

# 8

## STOCK VALUATION

When the stock market closed on May 10, 2006, the common stock of McGraw-Hill, publisher of fine-quality college textbooks, was going for \$53.55 per share. On that same day, stock in Wachovia, one of the largest banks in the United States, closed at \$55.20, while stock in Lexmark International, the printer manufacturer, closed at \$52.59. Because the stock prices of these three companies were

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so similar, you might expect that they would

be offering similar dividends to their stockholders, but you would be wrong. In fact, Wachovia's annual dividend was \$2.04 per share, McGraw-Hill's was \$0.73 per share, and Lexmark International was paying no dividends at all!

As we will see in this chapter, the dividends currently being paid are one of the primary factors we look at when attempting to value common stocks. However, it is obvious from looking at Lexmark that current dividends are not the end of the story. This chapter explores dividends, stock values, and the connection between the two.

**In our previous chapter**, we introduced you to bonds and bond valuation. In this chapter, we turn to the other major source of financing for corporations: common and preferred stock. We first describe the cash flows associated with a share of stock and then go on to develop a famous result, the dividend growth model. From there, we move on to examine various important features of common and preferred stock, focusing on shareholder rights. We close the chapter with a discussion of how shares of stock are traded and how stock prices and other important information are reported in the financial press.

## Common Stock Valuation

### 8.1

A share of common stock is more difficult to value in practice than a bond for at least three reasons. First, with common stock, not even the promised cash flows are known in advance. Second, the life of the investment is essentially forever because common stock has no maturity. Third, there is no way to easily observe the rate of return that the market requires. Nonetheless, as we will see, there are cases in which we can come up with the present value of the future cash flows for a share of stock and thus determine its value.

#### CASH FLOWS

Imagine that you are considering buying a share of stock today. You plan to sell the stock in one year. You somehow know that the stock will be worth \$70 at that time. You predict that the stock will also pay a \$10 per share dividend at the end of the year. If you require a 25 percent return on your investment, what is the most you would pay for the stock? In other words, what is the present value of the \$10 dividend along with the \$70 ending value at 25 percent?

If you buy the stock today and sell it at the end of the year, you will have a total of \$80 in cash. At 25 percent:

$$\text{Present value} = (\$10 + 70)/1.25 = \$64$$

Therefore, \$64 is the value you would assign to the stock today.

More generally, let  $P_0$  be the current price of the stock, and assign  $P_1$  to be the price in one period. If  $D_1$  is the cash dividend paid at the end of the period, then:

$$P_0 = (D_1 + P_1)/(1 + R) \quad [8.1]$$

where  $R$  is the required return in the market on this investment.

Notice that we really haven't said much so far. If we wanted to determine the value of a share of stock today ( $P_0$ ), we would first have to come up with the value in one year ( $P_1$ ). This is even harder to do, so we've only made the problem more complicated.

What is the price in one period,  $P_1$ ? We don't know in general. Instead, suppose we somehow knew the price in two periods,  $P_2$ . Given a predicted dividend in two periods,  $D_2$ , the stock price in one period would be:

$$P_1 = (D_2 + P_2)/(1 + R)$$

If we were to substitute this expression for  $P_1$  into our expression for  $P_0$ , we would have:

$$\begin{aligned} P_0 &= \frac{D_1 + P_1}{1 + R} = \frac{D_1 + \frac{D_2 + P_2}{1 + R}}{1 + R} \\ &= \frac{D_1}{(1 + R)^1} + \frac{D_2}{(1 + R)^2} + \frac{P_2}{(1 + R)^2} \end{aligned}$$

Now we need to get a price in two periods. We don't know this either, so we can procrastinate again and write:

$$P_2 = (D_3 + P_3)/(1 + R)$$

If we substitute this back in for  $P_2$ , we have:

$$\begin{aligned} P_0 &= \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \frac{P_2}{(1+R)^2} \\ &= \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \frac{\frac{D_3 + P_3}{1+R}}{(1+R)^2} \\ &= \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \frac{D_3}{(1+R)^3} + \frac{P_3}{(1+R)^3} \end{aligned}$$

You should start to notice that we can push the problem of coming up with the stock price off into the future forever. Note that no matter what the stock price is, the present value is essentially zero if we push the sale of the stock far enough away.<sup>1</sup> What we are eventually left with is the result that the current price of the stock can be written as the present value of the dividends beginning in one period and extending out forever:

$$P_0 = \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \frac{D_3}{(1+R)^3} + \frac{D_4}{(1+R)^4} + \frac{D_5}{(1+R)^5} + \dots$$

We have illustrated here that the price of the stock today is equal to the present value of all of the future dividends. How many future dividends are there? In principle, there can be an infinite number. This means that we still can't compute a value for the stock because we would have to forecast an infinite number of dividends and then discount them all. In the next section, we consider some special cases in which we can get around this problem.

