CHAPTER 10

Stock Valuation

Chapter **Outline**

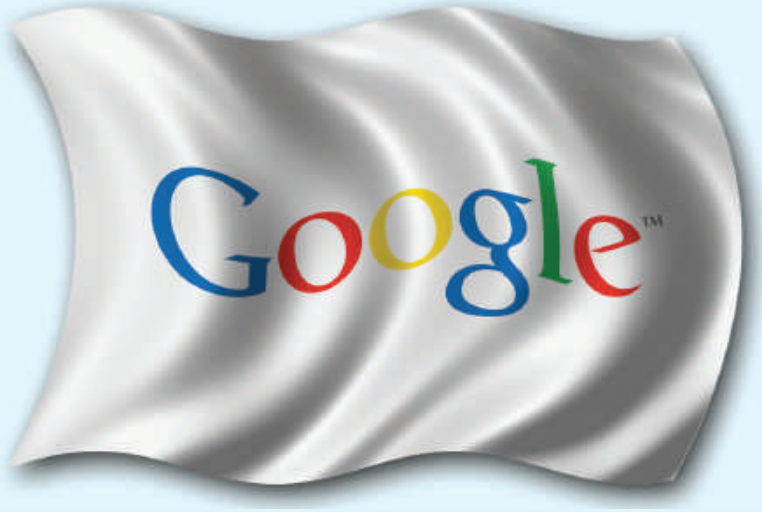
10.1 Common Stock **(pgs. 334–343)** → **Objective 1.** Identify the basic characteristics and features of common stock and use the discounted cash flow model to value common shares.

10.2 The Comparables Approach to Valuing Common Stock **(pgs. 343–347)** → **Objective 2.** Use the price/earnings (P/E) ratio to value common stock.

10.3 Preferred Stock **(pgs. 347–352)** → **Objective 3.** Identify the basic characteristics and features of preferred stock and value preferred shares.

Principles P1, P2, P3, P4, and P5 Applied

The determinants of stock valuation reflect the first three principles of finance: P Principle 1: **Money Has a Time Value**, P Principle 2: **There Is a Risk-Reward Tradeoff, and** P Principle 3: **Cash Flows Are the Source of Value**. We apply these principles to the valuation of a firm's common and preferred stock in this chapter following the same basic procedure we used to value a firm's bonds in Chapter 9. And because stock is typically sold in public markets where many investors are actively looking for under- and overpriced stock to purchase or sell, the fourth basic principle of finance comes into play. The fundamental implication of P Principle 4: **Market Prices Reflect Information** is that market prices are usually pretty good reflections of the value of the underlying shares of stock. In addition, P Principle 5: **Individuals Respond to Incentives** takes on importance because managers respond to incentives in their contracts, and if these incentives are not properly aligned with those of the firm's shareholders, managers may not make decisions consistent with increasing shareholder value.



If success is having your firm's name become a verb, then the founders of Google, Inc. (GOOG), Sergey Brin and Larry Page, have reached the very pinnacle of success. If you want to learn more about something, what do you do? Go to an encyclopedia? No, you *google* it. If you're writing a paper for a class, you *google* the topic; if you're buying a product, you *google* it to find which brand is best; and, if you're considering a new doctor, you may even *google* him or her.

In August of 2015, Google reorganized, creating a holding company named Alphabet with a number of subsidiary companies, the largest of which is Google. By almost any criterion, Google, as Alphabet, Inc., was originally called, is a phenomenal success story. But Google's early years were actually much like the early years of any start-up company.

In early 2004, Google's board of directors deliberated over how to translate their firm's success into money. The answer came with their decision to sell some of Google's stock to the public. They decided to auction off about 20 million shares of Google's common stock for between $108 and $135 per share. The offering was a great success; the stock price doubled within the next year and then doubled again the following year.

However, the value of Google's stock has fluctuated substantially since then. For example, in late 2007 it reached a high of over $700 per share and then fell to less than half of that amount within a year, but by 2013, it had recovered and set a new all-time high, closing above $800. Then by early 2016, in the year following its conversion to Alphabet, it overtook Apple as the most valuable U.S. company. Any investor considering the purchase of shares of Alphabet, Apple, or any other company would want to understand the fundamental determinants of its value. As we will discuss in this chapter, that value is determined by the time value of money, the risk-reward tradeoff, and the value of expected cash flows.

We begin with an examination of the characteristics of common stock followed by a look at its valuation. Here we not only consider the discounted cash flow method to value a firm's stock but also look at some common market-based ratios, such as the price/earnings ratio, used to value common stock. We then move on to an examination of the characteristics and valuation of preferred stock. Finally, we conclude with a discussion of the various stock markets, where the shares of stock are traded after they are issued.

Regardless of Your Major…

"Getting Your Fair Share"

Are you interested in starting your own business? If you are, then you are probably aware that you share this dream with millions of college students who are majoring in almost every conceivable area of study. If you start a company that becomes a success, at some point you will want to know the value of your ownership interest, and to determine that, you will need to know how equity securities are valued in the financial markets. For example, when Larry and Sergey were just getting started, they needed money to expand. Fortunately, one of their professors linked them up with one of the founders of Sun Microsystems, Andy Bechtolsheim. After a short demonstration in Larry's dorm room, Andy was impressed with the potential and handed them a check for $100,000—after which Larry and Sergey immediately filed incorporation papers so they could cash the check made out to Google. But how did Larry and Sergey decide how much of Google an investment of $100,000 would buy? Should $100,000 buy 10 percent of the business? Is this is a fair price? To answer these questions, you need to know the value of Google, and to determine that, you need to know something about finance and equity valuation.

Your Turn: See Study Question 10–1.

10.1 Common Stock

As you learned in Chapter 2, common stock represents ownership of the corporation, so the common stockholders are the owners of the firm. They elect the firm's board of directors, who, in turn, appoint the firm's top management team. The firm's management team then carries out the day-to-day management of the firm.

Characteristics of Common Stock

Common stock does not have a maturity date but exists as long as the firm does. Nor does common stock have an upper or lower limit on its dividend payments. In the event of bankruptcy, the common stockholders—as owners of the corporation—have the most junior claim, which means that they are not entitled to the assets of the firm until the firm's debt holders and preferred shareholders have been fully paid.

As we learned in Chapter 2, new securities trade in the primary market, whereas previously issued securities trade in the secondary market. In other words, if you bought 100 shares of Google (GOOG) stock during its **initial public offering (IPO)**—that is, the first time a company issues stock to the public—you bought them in the primary market but will have to sell them on the secondary market. When you sell them, the proceeds will go to you, the seller of the stock, not to Google. In fact, the only time Google ever receives money from the sale of one of its securities is when it is sold in the primary market.

Claim on Income

As the owners of the corporation, the common shareholders have the right to the firm's income that remains after bondholders and preferred stockholders have been paid. The common shareholders will either receive cash payments in the form of dividends or, if the firm's management reinvests its earnings back into the firm, reap any increase in value that results from the reinvested earnings. As we will see in Chapter 16, many times firms return money to their shareholders through stock repurchases or stock buybacks, where the firm uses its cash to repurchase some of its stock, and as a result, every remaining shareholder owns a larger portion of the company.

The right to residual income has both advantages and disadvantages for the common stockholder. The main advantage is that the potential return is unlimited. Once the claims of

Finance for Life

Herd Mentality

There is no question that individuals are influenced by what other individuals are doing. Back in the 1950s, Solomon Asch conducted a number of studies. In one of them he asked questions that were clearly false, but because he presented them as if everyone else had said they were true, the subjects answered "true." He referred to this as conformity or peer pressure, but it is also part of the herd mentality that we see in investors. There is also evidence that suggests that when individuals hear that "other investors" are selling or buying stocks, they have a tendency to do the same. They may ignore their own information and financial goals and just follow the herd. You want to make sure that how you invest reflects the value of stocks and your financial goals, not what others are doing.

Your Turn: See Study Question 10–5.

the more senior securities (bonds and preferred stock) have been satisfied, all the earnings that remain belong to common stockholders. The disadvantage, of course, is that there may be little or nothing left after paying the bondholders their principal and interest and paying the preferred shareholders their dividends.

Claim on Assets

Just as common stock has a residual claim on income, it also has a residual claim on assets in the case of liquidation. However, the claims of common shareholders get paid only after the claims of debt holders and preferred stockholders have been satisfied. Unfortunately, when bankruptcy does occur, the claims of the common shareholders generally go unsatisfied. This residual claim on assets adds to the risk of common stock. Thus, although common stock has historically provided a higher return than other securities, averaging about 10 percent compounded annually from 1926 through 2015, the returns are also much riskier.

Voting Rights

The common shareholders elect the board of directors and are in general the only security holders given a vote. Early in the twentieth century, it was not uncommon for a firm to issue two classes of common stock that were identical except that only one carried voting rights. For example, the Great Atlantic and Pacific Tea Company (GAP) had two such classes of common stock. This practice was virtually eliminated by three developments: (1) the Public Utility Holding Company Act of 1935, which gave the Securities and Exchange Commission the power to require that newly issued common stock carry voting rights; (2) the New York Stock Exchange's refusal to list common stock without voting privileges; and (3) investor demand for the inclusion of voting rights. However, with the merger boom of the 1980s, dual classes of common stock with different voting rights again emerged, this time as a defensive tactic used to prevent takeovers. Today, for example, Alphabet, Inc. (GOOG and GOOGL), has three classes of common stock, an arrangement that gives majority control to the firm's top three executives.[1] Likewise with Facebook (FB), just before the company went public in 2012, it created two classes of shares, and those owned by founder Mark Zuckerberg had far more voting power than the ones sold to outside shareholders. In fact, at the time of Facebook's initial public offering, Zuckerberg owned only 18 percent of the company but had control of 57 percent of the voting power.

[1] Google's Class A stock has one vote per share, while its Class B stock, owned only by Chief Executive Eric Schmidt and founders Larry Page and Sergey Brin, has 10 votes per share and its Class C stock has no voting rights.

Common shareholders not only have the right to elect the board of directors but also must approve any change in the corporate charter. A typical charter change might involve the authorization to issue new stock or perhaps engage in a merger.

