 38.1

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 38.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 38.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 38.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 38.d)

### Module Quiz 38.2

1. **A** For the constant growth model, the constant growth rate ( $g$ ) must be less than the required rate of return ( $k$ ). (LOS 38.e)
2. **C** The share value is  $7.0 / 0.0775 = \$90.32$ . (LOS 38.f)
3. **B**  $(\$40 + \$2) / 1.15 = \$36.52$ . (LOS 38.g)
4. **B** Using the constant growth model,  $\$1(1.05) / (0.10 - 0.05) = \$21.00$ . (LOS 38.g)
5. **C**  $(\$1.25 / 1.11) + [1.56 / (0.11 - 0.05)] / 1.11 = \$24.55$ . (LOS 38.g)
6. **C**  $\$1(1.25) / 1.1 + [\$1(1.25)^2 / (0.10 - 0.06)] / 1.1 = \$36.65$ . (LOS 38.g)
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 38.h)

## Module Quiz 38.3

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 38.i)
2. **B** Using the earnings multiplier model,  $0.6 / (0.15 - 0.07) = 7.5\times$ . (LOS 38.j)
3. **B** Enterprise value is market value of equity plus market value of debt minus cash and short-term investments. (LOS 38.k)
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 38.l)
5. **B** Results that may not be comparable across firms are considered a disadvantage of valuation models based on price multiples. (LOS 38.m)

## TOPIC QUIZ: EQUITY INVESTMENTS

*You have now finished the Equity Investments topic section. Please log into your Schweser online dashboard and take the Topic Quiz on Equity Investments. The Topic Quiz provides immediate feedback on how effective your study has been for this material. The number of questions on this quiz is approximately the number of questions for the topic on one-half of the actual Level I CFA exam. 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.*

*After you've completed this Topic Quiz, select "Performance Tracker" to view a breakdown of your score. Select "Compare with Others" to display how your score on the Topic Quiz compares to the scores of others who entered their answers.*

# FORMULAS

$$NPV = CF_0 + \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \dots + \frac{CF_n}{(1+k)^n} = \sum_{t=0}^n \frac{CF_t}{(1+k)^t}$$

$$IRR: 0 = CF_0 + \frac{CF_1}{(1+IRR)^1} + \frac{CF_2}{(1+IRR)^2} + \dots + \frac{CF_n}{(1+IRR)^n} = \sum_{t=0}^n \frac{CF_t}{(1+IRR)^t}$$

$$WACC = (w_d)[k_d(1-t)] + (w_{ps})(k_{ps}) + (w_{ce})(k_{ce})$$

$$\text{after-tax cost of debt} = k_d(1-t)$$

$$\text{cost of preferred stock} = k_{ps} = D_{ps} / P$$

cost of common equity:

$$k_{ce} = R_f + \beta[E(R_m) - R_f]$$

$k_{ce}$  = bond yield + risk premium

$$\text{Adjusted beta} = 2/3 \times \text{unadjusted beta} + 1/3$$

$$\text{unlevered asset beta:} \quad \text{target beta:}$$

$$\beta_{\text{ASSET}} = \beta_{\text{EQUITY}} \left\{ \frac{1}{1 + \left[ (1-t) \frac{D}{E} \right]} \right\} \quad \beta_{\text{TARGET}} = \beta_{\text{ASSET}} \left\{ 1 + \left[ (1-t) \frac{D}{E} \right] \right\}$$

$$\text{degree of operating leverage} = \frac{Q(P-V)}{Q(P-V)-F} = \frac{\% \Delta EBIT}{\% \Delta \text{sales}}$$

$$\text{degree of financial leverage} = \frac{EBIT}{EBIT-I} = \frac{\% \Delta EPS}{\% \Delta EBIT}$$

$$\text{degree of total leverage} = DOL \times DFL = \frac{\% \Delta EPS}{\% \Delta \text{sales}}$$

$$\text{breakeven quantity of sales} = \frac{\text{fixed operating costs} + \text{fixed financing costs}}{\text{price} - \text{variable cost per unit}}$$

$$\text{operating breakeven quantity of sales} = \frac{\text{fixed operating costs}}{\text{price} - \text{variable cost per unit}}$$

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

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

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

$$\text{number of days of receivables} = \frac{365}{\text{receivables turnover}} = \frac{\text{average receivables}}{\text{average day's credit sales}}$$

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

$$\text{number of days of inventory} = \frac{365}{\text{inventory turnover}} = \frac{\text{average inventory}}{\text{average day's COGS}}$$

$$\text{payables turnover ratio} = \frac{\text{purchases}}{\text{average trade payables}}$$

$$\text{number of days of payables} = \frac{365}{\text{payables turnover ratio}} = \frac{\text{average payables}}{\text{average day's purchases}}$$

$$\text{operating cycle} = \text{average days of inventory} + \text{average days of receivables}$$

$$\text{cash conversion cycle} = \left( \begin{array}{l} \text{average days} \\ \text{of receivables} \end{array} \right) + \left( \begin{array}{l} \text{average days} \\ \text{of inventory} \end{array} \right) - \left( \begin{array}{l} \text{average days} \\ \text{of payables} \end{array} \right)$$

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

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

$$\text{market cap-weighted index} = \frac{\sum [(\text{price}_{\text{today}})(\text{number of shares outstanding})]}{\sum [(\text{price}_{\text{base year}})(\text{number of shares outstanding})]} \times \text{base year index value}$$

$$\text{preferred stock valuation model: } P_0 = \frac{D_p}{k_p}$$

$$\text{one-period stock valuation model: } P_0 = \frac{D_1}{1 + k_e} + \frac{P_1}{1 + k_e}$$

$$\text{infinite period model: } P_0 = \frac{D_1}{k_e - g} = \frac{D_0 \times (1 + g)}{k_e - g}$$

multistage model:

$$P_0 = \frac{D_1}{(1 + k_e)} + \frac{D_2}{(1 + k_e)^2} + \dots + \frac{D_n}{(1 + k_e)^n} + \frac{P_n}{(1 + k_e)^n}$$

where:

$P_n = \frac{D_{n+1}}{k_e - g_c}$ , and  $D_{n+1}$  is a dividend that will grow at the constant rate of  $g_c$  forever

$$\text{earnings multiplier: } \frac{P_0}{E_1} = \frac{D_1}{E_1}$$

expected growth rate:  $g = (\text{retention rate})(\text{ROE})$

$$\text{trailing P/E} = \frac{\text{market price per share}}{\text{EPS over previous 12 months}}$$

$$\text{leading P/E} = \frac{\text{market price per share}}{\text{forecast EPS over next 12 months}}$$

$$\text{P/B ratio} = \frac{\text{market value of equity}}{\text{book value of equity}} = \frac{\text{market price per share}}{\text{book value per share}}$$

where:

$$\begin{aligned} \text{book value of equity} &= \text{common shareholders' equity} \\ &= (\text{total assets} - \text{total liabilities}) - \text{preferred stock} \end{aligned}$$

$$\text{P/S ratio} = \frac{\text{market value of equity}}{\text{total sales}} = \frac{\text{market price per share}}{\text{sales per share}}$$

$$\text{P/CF ratio} = \frac{\text{market value of equity}}{\text{cash flow}} = \frac{\text{market price per share}}{\text{cash flow per share}}$$

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

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