### EXAMPLE 8.1

### Growth Stocks

You might be wondering about shares of stock in companies such as Yahoo! that currently pay no dividends. Small, growing companies frequently plow back everything and thus pay no dividends. Are such shares worth nothing? It depends. When we say that the value of the stock is equal to the present value of the future dividends, we don't rule out the possibility that some number of those dividends are zero. They just can't *all* be zero.

Imagine a company that has a provision in its corporate charter that prohibits the paying of dividends now or ever. The corporation never borrows any money, never pays out any money to stockholders in any form whatsoever, and never sells any assets. Such a corporation couldn't really exist because the IRS wouldn't like it; and the stockholders could always vote to amend the charter if they wanted to. If it did exist, however, what would the stock be worth?

The stock is worth absolutely nothing. Such a company is a financial "black hole." Money goes in, but nothing valuable ever comes out. Because nobody would ever get any return on this investment, the investment has no value. This example is a little absurd, but it illustrates that when we speak of companies that don't pay dividends, what we really mean is that they are not *currently* paying dividends.

<sup>1</sup>The only assumption we make about the stock price is that it is a finite number no matter how far away we push it. It can be extremely large, just not infinitely so. Because no one has ever observed an infinite stock price, this assumption is plausible.

### SOME SPECIAL CASES

In a few useful special circumstances, we can come up with a value for the stock. What we have to do is make some simplifying assumptions about the pattern of future dividends. The three cases we consider are the following: (1) The dividend has a zero growth rate, (2) the dividend grows at a constant rate, and (3) the dividend grows at a constant rate after some length of time. We consider each of these separately.

**Zero Growth** The case of zero growth is one we've already seen. A share of common stock in a company with a constant dividend is much like a share of preferred stock. From Chapter 6 (Example 6.7), we know that the dividend on a share of preferred stock has zero growth and thus is constant through time. For a zero-growth share of common stock, this implies that:

$$D_1 = D_2 = D_3 = D = \text{constant}$$

So, the value of the stock is:

$$P_0 = \frac{D}{(1+R)^1} + \frac{D}{(1+R)^2} + \frac{D}{(1+R)^3} + \frac{D}{(1+R)^4} + \frac{D}{(1+R)^5} + \dots$$

Because the dividend is always the same, the stock can be viewed as an ordinary perpetuity with a cash flow equal to  $D$  every period. The per-share value is thus given by:

$$P_0 = D/R \quad [8.2]$$

where  $R$  is the required return.

For example, suppose the Paradise Prototyping Company has a policy of paying a \$10 per share dividend every year. If this policy is to be continued indefinitely, what is the value of a share of stock if the required return is 20 percent? The stock in this case amounts to an ordinary perpetuity, so the stock is worth  $\$10/.20 = \$50$  per share.

**Constant Growth** Suppose we know that the dividend for some company always grows at a steady rate. Call this growth rate  $g$ . If we let  $D_0$  be the dividend just paid, then the next dividend,  $D_1$ , is:

$$D_1 = D_0 \times (1 + g)$$

The dividend in two periods is:

$$\begin{aligned} D_2 &= D_1 \times (1 + g) \\ &= [D_0 \times (1 + g)] \times (1 + g) \\ &= D_0 \times (1 + g)^2 \end{aligned}$$

We could repeat this process to come up with the dividend at any point in the future. In general, from our discussion of compound growth in Chapter 6, we know that the dividend  $t$  periods into the future,  $D_t$ , is given by:

$$D_t = D_0 \times (1 + g)^t$$

As we have previously seen, an asset with cash flows that grow at a constant rate forever is called a *growing perpetuity*.

The assumption of steady dividend growth might strike you as peculiar. Why would the dividend grow at a constant rate? The reason is that, for many companies, steady growth in dividends is an explicit goal. For example, in 2006, Procter & Gamble, the Cincinnati-based maker of personal care and household products, increased its dividend by 10.7 percent to

\$1.00 per share; this increase was notable because it was the 50th in a row. The subject of dividend growth falls under the general heading of dividend policy, so we will defer further discussion of it to a later chapter.