Voting for directors and charter changes occurs at the corporation's annual meeting. Some shareholders vote in person, but the majority generally vote by proxy. A **proxy** gives a designated party the temporary power of attorney to vote for the signee at the corporation's annual meeting. The firm's management generally solicits proxy votes, and if the shareholders are satisfied with their performance, managers have little problem securing them. However, in times of financial distress or when management takeovers are being attempted, battles between rival groups for proxy votes often occur.

Although each share of stock generally carries the same number of votes, the voting procedure is not always the same from company to company. The two procedures commonly used are majority and cumulative voting. With **majority voting**, each share of stock allows the shareholder one vote, and each position on the board of directors is voted on separately. Because each member of the board of directors is elected by a simple majority, a majority of shares has the power to elect the entire board of directors.

With **cumulative voting**, each share of stock allows the shareholder a number of votes equal to the number of directors being elected. The shareholder can then cast all of his or her votes for a single candidate or split them among the various candidates. The advantage of a cumulative voting procedure is that it gives minority shareholders the power to elect a director.

Agency Costs and Common Stock

In theory, the common stockholders elect the corporation's board of directors, and the board of directors picks the management team. As a result, shareholders effectively control the firm through their representatives on the board of directors. In reality, the system frequently works the other way around. Shareholders are offered a slate of nominees selected by management from which to choose a board of directors. The end result is that management effectively selects the directors, who then may have more allegiance to the managers than to the shareholders. This, in turn, sets up the potential for the agency problems we discussed earlier in Chapter 1.

Recall from our discussion of P Principle 5: I**ndividuals Respond to Incentives** that even though managers are employees and, as such, owe their loyalty to the firm's stockholders (its owners), if their incentives are not properly aligned with those of the firm's shareholders, they may put their personal interests ahead of those of the firm's owners. This is referred to as the *agency problem* and is particularly critical in very large corporations that are run by professional managers who own only a small percentage of the firm's shares. When this is the case, managers are likely to avoid unpleasant tasks, such as reducing the number of employees; they may take less profitable projects that they personally like while avoiding very risky projects that may jeopardize their jobs.

The costs associated with the manager-stockholder (owner) agency problem are difficult to quantify, but, occasionally, we see indirect evidence of its importance. For instance, if investors feel that the management of a firm has been damaging shareholder value, we will observe a positive stock price response to the removal of that management team. For example, on the day following the death of Roy E. Farmer, who had been chairman and president of the coffee roaster Farmers Brothers (FARM), the firm's stock price rose about 27 percent. Many investors felt that Farmer was not an effective CEO and that his decision to hold a huge cash reserve rather than either using the cash to expand the business or distributing it to the firm's stockholders had been harming the shareholders. So with his demise, investors perceived the chance to change the direction of the firm in ways that would increase its value.

Valuing Common Stock Using the Discounted Dividend Model

As with bonds, a common stock's value is equal to the present value of all future cash flows that the stockholder expects to receive from owning the share of stock. However, in contrast to bonds, common stock does *not* offer its owners a promised interest payment, maturity payment, or dividend. For common stock, the dividend is based on (1) the profitability of the firm

and (2) management's decision as to whether it will pay dividends or retain the firm's earnings in order to grow the firm.

Thus, dividends will vary with a firm's profitability and its stage of growth. In a company's early years, few, if any, dividends are typically paid because all of the firm's cash flow is reinvested to finance the firm's growth. As the company matures, additional investment opportunities become less attractive, and the firm will typically begin paying more and more dividends to the common stockholders.

Because there is no promised dividend, common stock is valued by discounting the dividend stream that the firm is *expected* to pay to its shareholders. These expected dividends are discounted back to the present using the investor's required or expected rate of return, which is the rate of return that investors expect to receive from an investment of equal risk. We will refer to this expected rate of return as the *investor's required rate of return*.

Three-Step Procedure for Valuing Common Stock

To value common stock, we will use the same three-step procedure we used to value bonds in Chapter 9.

Step 1. Estimate the amount and timing of the receipt of the future cash flows the common stock is *expected* to provide.

Step 2. Evaluate the riskiness of the common stock's future dividends, and determine the rate of return an investor would expect to receive from a comparable-risk investment. The expected return of a comparable investment is the stock's required rate of return.

Step 3. Calculate the present value of the expected dividends by discounting them back to the present at the stock's required rate of return.

Let's take a look at these three steps. Each of them relies on one of our basic principles: Step 1 relies on Principle 3: **Cash Flows Are the Source of Value**, step 2 relies on Principle 2: **There Is a Risk-Return Tradeoff**, and step 3 relies on Principle 1: **Money Has a Time Value**. In step 1, we estimate the amount and timing of future cash flows. If you bought a share of common stock and never sold it, the only cash flow you would ever receive would be the dividends that the firm paid. Step 2 involves an estimate of the required rate of return, which was covered in Chapter 8, whereas step 3 involves calculating the present value of the future cash flows, discounted at the required rate of return. What this all means is that *the value of a common stock is equal to the present value of all future dividends*.

Along with the first three principles, the fourth principle comes into play in determining the value of a share of common stock because stock is typically sold in public markets where many investors are actively looking for under- and overpriced stock to purchase or sell. The fundamental implication of Principle 4: **Market Prices Reflect Information** is that market prices are usually pretty good reflections of the value of the underlying shares of stock.

Basic Concept of the Stock Valuation Model

To illustrate the basic concept of stock valuation, consider a situation in which we are valuing a share of common stock that we plan to hold for only one year. The stock pays a $1.75 dividend at the end of the year and is expected to have a price of $50.00 in one year when we plan to sell it. If investors require a 15 percent rate of return from investing in the stock, the value of the stock today is simply the present value of the dividend plus the selling price of the stock, discounted back one year using a 15 percent rate of return:

$$\text{Value of Common Stock Today} = \frac{\$1.75 + 50.00}{(1 + .15)^1} = \$45.00$$

In this instance, the share of stock is worth $45.00 today. Now let's assume that we decide to hold the stock for two years, so we receive two annual dividends of $1.75 and then sell the share of stock for $55.75. What value should we assign to the stock today if we plan on holding it for two years? We find the answer as follows:

$$\text{Value of Common Stock Today} = \frac{\$1.75}{(1 + .15)^1} + \frac{\$1.75 + 55.75}{(1 + .15)^2} = \$45.00$$

In both examples, the value of the share of stock today is equal to the present value of future dividends plus the selling price of the stock at the end of the holding period. This selling price is simply the present value of the dividends for all subsequent periods. For example, based on what we know about this stock, what should the price of the firm's stock be at the end of Year 1? The answer is found by discounting the dividend for Year 2 and the price at the end of Year 2 back one period to the end of Year 1:

$$\text{Value of Common Stock at Year 1} = \frac{\$1.75 + 55.75}{(1 + .15)^1} = \$50.00$$

The important learning point is that the value of a share of common stock can be thought of as the present value of future dividends where there are an infinite number of years (∞) over which dividends are received.

$$\text{Value of Common Stock in Year 0} = \frac{\text{Dividend for Year 1}}{\left(1 + \text{Stockholder's Required Rate of Return}\right)^1} + \frac{\text{Dividend for Year 2}}{\left(1 + \text{Stockholder's Required Rate of Return}\right)^2}$$
$$+ \frac{\text{Dividend for Year 3}}{\left(1 + \text{Stockholder's Required Rate of Return}\right)^3} + \cdots + \frac{\text{Dividend for Year } \infty}{\left(1 + \text{Stockholder's Required Rate of Return}\right)^\infty}$$

Valuing a share of common stock using this general discounted cash flow model is made difficult by virtue of the fact that the analyst has to forecast each of the future dividends. However, the forecasting problem is greatly simplified if the future dividends are expected to grow at a fixed or constant rate each year.

The Constant Dividend Growth Rate Model

If the firm's cash dividends grow by a constant rate each year, then the discounted value of these growing dividends forms the basis for a common stock valuation model that can be defined as follows:

$$\text{Value of Common Stock in Year 0} = \frac{\text{Dividend Paid in Year 0}\left(1 + \text{Dividend Growth Rate}\right)^1}{\left(1 + \text{Stockholder's Required Rate of Return}\right)^1} + \frac{\text{Dividend Paid in Year 0}\left(1 + \text{Dividend Growth Rate}\right)^2}{\left(1 + \text{Stockholder's Required Rate of Return}\right)^2}$$
$$+ \frac{\text{Dividend Paid in Year 0}\left(1 + \text{Dividend Growth Rate}\right)^3}{\left(1 + \text{Stockholder's Required Rate of Return}\right)^3} + \cdots + \frac{\text{Dividend Paid in Year 0}\left(1 + \text{Dividend Growth Rate}\right)^\infty}{\left(1 + \text{Stockholder's Required Rate of Return}\right)^\infty} \quad \textbf{(10–1)}$$

Fortunately, Equation (10–1) can be simplified greatly using the present value of a growing perpetuity, Equation (6–6), if dividends grow each year at a constant rate, g.

This **constant dividend growth rate model** of common stock valuation is defined in Equation (10–2) as follows:

$$\text{Value of Common Stock in Year 0} = \frac{\text{Dividend in Year 0}\left(1 + \text{Dividend Growth Rate}\right)}{\text{Stockholder's Required Rate of Return} - \text{Dividend Growth Rate}} = \frac{\text{Dividend in Year 1}}{\text{Stockholder's Required Rate of Return} - \text{Dividend Growth Rate}} \quad \textbf{(10–2)}$$

Figure 10.1 provides a quick reference guide to Equation (10–2).

Although we do not expect a firm's dividends to grow forever at a constant rate, this model has value and is used in the real world. A commonly used variant of this model is known as a three-stage growth model. With a three-stage growth model, rather than assuming a constant rate forever, a constant rate is assumed for a number of years—perhaps 5 years—after which the growth rate changes and continues on for a specified number of years—perhaps 10 more

Figure 10.1

A Quick Reference Guide for the Constant Dividend Growth Rate Valuation Model

If the rate of growth in common stock dividends is expected to be constant into the indefinite future and this rate of growth is less than the common stockholder's required rate of return, the discounted cash flow valuation model for common stock reduces to the following simple formula:

$$V_{cs} = \frac{D_0(1 + g)}{r_{cs} - g} = \frac{D_1}{r_{cs} - g} \quad \textbf{(10–2)}$$

Definitions and Assumptions:

- V_{cs} = the value of a share of common stock, which is equal to the present value of all future expected dividends.
- D_0 = the most recent annual cash dividend received by the common stockholder that was paid in the year the valuation is being done (Year 0).
- g = the expected annual rate of growth in the cash dividend payment, which is assumed to be constant forever.
- $D_1 = D_0 (1 + g)$ = the expected dividend for the end of Year 1.
- r_{cs} = the common stockholder's required rate of return for the shares of common stock. Note that this is not a market's required yield or promised rate of return but the rate of return the investor expects to earn from investing in the firm's stock. This expected rate of return reflects the riskiness of the stock's future dividends.