### EXAMPLE 8.2 Dividend Growth

The Hedless Corporation has just paid a dividend of \$3 per share. The dividend of this company grows at a steady rate of 8 percent per year. Based on this information, what will the dividend be in five years?

Here we have a \$3 current amount that grows at 8 percent per year for five years. The future amount is thus:

$$\$3 \times 1.08^5 = \$3 \times 1.4693 = \$4.41$$

The dividend will therefore increase by \$1.41 over the coming five years.



See the *dividend discount model in action* at [www.dividenddiscountmodel.com](http://www.dividenddiscountmodel.com).

If the dividend grows at a steady rate, then we have replaced the problem of forecasting an infinite number of future dividends with the problem of coming up with a single growth rate, a considerable simplification. In this case, if we take  $D_0$  to be the dividend just paid and  $g$  to be the constant growth rate, the value of a share of stock can be written as:

$$\begin{aligned} P_0 &= \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \frac{D_3}{(1+R)^3} + \dots \\ &= \frac{D_0(1+g)^1}{(1+R)^1} + \frac{D_0(1+g)^2}{(1+R)^2} + \frac{D_0(1+g)^3}{(1+R)^3} + \dots \end{aligned}$$

As long as the growth rate,  $g$ , is less than the discount rate,  $r$ , the present value of this series of cash flows can be written simply as:

$$P_0 = \frac{D_0 \times (1+g)}{R-g} = \frac{D_1}{R-g} \quad [8.3]$$

**dividend growth model**  
A model that determines the current price of a stock as its dividend next period divided by the discount rate less the dividend growth rate.

This elegant result goes by a lot of different names. We will call it the **dividend growth model**. By any name, it is easy to use. To illustrate, suppose  $D_0$  is \$2.30,  $R$  is 13 percent, and  $g$  is 5 percent. The price per share in this case is:

$$\begin{aligned} P_0 &= D_0 \times (1+g)/(R-g) \\ &= \$2.30 \times 1.05/ (.13 - .05) \\ &= \$2.415/.08 \\ &= \$30.19 \end{aligned}$$

We can actually use the dividend growth model to get the stock price at any point in time, not just today. In general, the price of the stock as of time  $t$  is:

$$P_t = \frac{D_t \times (1+g)}{R-g} = \frac{D_{t+1}}{R-g} \quad [8.4]$$

In our example, suppose we are interested in the price of the stock in five years,  $P_5$ . We first need the dividend at time 5,  $D_5$ . Because the dividend just paid is \$2.30 and the growth rate is 5 percent per year,  $D_5$  is:

$$D_5 = \$2.30 \times 1.05^5 = \$2.30 \times 1.2763 = \$2.935$$

From the dividend growth model, we get the price of the stock in five years:

$$P_5 = \frac{D_5 \times (1+g)}{R-g} = \frac{\$2.935 \times 1.05}{.13 - .05} = \frac{\$3.0822}{.08} = \$38.53$$

## Gordon Growth Company

## EXAMPLE 8.3

The next dividend for the Gordon Growth Company will be \$4 per share. Investors require a 16 percent return on companies such as Gordon. Gordon's dividend increases by 6 percent every year. Based on the dividend growth model, what is the value of Gordon's stock today? What is the value in four years?

The only tricky thing here is that the next dividend,  $D_1$ , is given as \$4, so we won't multiply this by  $(1 + g)$ . With this in mind, the price per share is given by:

$$\begin{aligned} P_0 &= D_1 / (R - g) \\ &= \$4 / (.16 - .06) \\ &= \$4 / .10 \\ &= \$40 \end{aligned}$$

Because we already have the dividend in one year, we know that the dividend in four years is equal to  $D_1 \times (1 + g)^3 = \$4 \times 1.06^3 = \$4.764$ . The price in four years is therefore:

$$\begin{aligned} P_4 &= D_4 \times (1 + g) / (R - g) \\ &= \$4.764 \times 1.06 / (.16 - .06) \\ &= \$5.05 / .10 \\ &= \$50.50 \end{aligned}$$

Notice in this example that  $P_4$  is equal to  $P_0 \times (1 + g)^4$ .

$$P_4 = \$50.50 = \$40 \times 1.06^4 = P_0 \times (1 + g)^4$$

To see why this is so, notice first that:

$$P_4 = D_5 / (R - g)$$

However,  $D_5$  is just equal to  $D_1 \times (1 + g)^4$ , so we can write  $P_4$  as:

$$\begin{aligned} P_4 &= D_1 \times (1 + g)^4 / (R - g) \\ &= [D_1 / (R - g)] \times (1 + g)^4 \\ &= P_0 \times (1 + g)^4 \end{aligned}$$

This last example illustrates that the dividend growth model makes the implicit assumption that the stock price will grow at the same constant rate as the dividend. This really isn't too surprising. What it tells us is that if the cash flows on an investment grow at a constant rate through time, so does the value of that investment.

You might wonder what would happen with the dividend growth model if the growth rate,  $g$ , were greater than the discount rate,  $R$ . It looks like we would get a negative stock price because  $R - g$  would be less than zero. This is not what would happen.

Instead, if the constant growth rate exceeds the discount rate, then the stock price is infinitely large. Why? If the growth rate is bigger than the discount rate, the present value of the dividends keeps getting bigger. Essentially the same is true if the growth rate and the discount rate are equal. In both cases, the simplification that allows us to replace the infinite stream of dividends with the dividend growth model is "illegal," so the answers we get from the dividend growth model are nonsense unless the growth rate is less than the discount rate.

Finally, the expression we came up with for the constant growth case will work for any growing perpetuity, not just dividends on common stock. As we saw in Chapter 6, if  $C_1$  is the next cash flow on a growing perpetuity, then the present value of the cash flows is given by:

$$\text{Present value} = C_1 / (R - g) = C_0(1 + g) / (R - g)$$

Notice that this expression looks like the result for an ordinary perpetuity except that we have  $R - g$  on the bottom instead of just  $R$ .

**Nonconstant Growth** The next case we consider is nonconstant growth. The main reason to consider this case is to allow for “supernormal” growth rates over some finite length of time. As we discussed earlier, the growth rate cannot exceed the required return indefinitely, but it certainly could do so for some number of years. To avoid the problem of having to forecast and discount an infinite number of dividends, we will require that the dividends start growing at a constant rate sometime in the future.

For a simple example of nonconstant growth, consider the case of a company that is currently not paying dividends. You predict that, in five years, the company will pay a dividend for the first time. The dividend will be \$.50 per share. You expect that this dividend will then grow at a rate of 10 percent per year indefinitely. The required return on companies such as this one is 20 percent. What is the price of the stock today?

To see what the stock is worth today, we first find out what it will be worth once dividends are paid. We can then calculate the present value of that future price to get today’s price. The first dividend will be paid in five years, and the dividend will grow steadily from then on. Using the dividend growth model, we can say that the price in four years will be:

$$\begin{aligned} P_4 &= D_4 \times (1 + g)/(R - g) \\ &= D_5/(R - g) \\ &= \$.50/ (.20 - .10) \\ &= \$5 \end{aligned}$$

If the stock will be worth \$5 in four years, then we can get the current value by discounting this price back four years at 20 percent:

$$P_0 = \$5/1.20^4 = \$5/2.0736 = \$2.41$$

The stock is therefore worth \$2.41 today.

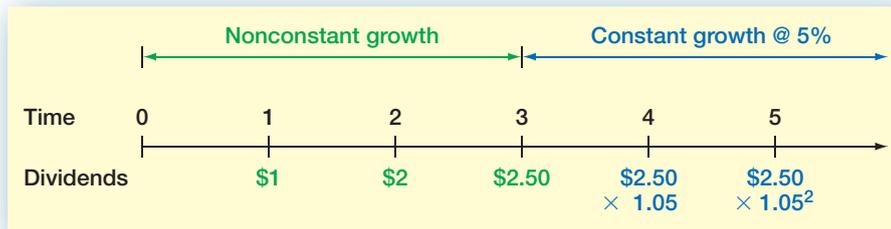
The problem of nonconstant growth is only slightly more complicated if the dividends are not zero for the first several years. For example, suppose you have come up with the following dividend forecasts for the next three years:

Year	Expected Dividend
1	\$1.00
2	\$2.00
3	\$2.50

After the third year, the dividend will grow at a constant rate of 5 percent per year. The required return is 10 percent. What is the value of the stock today?