>> END FIGURE 10.1

years—after which it changes again and stays at that final rate forever. The implications of this more complicated model are the same as those of the simple constant growth model; that is, the level of dividends, the annual dividend rate of growth, and the common stockholder's required rate of return determine the value of the firm's common stock.

What Causes Stock Prices to Go Up and Down?

We can use the constant dividend growth rate model of stock valuation in Equation (10–2) to develop a better understanding of what causes stock prices to move up and down.

$$V_{cs} = \frac{D_0(1 + g)}{r_{cs} - g} = \frac{\text{Dividend in Year 1}}{\text{Stockholder's Required Rate of Return} - \text{Growth Rate}} \quad \textbf{(10–2)}$$

There are three variables on the right-hand side of the above stock valuation model that drive share value, V_{cs}. These are the most recent dividend (D_0), the investor's required rate of return (r_{cs}), and the expected rate of growth in future dividends (g). Note that the most recent dividend has already been paid so it can't change, and, thus, this variable is not a source of variation or changes in the stock price. This leaves two variables, r_{cs} and g, that can vary and lead to changes in stock prices. As a result, to understand what causes stock prices to go up and down, we need to consider changes in the stockholder's required rate of return, r_{cs}, and the growth rate in future dividend payments, g.

Determinants of the Investor's Required Rate of Return

The investor's required rate of return is determined by two key factors—the level of interest rates in the economy and the risk of the firm's stock. In Chapter 8, we used the Capital Asset Pricing Model (CAPM) to describe the determinants of investor-required rates of return. Recall that the expected or required rate of return of an investment using the CAPM was expressed as follows:

$$\text{Expected Rate of Return} = \text{Risk-Free Rate of Interest} + \text{Common Stock Beta Coefficient}\left(\text{Expected Rate of Return on the Market Portfolio} - \text{Risk-Free Rate of Interest}\right) \quad \textbf{(8–6)}$$

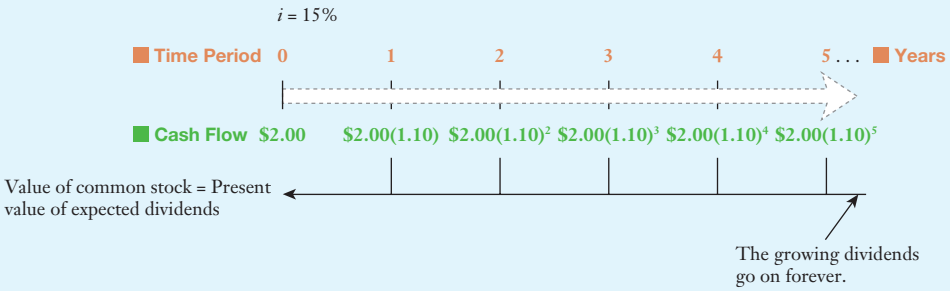
Checkpoint 10.1

Valuing Common Stock

Consider the valuation of a share of common stock that paid a $2 dividend at the end of last year and is expected to pay a cash dividend every year from now to infinity. Each year the dividends are expected to grow at a rate of 10 percent. Based on an assessment of the riskiness of the common stock, the investor's required rate of return is 15 percent. What is the value of this common stock?

STEP 1: Picture the problem

With a growing perpetuity, a timeline doesn't have an ending point but goes on forever, with the cash flows growing at a constant rate period after period—in this case, year after year:



STEP 2: Decide on a solution strategy

Because the value a share of stock can be viewed as the present value of a growing perpetuity, the equation for the value of a share of stock, which is presented in Equation (10–2), looks exactly like Equation (6–6), the equation for the value of a growing perpetuity. Because this equation involves only division, there is no need to look at an Excel solution or any unique keystrokes with a financial calculator.

STEP 3: Solve

In this problem, we must first determine D_1, the dividend next period. We know the stock paid a $2 dividend at the end of last year and that dividends are expected to grow at a rate of 10 percent forever. Because the $2 dividend was paid last period, $2 is D_0, and we are looking for D_1. Thus,

$$D_1 = D_0(1 + g) = \$2(1.10) = \$2.20$$

Substituting $D_1 = \$2.20$, $g = .10$, and $r_{cs} = .15$ into Equation (10–2), we get the following result:

$$V_{cs} = \frac{\$2.20}{.15 - .10} = \$44$$

Thus, the value of the common stock is $44.

STEP 4: Analyze

As you can see, once we assume that dividends will grow at a constant rate forever, the equation for the value of a share of stock boils down to just three variables, and one of them, D_1, is simply the dividend that already took place times $(1 + g)$. That means that changes in the dividend growth rate, g, and the required rate of return, r_{cs}, will push the stock price up and down. Certainly, this is not a perfect formula—after all, we've assumed that dividends will grow at a constant rate forever, and that simply isn't realistic. But it does allow us to boil an unmanageable formula down to something pretty simple and as a result see what factors move stock prices up and down.

STEP 5: Check yourself

What is the value of a share of common stock that paid a $6 dividend at the end of last year and is expected to pay a cash dividend every year from now to infinity, with that dividend growing at a rate of 5 percent per year, if the investor's required rate of return is 12 percent on that stock?

ANSWER: $90.

Your Turn: For more practice, do related **Study Problem** 10–3 at the end of this chapter.

>> END Checkpoint 10.1

Figure 10.2

A Quick Reference Guide for the Capital Asset Pricing Model

The Capital Asset Pricing Model (CAPM) is deceptively simple. It states that the expected rate of return on any risky investment can be thought of as the sum of the risk-free rate of interest and a risk premium. The risk premium, in turn, is determined by the market risk premium for the market portfolio and the beta coefficient for the investment.

$$r_{cs} = r_f + \beta_{cs}[E(r_m) - r_f] \quad \textbf{(8–6)}$$

Important Definitions and Concepts:

- r_{cs} = the investor's required rate of return on a firm's common stock.
- r_f = the risk-free rate of interest.
- β_{cs} = the beta of the stock.
- $E(r_m) - r_f$ = the market risk premium or the difference between the expected rate of return on the market portfolio, $E(r_m)$, and the risk-free rate of interest, r_f.

>> END FIGURE 10.2

Figure 10.2 contains a quick reference guide to the CAPM, including definitions for each of the key terms.

If the risk-free rate rises, perhaps reacting to an increase in anticipated inflation, other things remaining the same, the investor's required rate of return will rise, and the stock price will fall. Similarly, if the systematic risk of a stock increases, then the investor's required rate of return will rise accordingly, and, all else remaining the same, the share price will fall.

Determinants of the Growth Rate of Future Dividends

A change in the growth rate of expected future dividends can lead to a change in the stock price. For example, if Merck (MRK), the large pharmaceutical firm, were to get approval to market a revolutionary cancer-fighting drug, this would certainly raise investor expectations regarding the future growth rate in its earnings and dividends, which would, in turn, lead to a higher price for Merck's stock.

The key determinants of the future growth of a firm's earnings relate to the rates of return the firm expects to earn when it reinvests its earnings (the return on equity, or ROE) and the proportion of firm's earnings that it reinvests (retains or does not pay out in cash dividends), which is known as the retention ratio, b. To better understand this, consider the case where the ROE the firm expects to earn on reinvested earnings and the proportion of firm earnings that is retained and reinvested, b, are both assumed to be constant in the future. The growth rate in the firm's dividends, g, can then be thought of as simply the product of the firm's ROE and the ratio of the earnings it retains (the retention ratio, b). Because we will find this formula useful later, it is worthwhile defining the growth rate formally as follows:

$$\begin{pmatrix}\text{Rate of Growth}\\ \text{in Dividends } (g)\end{pmatrix} = \begin{pmatrix}\text{Retention}\\ \text{Ratio } (b)\end{pmatrix} \times \begin{pmatrix}\text{Rate of Return}\\ \text{on Equity } (ROE)\end{pmatrix}$$

where the retention ratio, b, is equal to one minus the dividend payout ratio (D_1/E_1):

$$\begin{pmatrix}\text{Rate of Growth}\\ \text{in Dividends } (g)\end{pmatrix} = \left(1 - \begin{pmatrix}\text{Dividend}\\ \text{Payout Ratio}\end{pmatrix}\right) \times \begin{pmatrix}\text{Rate of Return}\\ \text{on Equity } (ROE)\end{pmatrix} \quad \textbf{(10–3)}$$

Figure 10.3 contains a quick reference guide to Equation (10–3).

Figure 10.3

A Quick Reference Guide for the Growth Rate in Earnings and Dividends

The rate of growth a firm can expect in its future dividends is a function of how much of the firm's earnings are reinvested in the firm (i.e., the dividend retention ratio, *b*), and the rate of return the firm is expected to earn on the reinvested earnings (ROE).

$$g = (1 - D_1/E_1) \times ROE \qquad \textbf{(10–3)}$$

Important Definitions and Concepts:

- g = the expected annual rate of growth in dividends.
- D_1/E_1 = the dividend payout ratio, reflecting the ratio of cash dividends to be paid next period divided by the firm's earnings.
- $b = (1 - D_1/E_1)$, which is the proportion of firm earnings or net income that is retained and reinvested in the firm.
- ROE = the return on equity earned when the firm reinvests a portion of its earnings back into the firm.
- Equation (10–3) requires that the retention ratio, b, and ROE remain constant for all future periods.

>> END FIGURE 8.3

We now have the tools of financial analysis to value common stock, assuming that the dividends grow at a constant rate in perpetuity, which are shown as follows.