In dealing with nonconstant growth, a time line can be helpful. Figure 8.1 illustrates one for this problem. The important thing to notice is when constant growth starts. As we’ve shown, for this problem, constant growth starts at time 3. This means we can use our constant growth model to determine the stock price at time 3,  $P_3$ . By far the most common mistake in this situation is to incorrectly identify the start of the constant growth phase and, as a result, calculate the future stock price at the wrong time.

As always, the value of the stock is the present value of all the future dividends. To calculate this present value, we first have to compute the present value of the stock price three years down the road, just as we did before. We then have to add in the present value



**FIGURE 8.1**  
Nonconstant Growth

of the dividends that will be paid between now and then. So, the price in three years is:

$$\begin{aligned} P_3 &= D_3 \times (1 + g)/(R - g) \\ &= \$2.50 \times 1.05/ (.10 - .05) \\ &= \$52.50 \end{aligned}$$

We can now calculate the total value of the stock as the present value of the first three dividends plus the present value of the price at time 3,  $P_3$ :

$$\begin{aligned} P_0 &= \frac{D_1}{(1 + R)^1} + \frac{D_2}{(1 + R)^2} + \frac{D_3}{(1 + R)^3} + \frac{P_3}{(1 + R)^3} \\ &= \frac{\$1}{1.10} + \frac{2}{1.10^2} + \frac{2.50}{1.10^3} + \frac{52.50}{1.10^3} \\ &= \$0.91 + 1.65 + 1.88 + 39.44 \\ &= \$43.88 \end{aligned}$$

The value of the stock today is thus \$43.88.

### Supernormal Growth

### EXAMPLE 8.4

Chain Reaction, Inc., has been growing at a phenomenal rate of 30 percent per year because of its rapid expansion and explosive sales. You believe this growth rate will last for three more years and will then drop to 10 percent per year. If the growth rate then remains at 10 percent indefinitely, what is the total value of the stock? Total dividends just paid were \$5 million, and the required return is 20 percent.

Chain Reaction's situation is an example of supernormal growth. It is unlikely that a 30 percent growth rate can be sustained for any extended time. To value the equity in this company, we first need to calculate the total dividends over the supernormal growth period:

Year	Total Dividends (in millions)
1	$\$5.00 \times 1.3 = \$ 6.500$
2	$6.50 \times 1.3 = 8.450$
3	$8.45 \times 1.3 = 10.985$

The price at time 3 can be calculated as:

$$P_3 = D_3 \times (1 + g)/(R - g)$$

where  $g$  is the long-run growth rate. So, we have:

$$P_3 = \$10.985 \times 1.10/ (.20 - .10) = \$120.835$$

(continued)

To determine the value today, we need the present value of this amount plus the present value of the total dividends:

$$\begin{aligned} P_0 &= \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \frac{D_3}{(1+R)^3} + \frac{P_3}{(1+R)^3} \\ &= \frac{\$6.50}{1.20} + \frac{8.45}{1.20^2} + \frac{10.985}{1.20^3} + \frac{120.835}{1.20^3} \\ &= \$5.42 + 5.87 + 6.36 + 69.93 \\ &= \$87.58 \end{aligned}$$

The total value of the stock today is thus \$87.58 million. If there were, for example, 20 million shares, then the stock would be worth  $\$87.58/20 = \$4.38$  per share.

**Two-Stage Growth** The last case we consider is a special case of nonconstant growth: two-stage growth. Here, the idea is that the dividend will grow at a rate of  $g_1$  for  $t$  years and then grow at a rate of  $g_2$  thereafter forever. In this case, the value of the stock can be written as:

$$P_0 = \frac{D_1}{R - g_1} \times \left[ 1 - \left( \frac{1 + g_1}{1 + R} \right)^t \right] + \frac{P_t}{(1 + R)^t} \quad [8.5]$$

Notice that the first term in our expression is the present value of a growing annuity, which we discussed in Chapter 6. In this first stage,  $g_1$  can be greater than  $R$ . The second part is the present value of the stock price once the second stage begins at time  $t$ .

We can calculate  $P_t$  as follows:

$$P_t = \frac{D_{t+1}}{R - g_2} = \frac{D_0 \times (1 + g_1)^t \times (1 + g_2)}{R - g_2} \quad [8.6]$$

In this calculation, we need the dividend at time  $t + 1$ ,  $D_{t+1}$ , to get the stock price at time  $t$ ,  $P_t$ . Notice that to get it, we grew the current dividend,  $D_0$ , at rate  $g_1$  for  $t$  periods and then grew it one period at rate  $g_2$ . Also, in this second stage,  $g_2$  must be less than  $R$ .

### EXAMPLE 8.5 Two-Stage Growth

The Highfield Company's dividend is expected to grow at 20 percent for the next five years. After that, the growth is expected to be 4 percent forever. If the required return is 10 percent, what's the value of the stock? The dividend just paid was \$2.

There is a fair amount of computation here, but it is mostly just "plug and chug" with a calculator. We can start by calculating the stock price five years from now,  $P_5$ :

$$\begin{aligned} P_5 &= \frac{D_6}{R - g_2} = \frac{D_0 \times (1 + g_1)^5 \times (1 + g_2)}{R - g_2} \\ &= \frac{\$2 \times (1 + .20)^5 \times (1 + .04)}{.10 - .04} = \frac{\$5.18}{.06} \\ &= \$86.26 \end{aligned}$$

We then plug into our two-stage growth formula to get the price today:

$$\begin{aligned} P_0 &= \frac{D_1}{R - g_1} \times \left[ 1 - \left( \frac{1 + g_1}{1 + R} \right)^t \right] + \frac{P_t}{(1 + R)^t} \\ &= \frac{\$2 \times (1 + .20)}{.10 - .20} \times \left[ 1 - \left( \frac{1 + .20}{1 + .10} \right)^5 \right] + \frac{\$86.26}{(1 + .10)^5} \\ &= \$66.64 \end{aligned}$$

(continued)

Notice that we were given  $D_0 = \$2$  here, so we had to grow it by 20 percent for one period to get  $D_1$ . Notice also that  $g_1$  is bigger than  $R$  in this problem, but that fact does not cause a problem.

## COMPONENTS OF THE REQUIRED RETURN

Thus far, we have taken the required return, or discount rate,  $R$ , as given. We will have quite a bit to say about this subject in Chapters 12 and 13. For now, we want to examine the implications of the dividend growth model for this required return. Earlier, we calculated  $P_0$  as:

$$P_0 = D_1 / (R - g)$$

If we rearrange this to solve for  $R$ , we get:

$$\begin{aligned} R - g &= D_1 / P_0 \\ R &= D_1 / P_0 + g \end{aligned} \quad [8.7]$$

This tells us that the total return,  $R$ , has two components. The first of these,  $D_1 / P_0$ , is called the **dividend yield**. Because this is calculated as the expected cash dividend divided by the current price, it is conceptually similar to the current yield on a bond.

The second part of the total return is the growth rate,  $g$ . We know that the dividend growth rate is also the rate at which the stock price grows (see Example 8.3). Thus, this growth rate can be interpreted as the **capital gains yield**—that is, the rate at which the value of the investment grows.<sup>2</sup>

To illustrate the components of the required return, suppose we observe a stock selling for \$20 per share. The next dividend will be \$1 per share. You think that the dividend will grow by 10 percent per year more or less indefinitely. What return does this stock offer if this is correct?

The dividend growth model calculates total return as:

$$\begin{aligned} R &= \text{Dividend yield} + \text{Capital gains yield} \\ R &= \quad D_1 / P_0 \quad + \quad g \end{aligned}$$

In this case, total return works out to be:

$$\begin{aligned} R &= \$1/20 + 10\% \\ &= 5\% + 10\% \\ &= 15\% \end{aligned}$$

This stock, therefore, has an expected return of 15 percent.

We can verify this answer by calculating the price in one year,  $P_1$ , using 15 percent as the required return. Based on the dividend growth model, this price is:

$$\begin{aligned} P_1 &= D_1 \times (1 + g) / (R - g) \\ &= \$1 \times 1.10 / (.15 - .10) \\ &= \$1.10 / .05 \\ &= \$22 \end{aligned}$$

<sup>2</sup>Here and elsewhere, we use the term *capital gains* a little loosely. For the record, a capital gain (or loss) is, strictly speaking, something defined by the IRS. For our purposes, it would be more accurate (but less common) to use the term *price appreciation* instead of *capital gain*.

### dividend yield

A stock's expected cash dividend divided by its current price.

### capital gains yield

The dividend growth rate, or the rate at which the value of an investment grows.

Notice that this \$22 is  $\$20 \times 1.1$ , so the stock price has grown by 10 percent as it should. If you pay \$20 for the stock today, you will get a \$1 dividend at the end of the year, and you will have a  $\$22 - 20 = \$2$  gain. Your dividend yield is thus  $\$1/\$20 = 5\%$ . Your capital gains yield is  $\$2/\$20 = 10\%$ , so your total return would be  $5\% + 10\% = 15\%$ .