Tools of Financial Analysis—Common Stock Valuation

Name of Tool	Formula	What It Tells You
Common stock valuation	$V_{cs} = \frac{D_1}{(1 + r_{cs})^1} + \frac{D_2}{(1 + r_{cs})^2} + \cdots + \frac{D_n}{(1 + r_{cs})^n} + \cdots + \frac{D_\infty}{(1 + r_{cs})^\infty}$	• The value of a share of stock is the present value of the expected dividends discounted using the investor's required or expected rate of return.
Common stock valuation, assuming constant dividend growth	$V_{cs} = \frac{\text{Dividend in Year 1}}{\text{Required Rate of Return} - \text{Dividend Growth Rate}}$ $V_{cs} = \frac{D_1}{r_{cs} - g}$	• What the value of a share of stock would be if dividends grow at a constant rate in perpetuity and all else held constant. • If the required rate of return, r_{cs}, goes up, the value of the stock goes down. • If the growth rate, g, goes up, the value of the stock climbs.
Investor's required rate of return using the CAPM	$r_{cs} = r_f + \beta[E(r_m) - r_f]$	• A stock's required rate of return is a function of the risk-free rate and a return to compensate for the risk of the firm's stock.
Dividend growth rate	$\text{Rate of Growth in Dividends } (g) = \text{Retention Ratio } (b) \times \text{Rate of Return on Equity } (ROE)$ $g = (1 - D_1/E_1) \times ROE$	• An estimation of a company's growth rate to be used in valuing the stock. • The growth rate of future dividends is dependent on (1) the proportion of the firm's earnings that are reinvested and (2) the rate of return the firm earns on earnings that it reinvests.

Before you move on to 10.2

Concept Check | 10.1

1. What are the attributes of common stock that distinguish it from bonds and preferred stock?
2. What does agency cost mean with respect to the owners of a firm's common stock?
3. Describe the three-step process for valuing common stock using the discounted dividend model.

10.2 The Comparables Approach to Valuing Common Stock

The discounted dividend valuation model provides a good framework for estimating the value of common stock and for understanding what drives stock prices up and down. However, this approach requires a number of inputs, such as the rate of growth and the discount rate, that are difficult to estimate, especially for companies like Alphabet (GOOG), eBay (EBAY), and Amazon.com (AMZN) that do not yet pay cash dividends. For this reason, analysts often use market comparables or "comps" to estimate firm values. This method estimates the value of the firm's stock as a multiple of some measure of firm performance, such as the firm's earnings per share, book value per share, sales per share, or cash flow per share, where the multiple is determined by the multiples observed from comparable companies. By far the most common performance metric is earnings per share, which means that the values are determined from the price/earnings ratio, or the earnings multiplier, of comparable firms.

Defining the P/E Ratio Valuation Model

Investors regularly use the **price/earnings ratio** (sometimes referred to as the *P/E ratio* or *P/E multiple*) as a measure of a stock's relative value. The price/earnings ratio, or earnings multiplier, is simply the price per share divided by the company's earnings per share. In effect, it is a relative value model because it tells the investor how many dollars investors are willing to pay for each dollar of the company's earnings. The earnings per share in the denominator will be either the earnings per share for the most recent four quarters or the expected earnings per share over the next four quarters.

We write it as

$$\text{Value of Common Stock, } V_{cs} = \left(\begin{array}{c}\text{Appropriate}\\ \text{Price/Earnings Ratio}\end{array}\right) \times \left(\begin{array}{c}\text{Estimated Earnings}\\ \text{per Share for Year 1}\end{array}\right) = \frac{P}{E_1} \times E_1 \quad \textbf{(10–4)}$$

Figure 10.4 contains a quick reference guide to Equation (10–4).

P/E ratios allow us to express the price of stocks in relative terms—that is, the price per dollar of earnings—which makes it easier to compare one stock to another. The investor can decide what an appropriate P/E ratio is for the stock being valued by looking at the P/E ratio of other stocks and then, based on the anticipated earnings, determine what the price of the stock should be. As a result, it takes the emphasis off determining the price per share and puts it on determining a fair P/E ratio.

What Determines the P/E Ratio for a Stock?

How do you determine an appropriate P/E ratio for a specific stock? One obvious answer would be to look at the P/E ratios of similar stocks.

As a first step, we should look at the P/E ratio for the entire market. The P/E ratio of U.S. stock market indexes such as the S&P 500 is typically between 15 and 25, depending on the strength of the economy, the level of interest rates, the size of the federal deficit, and the inflation rate. This overall market P/E ratio can then be adjusted depending on the specific prospects for the individual stock. For example, if the growth potential is above average, we would adjust the P/E ratio upward—but by how much is the real question. Looking at the P/E ratios of firms of similar size in the same industry probably provides the most useful information.

Figure 10.4

A Quick Reference Guide for the Price/Earnings Stock Valuation Model

The price/earnings stock valuation model is sometimes referred to as a relative valuation model that is based on comparable-firm valuations. This reflects the fact that the price/earnings ratio used to value the stock measures value relative to firm earnings and is chosen by looking at comparable firms.

$$V_{cs} = \frac{P}{E_1} \times E_1 \qquad \textbf{(10–4)}$$

Important Definitions and Concepts:

- V_{cs} = the value of the common stock of the firm.
- P/E_1 = the price/earnings ratio for the firm based on the current price per share divided by earnings for the end of Year 1.[2]
- E_1 = the estimated earnings per share of common stock for the end of Year 1.

>> END FIGURE 10.4

P/E ratios can vary widely from stock to stock. For example, at the same time IBM (IBM) had a P/E ratio of 9, Ford (F) had a ratio of 7, Coca-Cola (COKE) had a ratio of 26, and Netflix (NFLX) had a ratio of 300—all in all a pretty wide range of P/E ratios! The question you might ask now is why anyone would pay $300 for every $1 of earnings that Netflix made but only $7 for every dollar of earnings that Ford made. As we now illustrate, different P/E ratios arise from differences in the risk and earnings growth expectations of the firms being compared.

To open our discussion of the determinants of a firm's P/E ratio, let's first review the constant dividend growth model of stock value presented earlier in Equation (10–2):

$$V_{cs} = \frac{D_0(1+g)}{r_{cs}-g} = \frac{\text{Dividend in Year 1}}{\text{Stockholder's Required Rate of Return} - \text{Growth Rate}} \qquad \textbf{(10–2)}$$

Recall that D_1 is the dividend expected at the end of the year, r_{cs} is the investor's required rate of return, and g is the expected rate of growth in dividends. If we assume that the current market price of the firm's shares (P) is equal to the value of the firm's shares, V_{cs} (i.e., the present value of expected future dividends), we can rewrite Equation (10–2) as follows:

$$P = \frac{D_1}{r_{cs}-g}$$

We now have a formula for the price of the firm's common stock. Let's divide both sides of this equation by our estimated earnings per share for next year, E_1, to find the P/E ratio, as follows:

$$\frac{P}{E_1} = \frac{D_1/E_1}{r_{cs}-g} \qquad \textbf{(10–5)}$$

To better understand the determinants of the P/E ratio, we expand Equation (10–5) by substituting for g. Recall from Equation (10–3) that $g = (1 - D_1/E_1) \times ROE$, which we now substitute into Equation (10–5):

$$\frac{P}{E_1} = \frac{D_1/E_1}{r_{cs}-g} = \frac{D_1/E_1}{r_{cs} - [(1 - D_1/E_1) \times ROE]} \qquad \textbf{(10–5a)}$$

[2] Technically, this is the definition of the *forward P/E* ratio because it uses predicted earnings one year hence. The P/E ratio can also be calculated using the most recent 12-month period's earnings, or trailing 12 months (TTM), P/E_{TTM}. For our purposes we will follow the convention of using the end-of-period earnings—that is, the trailing 12 months. In that way we do not have to rely on forecasts.

Checkpoint 10.2

Valuing Common Stock Using the P/E Ratio

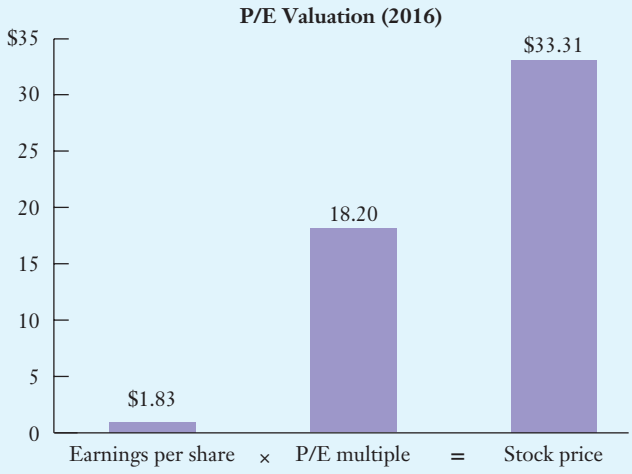
The Heels Shoe Company sells a line of athletic shoes for children and young adults, including cleats and other specialty footwear used for various types of sports. The company is privately owned and is considering the sale of a portion of its shares to the public. The company's owners are currently in discussions with an investment banker who has offered to manage the sale of shares to the public. The critical point of their discussion is the price that Heels might expect to receive upon the sale of its shares. The investment banker has explained that this price can be estimated by looking at the P/E multiples of other publicly traded firms that are in the same general business as the Heels Shoe Company and multiplying their average P/E ratio by Heels' expected earnings per share (EPS) for the coming year. Last year the Heels Shoe Company had earnings of $1.65 per share for the 12-month period ended in March, 2016. Heels' CFO estimates that company earnings for 2017 will be $1.83 a share.

As a preliminary step, the banker has suggested that Heels' management team consider the P/E multiples of three companies: Wolverine World Wide (WWW), Nike (NKE), and Steve Madden (SHOO). The current P/E ratios for these firms are as follows:

	P/E Ratio
Wolverine	18.52
Nike	19.75
Steve Madden	16.32
Average	18.20

What is your estimate of the price of Heels' shares based on the above comparable P/E ratios?

STEP 1: Picture the problem



STEP 2: Decide on a solution strategy

The P/E valuation method is deceptively easy because the analytics are simple. The estimated price per share is simply the product of the firm's estimated earnings per share for the coming year and what the analyst estimates to be an appropriate P/E ratio. That is, we substitute these values into Equation (10–4):

$$V_{CS} = P/E_1 \times E_1 \qquad \textbf{(10–4)}$$

STEP 3: Solve

Substituting into Equation (10–4), we estimate Heels' share price to be $33.31:

$$V_{CS} = P/E_1 \times E_1 = 18.20 \times \$1.83 = \$33.31$$

(10.2 CONTINUED >> ON NEXT PAGE)

STEP 4: Analyze

Based on the P/E ratios of these three comparable firms, we estimate the offering price of Heels' shares to be $33.31. However, this estimate is contingent on whether the companies chosen are appropriate comparables for the Heels Shoe Company. Also, because the sale of a privately held company's shares to the public can take several months, this estimate is contingent on no significant changes in the market. For example, if inflation worsens and the country slips into a recession, the P/E multiples of all public companies may fall. For this reason, the final offering price for a firm's shares that are being sold to the public is typically set the night before the offering and reflects the most recent P/E ratios of comparable firms.

STEP 5: Check yourself

After some careful analysis and reflection on the valuation of the Heels' shares, the company CFO has suggested that the earnings projections are too conservative and that earnings for the coming year could easily jump to $2.00. What does this do to your estimate of the value of Heels' shares?

ANSWER: $36.40.

Your Turn: For more practice, do related **Study Problem** 10–12 at the end of this chapter. **>> END Checkpoint 10.2**

Now we are ready to investigate the determinants of the P/E ratio. Specifically, looking at Equations (10–5) and (10–5a), we see that there are two fundamental determinants of a firm's P/E ratio:

1. **Growth Rate in Dividends.** The rate of growth in a firm's dividends is itself determined by how much of the firm's earnings are retained and reinvested (i.e., $1 - D_1/E_1$) and by the rate of return the firm earns when it reinvests those funds (ROE) because the growth rate equals the product of these two variables.
2. **Investor-Required Rate of Return.** The firm's stockholders require that the firm earn this rate of return, r_{cs} on their investment in the firm's stock.

Looking at the P/E equation found in Equation (10–5), we can make some quick observations about the mechanical or mathematical relationships between these variables and the P/E ratio:

1. **The higher the rate of growth in dividends, other things being the same, the higher the P/E ratio.** To see why, look at where g appears in the P/E equation, Equation (10–5a). It is subtracted in the denominator, so the larger g is, the smaller the denominator is and, consequently, the higher the P/E ratio is (assuming all else is held constant).
2. **The higher the investor's required rate of return, other things being the same, the lower the P/E ratio.** The required rate of return, r_{cs}, is in the denominator of the P/E equation, Equation (10–5a), and it has a positive sign. As a result, the higher the required rate of return, r_{cs}, is, holding all else constant, the lower the P/E ratio will be.

But what causes the growth rate in dividends (and earnings) and the investor's required rate of return to go up and down? These are the real determinants of the P/E ratio:

- **Firm factors impacting the investor's required rate of return, r_{cs}.** *The higher the investor's required rate of return, the lower the P/E ratio.* If the firm becomes more risky, r_{cs} will rise, and as a result, the P/E ratio will fall. Likewise, if the firm becomes less risky, r_{cs} will fall, and as a result, the P/E ratio will rise.
- **Economic or macro factors impacting the investor's required rate of return, r_{cs}.** All P/E ratios are affected by market interest rates and the general level of risk or uncertainty in the stock market. *Higher interest rates and greater uncertainty will increase the investor's required rate of return, whereas lower interest rates and less uncertainty will decrease the investor's required rate of return.* As a result, when interest rates and uncertainty decline, r_{cs} will decline for all stocks, and as a result, the P/E ratios on all stocks will rise.
- **Firm factors impacting the growth rate.** The growth rate in firm dividends is itself determined by two variables—dividend policy and the profitability of the firm's investment opportunities.

- **Dividend policy.** Firms that retain and reinvest their earnings put themselves in a position where future earnings might grow, whereas firms that pay out all their earnings in dividends cannot grow.
- **Firm investment opportunities.** Firm earnings and future dividends can grow only if the firm's investment opportunities are good enough to offer growth opportunities. This occurs when ROE exceeds the investor's required rate of return, r_{cs}; in that case, the higher the return on new investments (ROE), the higher the growth rate.

An Aside on Managing for Shareholder Value

If the ROE on a firm's new investment is exactly equal to the firm's required rate of return, the new investment doesn't add any value, and if that ROE is less than the required rate of return, the firm may face problems. This is really a commonsense notion. If a company's investors require a 20 percent return on their stock and the company makes new investments that have the same risk as its stock but that earn only 15 percent, the company's equity investors will not be pleased, and the stock price will decline. The lesson here is that shareholder value is created only when the reinvested earnings generate a rate of return higher than the required risk-adjusted rate of return. This may not sound like rocket science, but you would probably be surprised to learn just how many managers lose sight of this fundamental fact of business life.

A Word of Caution About P/E Ratios

The P/E ratio is not always calculated using a consistent definition of earnings. Although you would expect that the measure of earnings would be based on net income calculated using Generally Accepted Accounting Principles (GAAP), this is not always the case. P/E ratios are often reported using operating earnings, economic earnings, core earnings, or ongoing earnings. These earnings numbers tend to be higher than reported net income because they add back nonrecurring expenses that are labeled "one-time, exceptional, or noncash." The rationale for using these alternative earnings numbers is that they provide a clearer picture of the firm's long-term earnings potential. The problem is that there isn't any standard approach for determining what expenses should be omitted to provide a clearer picture of the firm's performance and the performance we might be able to expect to continue in the future.

Before you move on to 10.3

Concept Check | 10.2

1. If a corporation decides to retain its earnings and reinvest them in the firm, does the market value of the firm's shares always increase? Why or why not?
2. What is the price/earnings model of equity valuation?
3. How does a firm's dividend policy affect the firm's P/E ratio?

10.3 Preferred Stock

In Chapter 2, we referred to preferred stock as a hybrid security that shares some of the features of bonds and common stock. For example, like bonds that pay a contractually set interest payment, preferred stock has a contractually stated cash dividend that is paid to the preferred stockholder. Like common stock, and unlike bonds, there is no maturity for a preferred stock issue. Let's consider some of the key features of preferred stock that make it unique.

Features of Preferred Stock

In general, the size of the preferred stock dividend is fixed, and it is stated either as a dollar amount or as a percentage of the preferred stock's par value. For example, DuPont (DD.PB) has issued $4.50 preferred stock, meaning that the preferred stock pays $4.50 per year in dividends. On the other hand, Bank of America (BAC.PH) has 7.25 percent preferred stock outstanding

Table 10.1 Examples of Different Pacific Gas & Electric Preferred Stock Issues Outstanding, February 2016

Name	Symbol	Par Value	Price	Dividend	Dividend Yield
Pacific Gas & Electric 5% PF	PCG.PD	$25.00	$25.46	$1.25	4.91%
Pacific Gas & Electric 6% PF	PCG.PA	$30.00	$30.10	$1.50	4.98%

with a par value of $1,000.00 per share. The annual dividend on the Bank of America preferred stock is $72.25 (7.25 × $1,000). Keep in mind that preferred stock dividends are fixed; that is, regardless of how well the firm does, they still pay only their stated dividend. In effect, preferred stockholders do not share in any improvement in the earnings of the firm.

Multiple Classes

If a company desires, it can issue more than one class of preferred stock, and each class can have different characteristics. In fact, it is quite common for firms that issue preferred stock to issue more than one class. For example, Public Storage (PSA) has 12 different classes of preferred stock outstanding. These classes can be further differentiated in that some are convertible into common stock and others are not, and some have more seniority—that is, they get paid earlier in the event of the issuing firm's bankruptcy. You'll notice in Table 10.1 that there are listings for two different classes of preferred stock issued by Pacific Gas & Electric (PCG); each has a different dividend and is selling for a different price, but both provide approximately the same dividend yield.

Claim on Assets and Income

In the event of bankruptcy, the claims of preferred stockholders have priority over those of common stockholders, which means that the preferred stockholders must be paid in full before common stockholders are paid. However, the claims of preferred stockholders have lower priority than those of the firm's debt holders. In addition, the firm must pay its preferred stock dividends before it pays common stock dividends, and most preferred stocks carry a cumulative feature. **Cumulative preferred stock** requires all past unpaid preferred stock dividends to be paid before any common stock dividends are declared. Thus, in terms of risk, preferred stock is safer than common stock but riskier than the firm's debt.

Preferred Stock as a Hybrid Security

As we noted earlier, preferred stock has characteristics of both common stock and bonds. First, like common stock, preferred stock has no fixed maturity date. Also like common stock, the nonpayment of dividends does not bring on bankruptcy, and dividends are not deductible for tax purposes. On the other hand, like interest payments on debt, preferred stock dividends are fixed in amount. In addition, although in theory preferred stock does not have a set maturity associated with it, many issues of preferred stock require that money be set aside regularly to retire the preferred stock issue, in effect resulting in a maturity date.

Valuing Preferred Stock

The owner of preferred stock generally receives a fixed dividend from the investment in each period. Because preferred stocks are perpetuities (nonmaturing) and because the cash dividend is the same every period, the dividend stream is a level perpetuity that can be valued by applying what we learned in Chapter 6 about calculating the present value of a level perpetuity, as done in Equation (6–5). In effect, the value of a share of preferred stock is dependent on P Principle 1: **Money Has a Time Value**, P Principle 2: **There Is a Risk-Return Tradeoff**, and P Principle 3: **Cash Flows Are the Source of Value**.

Thus, the value of a share of preferred stock can be written as follows:

$$\text{Value of Preferred Stock} = \frac{\text{Annual Preferred Stock Dividend}}{\text{Market's Required Yield on Preferred Stock}} \quad \textbf{(10–6)}$$

Figure 10.5 contains a quick reference resource for this valuation model, along with definitions of the symbols typically used. In addition, the figure contains other details concerning the valuation of preferred stock that you will find useful.