To get a feel for actual numbers in this context, consider that, according to the 2006 Value Line *Investment Survey*, Procter & Gamble's dividends were expected to grow by 9 percent over the next 5 or so years, compared to a historical growth rate of 10 percent over the preceding 5 years and 11.5 percent over the preceding 10 years. In 2006, the projected dividend for the coming year was given as \$1.35. The stock price at that time was about \$56 per share. What is the return investors require on P&G? Here, the dividend yield is 2.4 percent and the capital gains yield is 9 percent, giving a total required return of 11.4 percent on P&G stock.

Our discussion of stock valuation is summarized in Table 8.1.

**TABLE 8.1**

Summary of Stock Valuation

<b>I. The General Case</b>
<p>In general, the price today of a share of stock, <math>P_0</math>, is the present value of all of its future dividends, <math>D_1, D_2, D_3, \dots</math>:</p> $P_0 = \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \frac{D_3}{(1+R)^3} + \dots$ <p>where <math>R</math> is the required return.</p>
<b>II. Constant Growth Case</b>
<p>If the dividend grows at a steady rate, <math>g</math>, then the price can be written as:</p> $P_0 = \frac{D_1}{R - g}$ <p>This result is called the <i>dividend growth model</i>.</p>
<b>III. Nonconstant Growth</b>
<p>If the dividend grows steadily after <math>t</math> periods, then the price can be written as:</p> $P_0 = \frac{D_1}{(1+R)^1} + \frac{D_2}{(1+R)^2} + \dots + \frac{D_t}{(1+R)^t} + \frac{P_t}{(1+R)^t}$ <p>where</p> $P_t = \frac{D_t \times (1+g)}{(R-g)}$
<b>IV. Two-Stage Growth</b>
<p>If the dividend grows at rate <math>g_1</math> for <math>t</math> periods and then grows at rate <math>g_2</math> thereafter, then the price can be written as:</p> $P_0 = \frac{D_1}{R - g_1} \times \left[ 1 - \left( \frac{1+g_1}{1+R} \right)^t \right] + \frac{P_t}{(1+R)^t}$ <p>where</p> $P_t = \frac{D_{t+1}}{R - g_2} = \frac{D_0 \times (1+g_1)^t \times (1+g_2)}{R - g_2}$
<b>V. The Required Return</b>
<p>The required return, <math>R</math>, can be written as the sum of two things:</p> $R = D_1/P_0 + g$ <p>where <math>D_1/P_0</math> is the <i>dividend yield</i> and <math>g</math> is the <i>capital gains yield</i> (which is the same thing as the growth rate in dividends for the steady growth case).</p>

### Concept Questions

- 8.1a** What are the relevant cash flows for valuing a share of common stock?
- 8.1b** Does the value of a share of stock depend on how long you expect to keep it?
- 8.1c** What is the value of a share of stock when the dividend grows at a constant rate?

## Some Features of Common and Preferred Stocks

### 8.2

In discussing common stock features, we focus on shareholder rights and dividend payments. For preferred stock, we explain what *preferred* means, and we also debate whether preferred stock is really debt or equity.

#### COMMON STOCK FEATURES

The term **common stock** means different things to different people, but it is usually applied to stock that has no special preference either in receiving dividends or in bankruptcy.

**common stock**  
Equity without priority for dividends or in bankruptcy.

**Shareholder Rights** The conceptual structure of the corporation assumes that shareholders elect directors who, in turn, hire managers to carry out their directives. Shareholders, therefore, control the corporation through the right to elect the directors. Generally, only shareholders have this right.

Directors are elected each year at an annual meeting. Although there are exceptions (discussed next), the general idea is “one share, one vote” (*not one shareholder, one vote*). Corporate democracy is thus very different from our political democracy. With corporate democracy, the “golden rule” prevails absolutely.<sup>3</sup>

Directors are elected at an annual shareholders’ meeting by a vote of the holders of a majority of shares who are present and entitled to vote. However, the exact mechanism for electing directors differs across companies. The most important difference is whether shares must be voted cumulatively or voted straight.

To illustrate the two different voting procedures, imagine that a corporation has two shareholders: Smith with 20 shares and Jones with 80 shares. Both want to be a director. Jones does not want Smith, however. We assume there are a total of four directors to be elected.