Figure 10.5

Quick Reference Guide for the Preferred Stock Valuation Model

The value of a share of preferred stock, like that of any security, is defined by the present value of the cash flows it is expected to produce for the owner of the stock. Because the preferred shares typically pay a fixed dividend, this cash flow stream is a level perpetuity, which, as we saw in Equation (6–5), makes discounting the future dividends simple. We divide the dividend by the required rate of return on the preferred stock:

$$\text{Value of Preferred Stock } (V_{ps}) = \frac{\text{Annual Preferred Stock Dividend}}{\text{Market's Required Yield on Preferred Stock}} = \frac{D_{ps}}{r_{ps}} \quad \textbf{(10–6)}$$

Important Definitions and Concepts:

- V_{ps} = the value of a share of preferred stock.
- D_{ps} = the annual preferred stock dividend. This dividend is the contractually promised dividend. Remember that preferred dividends are paid only if the firm has the cash to pay them, and they must be paid *before* common stockholders get any dividends. The critical point here is that the preferred stock dividend may be skipped in some years if the company is unable to pay it, so that the annual dividend is a *promised* dividend (not an *expected* dividend). The amount of the dividend is the product of the promised dividend rate and the par or face value of the preferred stock and is prescribed in the security contract.
- r_{ps} = the *market's required yield* or promised rate of return on the preferred stock's contractually promised dividend. This market's required yield is analogous to the market's required yield to maturity on a bond discussed in Chapter 9. Note that because this market yield is based on the promised dividend, we can also think of it as a *promised rate of return* to the preferred stock investor that will be realized only if preferred stock dividends are always paid in a timely manner.
- $\frac{D_{ps}}{r_{ps}}$ = the present value of a level perpetuity, which equals the promised dividend on preferred stock discounted using the market's required yield or promised rate of return to the preferred stockholders (recall that we defined this useful present value equation in Chapter 6).

>> END FIGURE 10.5

Dealing with Reality: Promised Versus Expected Returns for Preferred Stock

Recall from Chapter 9 that the market's required yield to maturity used to value a bond is not the same thing as the expected rate of return on the bond. The reason for this is that the bond interest and principal payments used to value the bond are the *contractual* or *promised* payments that are received *only* if the borrowing firm makes all the contractually promised interest and principal payments on time (i.e., the firm does not default). The same idea is applied to the valuation of preferred stock. Preferred stock dividends are *promised dividends* that are paid only if the firm earns sufficient income to pay them. This causes no problem for valuing the preferred stock because we simply discount the promised dividends back to the present using the market's required yield or promised rate of return for similar shares of preferred stock in the financial marketplace. *In other words, we value preferred shares by discounting the contractually promised dividend payments using a promised rate of return to the preferred shareholders.*

Estimating the Market's Required Yield. The **market's required yield** on a share of preferred stock is typically estimated using the market prices of similar shares of preferred stock that can be observed in the financial market. For example, let's assume that the electric utility Pacific Gas & Electric (PCG) is considering the sale of an issue of preferred stock. The preferred issue would pay a 5.00 percent annual dividend based on a par value of $50, for a dividend of $2.50. To determine the price that this issue might sell for, we must look at the market yields on other classes of preferred stock issued by PCG or on classes of preferred stock issued by similar companies. Let's for a moment assume that PCG does not have any other classes of preferred stock outstanding. In that case, we must look for a company of

similar risk with preferred stock outstanding. After a careful analysis of comparable firms, we choose American Electric Power (AEP) because we deem its level of risk to be very similar to that of PCG and it has preferred stock outstanding. The American Electric Power preferred has a promised annual dividend of $1.25 per share, and each share is currently selling for $25.46. We can use Equation (10–6) to solve for the market's required yield, r_{ps}, as follows:

$$V_{ps} = \frac{D_{ps}}{r_{ps}}$$

$$V_{ps} = \frac{D_{ps}}{V_{ps}} = \frac{\$1.25}{\$25.46} = .0491, \text{ or } 4.91\%$$

We can now use the 4.91 percent market's required yield for the American Electric Power preferred stock to estimate the value of the preferred stock of Pacific Gas & Electric. First, we calculate the annual dividend to reflect a 5.00 percent dividend yield and a par value of $50 per share. The resulting dividend is $2.50 ($50 × .05) a share. Substituting this dividend and the promised rate of return estimated using American Electric Power into Equation (10–6), we estimate the value of Pacific Gas & Electric's preferred stock to be $50.92, as follows:

$$V_{ps} = \frac{D_{ps}}{r_{ps}} = \frac{\$2.50}{.0491} = \$50.92$$

Note that we have valued the new issue of preferred stock using the contractual or promised dividend for the issue and estimated the market's required yield using the current market price and dividend for a comparable-risk preferred issue. Recall that this is very similar to the way that we valued a corporate bond in Chapter 9.

In summary, the value of a preferred stock is the present value of all future dividends. Because most preferred stocks are perpetuities, which means that the firm is promising to pay the dividends forever, we simply use our formula for the present value of a perpetuity to value them.

We now have the tools of financial analysis to value preferred stock, assuming that the dividends grow at a constant rate in perpetuity, which are shown as follows.

Tools of Financial Analysis—Preferred Stock Valuation

Name of Tool	Formula	What It Tells You
Preferred stock valuation	$V_{ps} = \frac{\text{Annual Preferred Stock Dividend}}{\text{Market's Required Yield or Promised Rate of Return}}$ $V_{ps} = \frac{D_{ps}}{r_{ps}}$	• The value of preferred stock is equal to the present value of all the future dividends in perpetuity. • As the investor's required yield or return goes up, perhaps as a result of the firm becoming riskier or market interest rates climbing, the value of a share of preferred stock falls.

A Quick Review: Valuing Bonds, Preferred Stock, and Common Stock

In Chapter 9, we learned how to value bonds by discounting their contractually promised interest and principal payments back to the present. In this chapter, we used the same discounted cash flow procedure to value both preferred and common stock. However, there is a subtle but important difference between how bonds and preferred stock are valued and how common stock is valued using the discounted cash flow method.

Bonds and preferred stock are valued using contractually *promised yields* and *promised cash flows*. However, because common stock does not have a promised cash flow and we must estimate the expected dividends for each future period, we discount these *expected dividends* using an *expected rate of return* for investing in the company's shares. Table 10.2 summarizes the application of discounted cash flow in valuing all three types of securities.

Table 10.2 Summary of Discounted Cash Flow Valuation of Bonds, Preferred Stock, and Common Stock

Bonds and preferred stock specify a promised cash payment to the security holder. In the case of a bond, interest and principal must be paid in accordance with the terms of the bond contract (indenture). Preferred shares have a stated dividend yield, which, when multiplied by the face or par value of the preferred stock, equals the promised preferred dividend. Both bonds and preferred stock are valued by discounting these promised cash flows back to the present. However, because these are promised (and not expected) cash flows, we discount them using the promised rate of return reflected in the current market prices of similar securities. Common stock, on the other hand, does not have a contractual promised dividend payment, so we apply the discounted cash flow model in this instance by estimating expected future dividends and then discounting them back to the present using the expected rate of return that an investor would require if investing in a stock with the risk attributes of the shares being valued.

Type of Security	Cash Flow	Discount Rate	Valuation Model
Bond	**Promised interest and principal payments.** These payments are set forth in the contract between the bond-issuing company and the owner of the bond.	**Market's required yield to maturity.** Typically, the YTM on a similar bond is used to value a bond. This YTM is the realized rate of return to the bondholder *only* if all promised payments are made on time. Consequently, the yield to maturity calculated for a bond is a promised yield and not the expected yield.	The value of a bond is equal to the present value of the future interest and the repayment of the bond's principal at maturity. $\text{Bond Value} = \text{Interest}\left[\frac{1 - \frac{1}{(1 + YTM_{\text{Market}})^n}}{YTM_{\text{Market}}}\right] + \text{Principal}\left[\frac{1}{(1 + YTM)^n}\right]$
Preferred stock	**Promised dividends.** Dividends are defined using a contractually set dividend yield that is multiplied by the par or face value of the preferred stock to get the preferred stock dividend.	**Market or promised yield on preferred stock.** We typically calculate this yield using market prices and promised dividends for similar shares of preferred stock. This yield is a promised yield that will be earned only if the preferred stock dividends are fully paid every period as promised.	The value of a share of preferred stock is equal to the present value of the future preferred stock dividends. $\text{Value of Preferred Stock } (V_{ps}) = \frac{\text{Annual Preferred Stock Dividend}}{\text{Market's Required Yield on Preferred Stock}} = \frac{D_{ps}}{r_{ps}}$
Common stock	**Expected future dividends.** No dividend is prescribed for common stock. Instead, dividends must be estimated, so we value common stock using expected rather than promised future cash flows. In the constant dividend growth rate model, dividends are estimated using a constant rate of growth from year to year.	**Investor's expected rate of return, which is the investor's required rate of return.** Because common stock dividends are risky, we use expected future dividends and discount them using a risk-adjusted or expected rate of return for investing in shares of stock of firms with similar risk to the firm issuing the common stock being valued. We can estimate this expected rate of return using the CAPM.	Value of a share of common stock is equal to the present value of the future dividends. $\text{Value of Common Stock } (V_{cs}) = \frac{D_0(1 + g)}{r_{cs} - g}$

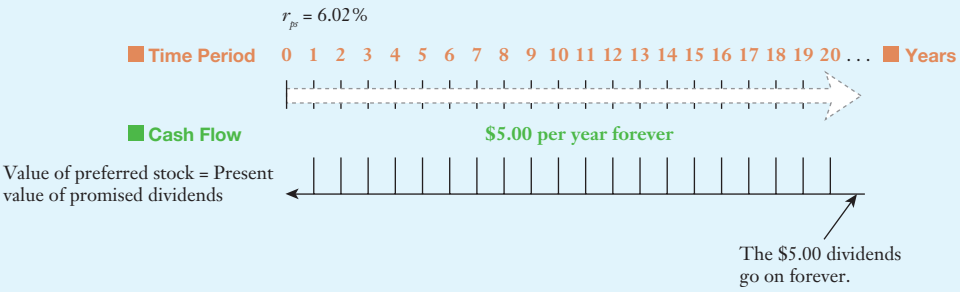
Checkpoint 10.3

Valuing Preferred Stock

Consider Con Edison's (ED) preferred stock issue, which pays an annual dividend of $5.00 per share and does not have a maturity date; the market's required yield or promised rate of return (r_{ps}) for similar shares of preferred stock is 6.02 percent. What is the value of the Con Edison preferred stock?

STEP 1: Picture the problem

Because preferred stock dividends are constant for all future years, they form a level perpetuity. In effect, a perpetuity can be visualized as a timeline that doesn't have an ending point, with the same cash flow occurring period after period—in this case, year after year:



STEP 2: Decide on a solution strategy

Because preferred stock dividends are constant and have no maturity or end date, these dividends are a level perpetuity. Consequently, calculating the present value of a share of preferred stock using Equation (10–6) involves only simple division, and there is no need for an Excel solution or any unique keystrokes with a financial calculator. We just divide the amount you receive at the end of each period forever by the market's required yield.

STEP 3: Solve

Substituting $5.00 for D_{ps} and 0.0602 for r_{ps} in Equation (10–6), we can determine the value of the Con Edison preferred stock as follows:

$$V_{ps} = \frac{D_{ps}}{r_{ps}} = \frac{\$5.00}{0.0602} = \$83.06$$

Thus, the present value of this preferred stock is $83.06.

STEP 4: Analyze

Because preferred stock is a level perpetuity, its present value on any future date will be the same as its present value today. That is, the value of the preferred stock is $83.06 today, and if all else remains the same, the preferred shares will be worth $83.06 five years from now, 10 years from now, and 100 years from now.

STEP 5: Check yourself

What is the present value of a share of preferred stock that pays a dividend of $12.00 per share if the market's required yield on similar issues of preferred stock is 8 percent?

ANSWER: $150.00.

Your Turn: For more practice, do related **Study Problem** 10–15 at the end of this chapter.

>> END Checkpoint 10.3

Before you begin end-of-chapter material

Concept Check | 10.3

1. What are three common features of preferred stock?
2. What is the market's required yield on a preferred stock?
3. Explain the meaning of the following statement: The market yield is a promised rate of return rather than an expected rate of return.

Applying the Principles of Finance to Chapter 10

P Principle 1: **Money Has a Time Value** The value of common stock is equal to the present value of the future cash flows, discounted at the required rate of return. As a result, Principle 1 plays a pivotal role in determining the value of debt.

P Principle 2: **There Is a Risk-Return Tradeoff** Different common stocks have different levels of risk associated with them, with more risk resulting in a higher required rate of return.

P Principle 3: **Cash Flows Are the Source of Value** The calculation of the value of a share of stock begins with an estimation of the amount and timing of future cash flows. If you bought a share of common stock and never sold it, the only cash flow you would ever receive would be the dividends that the firm paid. It is these cash flows that are discounted back to present to determine the value of a share of stock.

P Principle 4: **Market Prices Reflect Information** Principle 4 implies that market prices are a pretty good reflection of the value of the underlying shares of stock.

P Principle 5: **Individuals Respond to Incentives** This principle takes on importance because managers respond to incentives in their contracts. If these incentives are not properly aligned with those of the firm's shareholders, managers may not make decisions consistent with increasing shareholder value.

Chapter Summaries

10.1 Identify the basic characteristics and features of common stock and use the discounted cash flow model to value common shares. (pgs. 334–343)

SUMMARY: Common stock does not have a maturity date and has a life that is limited only by the life of the issuing firm. Common dividends have no minimums or maximums. In the event of bankruptcy, the common stockholders cannot exercise claims on assets until the firm's creditors, including the bondholders and preferred shareholders, have been satisfied.

The common stockholders are the owners of the firm and are in general the only security holders given a vote. Common shareholders have the right to elect the board of directors and to approve any change in the corporate charter. Although each share of stock carries the same number of votes, the voting procedure is not always the same from company to company.

A popular model used to calculate the present value of the future dividends of a firm's common stock is the constant dividend growth rate model. This model can be stated as follows:

$$\text{Value of Common Stock} = \frac{\text{Dividend for Year 1}}{\left(\text{Investor's Required Rate of Return}\right) - \left(\text{Dividend Growth Rate}\right)} \quad \textbf{(10–2)}$$

The valuation of common stock differs from the valuation of preferred stock (and bonds) because common stock has no promised dividends. As a result, we use expected future dividends to estimate the cash flows to the common stockholders. Because we are discounting expected future cash flows, we discount them using the expected rate of return the investor anticipates from an investment with the risk of the common stock being valued.

KEY TERMS

Constant dividend growth rate model, page 338 A common stock valuation model that assumes that dividends will grow at a constant rate forever.

Cumulative voting, page 336 Voting in which each share of stock allows the shareholder a number of votes equal to the number of directors being elected. The shareholder can then cast all of his or her votes for a single candidate or split them among the various candidates.

Initial public offering (IPO), page 334 The first time a company issues stock to the public. This occurs in the primary markets.

Majority voting, page 336 Each share of stock allows the shareholder one vote, and each position on the board of directors is voted on separately.

Proxy, page 336 A means of voting in which a designated party is provided with the temporary power of attorney to vote for the signee at the corporation's annual meeting.

KEY EQUATIONS

$$\text{Value of Common Stock in Year 0} = \frac{\text{Dividend Paid in Year 0}\left(1 + \text{Dividend Growth Rate}\right)^{1}}{\left(1 + \text{Stockholder's Required Rate of Return}\right)^{1}} + \frac{\text{Dividend Paid in Year 0}\left(1 + \text{Dividend Growth Rate}\right)^{2}}{\left(1 + \text{Stockholder's Required Rate of Return}\right)^{2}} + \frac{\text{Dividend Paid in Year 0}\left(1 + \text{Dividend Growth Rate}\right)^{3}}{\left(1 + \text{Stockholder's Required Rate of Return}\right)^{3}} + \cdots + \frac{\text{Dividend Paid in Year 0}\left(1 + \text{Dividend Growth Rate}\right)^{\infty}}{\left(1 + \text{Stockholder's Required Rate of Return}\right)^{\infty}} \quad \textbf{(10–1)}$$

Concept Check | 10.1

1. What are the attributes of common stock that distinguish it from bonds and preferred stock?
2. What does agency cost mean with respect to the owners of a firm's common stock?
3. Describe the three-step process for valuing common stock using the discounted dividend model.

$$V_{cs} = \frac{\text{Dividend in Year 0}\left(1 + \dfrac{\text{Dividend}}{\text{Growth Rate}}\right)}{\dfrac{\text{Stockholder's Required}}{\text{Rate of Return}} - \dfrac{\text{Dividend}}{\text{Growth Rate}}} = \frac{\text{Dividend in Year 1}}{\dfrac{\text{Stockholder's Required}}{\text{Rate of Return}} - \dfrac{\text{Dividend}}{\text{Growth Rate}}} \quad \textbf{(10–2)}$$

$$\frac{\text{Rate of Growth}}{\text{in Dividends}\,(g)} = \left(1 - \frac{\text{Dividend}}{\text{Payout Ratio}}\right) \times \frac{\text{Rate of Return}}{\text{on Equity}\,(ROE)} \quad \textbf{(10–3)}$$

10.2 Use the price/earnings (P/E) ratio to value common stock. (pgs. 343–347)

SUMMARY: The price/earnings model for stock valuation is commonly referred to as a relative valuation approach. The reason is that we define value relative to firm earnings and relative to how similar firms' earnings are valued. The P/E valuation model is defined as follows:

$$\frac{\text{Value of}}{\text{Common Stock}} = \left(\frac{\text{Price/Earnings}}{\text{Ratio}}\right) \times \left(\frac{\text{Firm}}{\text{Earnings per Share}}\right) \quad \textbf{(10–4)}$$

The P/E valuation method is generally used in association with the comparables approach. Specifically, the P/E multiple is generally determined by examining the P/E ratios of comparable firms. We learned that the price/earnings ratio is determined by the profitability of the firm's investment opportunities, the fraction of the firm's earnings that it reinvests in the firm, and the riskiness of the firm's common stock.

KEY TERM

Price/earnings ratio, page 343 The price the market places on $1 of a firm's earnings. For example, if a firm has earnings per share of $2 and a stock price of $30, its price/earnings ratio is 15 ($30 ÷ $2).

KEY EQUATIONS

$$\frac{\text{Value of}}{\text{Common Stock, } V_{cs}} = \left(\frac{\text{Appropriate}}{\text{Price/Earnings Ratio}}\right) \times \left(\frac{\text{Estimated Earnings}}{\text{per Share for Year1}}\right) = \frac{P}{E_1} \times E_1 \quad \textbf{(10–4)}$$

$$\frac{P}{E_1} = \frac{D_1 / E_1}{r_{cs} - g} \quad \textbf{(10–5)}$$

Concept Check | 10.2

1. If a corporation decides to retain its earnings and reinvest them in the firm, does the market value of the firm's shares always increase? Why or why not?
2. What is the price/earnings model of equity valuation?
3. How does a firm's dividend policy affect the firm's P/E ratio?

10.3 Identify the basic characteristics and features of preferred stock and value preferred shares. (pgs. 347–352)

SUMMARY: Preferred stock has several characteristics that make it unique. Specifically, unlike bonds, preferred stock does not have a fixed maturity date. Moreover, preferred stock dividends are typically fixed, unlike common stock, which may not pay any dividend. The following are some of the more common characteristics of preferred stock:

- There are multiple classes of preferred stock.
- Preferred stock has a priority claim over common stock with respect to the proceeds from the sale of assets and the distribution of income.
- Preferred stock dividends must be paid as promised before any common stock dividends can be paid.
- Protective provisions are often included in the contract for the preferred shareholder in order to reduce the investment's risk.

The value of a share of preferred stock is equal to the present value of the stream of contractually promised future dividends discounted using the market's required yield on shares of preferred stock of similar risk. Because the preferred dividend is typically the same for all future years and there is no maturity date, the present value of these dividends can be solved as the present value of a level perpetuity. That is, the value of a preferred stock is simply the ratio of the promised preferred dividend divided by the promised yield of a preferred stock with similar risk.

$$\text{Value of Preferred Stock} = \frac{\text{Annual Preferred Stock Dividend}}{\text{Market's Required Yield on Preferred Stock}} \quad \textbf{(10–6)}$$

Concept Check | 10.3

1. What are three common features of preferred stock?
2. What is the market's required yield on a preferred stock?
3. Explain the meaning of the following statement: The market yield is a promised rate of return rather than an expected rate of return.

KEY TERMS

Cumulative preferred stock, page 348 Preferred stock that requires all past unpaid preferred stock dividends to be paid before any common stock dividends are declared.

Market's required yield, page 349 The rate of return on the preferred stock's contractually promised dividend. The market's required yield on a preferred stock is analogous to the market's required yield to maturity on a bond.

KEY EQUATIONS

$$\text{Value of Preferred Stock}(V_{ps}) = \frac{\text{Annual Preferred Stock Dividend}}{\text{Market's Required Yield on Preferred Stock}} = \frac{D_{ps}}{r_{ps}} \quad \textbf{(10–6)}$$

Study Questions

10–1. *Regardless of Your Major: Getting Your Fair Share* on page 334 focuses on the valuation of a new business venture. If you were faced with the need to value this business, what would you want to know about the business?

10–2. Why is preferred stock referred to as a hybrid security?

10–3. Because preferred stock dividends must be paid before common stock dividends, should preferred stock be considered a liability and appear on the right side of the balance sheet alongside of the firm's long-term debt?

10–4. Discuss two reasons why investors may perceive preferred stock to be less risky than common stock.

10–5. In *Finance for Life: Herd Mentality* on page 335, we learned that it is common for investors to follow the investment lead of others. If they are all investing in dotcom firms or biotech firms, you might be swayed to jump on the bandwagon and do the same. How might the media help reinforce herd behavior?

10–6. Compare the methods for valuing preferred stock and common stock.

10–7. The market's required yield on preferred stock is actually a promised rate of return. Explain this statement.

10–8. Common stockholders receive two types of return from their investment. What are they?

10–9. The opening vignette on page 333 described Google first going public in 2004. Prior to going public, did Google's stock have a market price? What principles would go into determining the value of a company that hadn't gone public yet?

Study Problems

MyLab Finance

Go to www.myfinancelab.com to complete these exercises online and get instant feedback.

Common Stock

10–1. **(Measuring growth)** If Pepperdine, Inc.'s return on equity is 16 percent and the management plans to retain 60 percent of earnings for investment purposes, what will be the firm's growth rate?

10–2. **(Measuring growth)** If the Stanford Corporation's net income is $200 million, its common equity is $833 million, and management plans to retain 70 percent of the firm's earnings to finance new investments, what will be the firm's growth rate?

10–3. **(Valuing common stock)** **(Related to Checkpoint 10.1 on page 340)** Header Motor, Inc., paid a $3.50 dividend last year. At a constant growth rate of 5 percent, what is the value of the common stock if the investors require a 20 percent rate of return?

10–4. **(Valuing common stock)** J. Pinkman Motors, Inc., paid a $3.75 dividend last year. If J. Pinkman's return on equity is 24 percent and its retention rate is 25 percent, what is the value of the common stock if the investors require a 20 percent rate of return?

10–5. **(Valuing common stock)** The common stock of NCP paid $1.32 in dividends last year. Dividends are expected to grow at an 8 percent annual rate for an indefinite number of years.

a. If your required rate of return is 10.5 percent, what is the value of the stock to you?
b. Should you make the investment?

10–6. **(Measuring growth)** Given that a firm's return on equity is 18 percent and management plans to retain 40 percent of earnings for investment purposes, what will be the firm's growth rate? If the firm decides to increase its retention rate, what will happen to the value of its common stock?

10–7. **(Valuing common stock)** Wayne, Inc.'s outstanding common stock is currently selling in the market for $33. Dividends of $2.30 per share were paid last year, return on equity is 20 percent, and its retention rate is 25 percent.

a. What is the value of the stock to you, given a 15 percent required rate of return?
b. Should you purchase this stock?

10–8. **(Measuring growth)** Walter White, Inc.'s return on equity is 13 percent, and management has plans to retain 20 percent of earnings for investment in the company.

a. What will be the company's growth rate?
b. How would the growth rate change if management (i) increased retained earnings to 35 percent or (ii) decreased retention to 13 percent?

10–9. **(Measuring growth)** Solarpower Systems expects to earn $20 per share this year and intends to pay out $8 in dividends to shareholders and retain $12 to invest in new projects with an expected return on equity of 20 percent. In the future, Solarpower expects to maintain the same dividend payout ratio, expects to earn a 20 percent return on its equity invested in new projects, and will not be changing the number of shares of common stock outstanding.

a. Calculate the future growth rate for Solarpower's earnings.
b. If the investor's required rate of return for Solarpower's stock is 15 percent, what is the price of Solarpower's common stock?

c. What would happen to the price of Solarpower's common stock if it raised its dividends to $12 this year and then continued with that same dividend payout ratio permanently? Should Solarpower make this change? (Assume that the investor's required rate of return remains at 15 percent.)

d. What would happen to the price of Solarpower's common stock if it lowered its dividends to $4 this year and then continued with that same dividend payout ratio permanently? Does the constant dividend growth rate model work in this case? Why or why not? (Assume that the investor's required rate of return remains at 15 percent and all future new projects earn 20 percent.)

10–10. (Measuring growth) Tyrion L.'s Gadgets Inc. is trying to decide whether to cut its expected dividends for next year from $8 per share to $5 per share in order to have more money to invest in new projects. If it does not cut the dividend, the firm's expected rate of growth in dividends will be 5 percent per year, and the price of its common stock will be $100 per share. However, if it cuts the dividend, the dividend growth rate is expected to rise to 8 percent in the future. Assuming that the investor's required rate of return does not change, what would you expect to happen to the price of Tyrion L.'s Gadgets' common stock if the firm cuts the dividend to $5? Should Tyrion L.'s Gadgets cut its dividend? Support your answer as best as you can.

10–11. (Valuing common stock) Dubai Metro's stock price was at $100 per share when it announced that it would cut its dividends for next year from $10 per share to $6 per share, with the additional funds to be used for expansion. Prior to the dividend cut, Dubai Metro expected its dividends to grow at a 4 percent rate, but with the expansion, dividends are now expected to grow at 7 percent. How do you think the announcement will affect Dubai Metro's stock price?

Comparables Approach to Valuing Common Stock

10–12. (Using relative valuation for common stock) (Related to Checkpoint 10.2 on page 345) Using the P/E ratio approach to valuation, calculate the value of a share of stock under the following conditions:

- The investor's required rate of return is 12 percent.
- The expected level of earnings at the end of this year (E_1) is $4.00.
- The firm follows a policy of retaining 30 percent of its earnings.
- The return on equity (ROE) is 15 percent.
- Similar shares of stock sell at multiples of 13.3325 times earnings per share.

Now show that you get the same answer using the discounted dividend model.

10–13. (Valuing common stock) Assume the following:

- The investor's required rate of return is 13.5 percent.
- The expected level of earnings at the end of this year (E_1) is $6.00.
- The retention ratio is 50 percent.
- The return on equity (ROE) is 15 percent (that is, it can earn 15 percent on reinvested earnings).
- Similar shares of stock sell at multiples of 16.667 times earnings per share.

a. Determine the expected growth rate for dividends.
b. Determine the price/earnings ratio (P/E_1) using Equation (10–5a).
c. What is the stock price using the P/E ratio valuation method?
d. What is the stock price using the dividend discount model?

e. What would happen to the P/E ratio (P/E_1) and stock price if the company increased its retention rate to 60 percent (holding all else constant)? What would happen to the P/E ratio (P/E_1) and stock price if the company paid out all its earnings in the form of dividends?
f. What have you learned about the relationship between the retention rate and the P/E ratio?

10–14. (Valuing common Stock) Assume the following:

- The investor's required rate of return is 15 percent.
- The expected level of earnings at the end of this year (E_1) is $5.00.
- The retention ratio is 50 percent.
- The return on equity (ROE) is 20 percent (that is, it can earn 20 percent on reinvested earnings).
- Similar shares of stock sell at multiples of 10 times earnings per share.

a. Determine the expected growth rate for dividends.
b. Determine the price/earnings ratio (P/E_1) using Equation (10–5a).
c. What is the stock price using the P/E ratio valuation method?
d. What is the stock price using the dividend discount model?
e. What would happen to the P/E ratio (P/E_1) and stock price if the firm could earn 25 percent on reinvested earnings (ROE)?
f. What does this tell you about the relationship between the rate the firm can earn on reinvested earnings and the P/E ratio?

Preferred Stock

10–15. (Valuing preferred stock) (Related to Checkpoint 10.3 on page 352) Calculate the value of a preferred stock that pays a dividend of $6 per share when the market's required yield on similar shares is 12 percent.

10–16. (Valuing preferred stock) Pioneer's preferred stock is selling for $33 in the market and pays a $3.60 annual dividend.

a. If the market's required yield is 10 percent, what is the value of the stock to investors?
b. Should investors acquire the stock?

10–17. (Valuing preferred stock) What is the value of a preferred stock where the dividend rate is 14 percent on a $100 par value and the market's required yield on similar shares is 12 percent?

10–18. (Valuing preferred stock) You own 200 shares of Somner Resources preferred stock, which currently sells for $40 per share and pays annual dividends of $3.40 per share. If the market's required yield on similar shares is 10 percent, should you sell your shares or buy more?

10–19. (Valuing preferred stock) Kendra Corporation's preferred shares are trading for $25 in the market and pay a $4.50 annual dividend. Assume that the market's required yield is 14 percent.

a. What is the stock's value to you, the investor?
b. Should you purchase the stock?

Mini-Case

You have finally saved $10,000 and are ready to make your first investment. You have the following three alternatives for investing that money:

- Capital Cities ABC, Inc., bonds, which have a par value of $1,000 and a coupon interest rate of 8.75 percent, are selling for $1,314 and mature in 12 years.
- Southwest Bancorp preferred stock is paying a dividend of $2.50 and selling for $25.50.
- Emerson Electric common stock is selling for $36.75. The stock recently paid a $1.32 dividend, and the firm's earnings per share have increased from $1.49 to $3.06 in the past five years. The firm expects to grow at the same rate for the foreseeable future.

Your required rates of return for these investments are 6 percent for the bond, 7 percent for the preferred stock, and 15 percent for the common stock. Using this information, answer the following questions.

a. Calculate the value of each investment based on your required rate of return.

b. Which investment would you select? Why?

c. Assume Emerson Electric's managers expect an earnings downturn and a resulting decrease in growth of 3 percent. How does this affect your answers to parts a and b?

d. What required rates of return would make you indifferent to all three options?