The effect of **cumulative voting** is to permit minority participation.<sup>4</sup> If cumulative voting is permitted, the total number of votes that each shareholder may cast is determined first. This is usually calculated as the number of shares (owned or controlled) multiplied by the number of directors to be elected.

**cumulative voting**  
A procedure in which a shareholder may cast all votes for one member of the board of directors.

With cumulative voting, the directors are elected all at once. In our example, this means that the top four vote getters will be the new directors. A shareholder can distribute votes however he or she wishes.

<sup>3</sup>The golden rule: Whosoever has the gold makes the rules.

<sup>4</sup>By *minority participation*, we mean participation by shareholders with relatively small amounts of stock.

Will Smith get a seat on the board? If we ignore the possibility of a five-way tie, then the answer is yes. Smith will cast  $20 \times 4 = 80$  votes, and Jones will cast  $80 \times 4 = 320$  votes. If Smith gives all his votes to himself, he is assured of a directorship. The reason is that Jones can't divide 320 votes among four candidates in such a way as to give all of them more than 80 votes, so Smith will finish fourth at worst.

In general, if there are  $N$  directors up for election, then  $1/(N + 1)$  percent of the stock plus one share will guarantee you a seat. In our current example, this is  $1/(4 + 1) = 20\%$ . So the more seats that are up for election at one time, the easier (and cheaper) it is to win one.

With **straight voting**, the directors are elected one at a time. Each time, Smith can cast 20 votes and Jones can cast 80. As a consequence, Jones will elect all of the candidates. The only way to guarantee a seat is to own 50 percent plus one share. This also guarantees that you will win every seat, so it's really all or nothing.

### straight voting

A procedure in which a shareholder may cast all votes for each member of the board of directors.

## EXAMPLE 8.6

### Buying the Election

Stock in JRJ Corporation sells for \$20 per share and features cumulative voting. There are 10,000 shares outstanding. If three directors are up for election, how much does it cost to ensure yourself a seat on the board?

The question here is how many shares of stock it will take to get a seat. The answer is 2,501, so the cost is  $2,501 \times \$20 = \$50,020$ . Why 2,501? Because there is no way the remaining 7,499 votes can be divided among three people to give all of them more than 2,501 votes. For example, suppose two people receive 2,502 votes and the first two seats. A third person can receive at most  $10,000 - 2,502 - 2,502 - 2,501 = 2,495$ , so the third seat is yours.

As we've illustrated, straight voting can "freeze out" minority shareholders; that is why many states have mandatory cumulative voting. In states where cumulative voting is mandatory, devices have been worked out to minimize its impact.

One such device is to stagger the voting for the board of directors. With staggered elections, only a fraction of the directorships are up for election at a particular time. Thus if only two directors are up for election at any one time, it will take  $1/(2 + 1) = 33.33\%$  of the stock plus one share to guarantee a seat.

Overall, staggering has two basic effects:

1. Staggering makes it more difficult for a minority to elect a director when there is cumulative voting because there are fewer directors to be elected at one time.
2. Staggering makes takeover attempts less likely to be successful because it makes it more difficult to vote in a majority of new directors.

We should note that staggering may serve a beneficial purpose. It provides "institutional memory"—that is, continuity on the board of directors. This may be important for corporations with significant long-range plans and projects.

### proxy

A grant of authority by a shareholder allowing another individual to vote his or her shares.

**Proxy Voting** A **proxy** is the grant of authority by a shareholder to someone else to vote his or her shares. For convenience, much of the voting in large public corporations is actually done by proxy.

As we have seen, with straight voting, each share of stock has one vote. The owner of 10,000 shares has 10,000 votes. Large companies have hundreds of thousands or even millions of shareholders. Shareholders can come to the annual meeting and vote in person, or they can transfer their right to vote to another party.

Obviously, management always tries to get as many proxies as possible transferred to it. However, if shareholders are not satisfied with management, an “outside” group of shareholders can try to obtain votes via proxy. They can vote by proxy in an attempt to replace management by electing enough directors. The resulting battle is called a *proxy fight*.

**Classes of Stock** Some firms have more than one class of common stock. Often the classes are created with unequal voting rights. The Ford Motor Company, for example, has Class B common stock, which is not publicly traded (it is held by Ford family interests and trusts). This class has 40 percent of the voting power, even though it represents less than 10 percent of the total number of shares outstanding.

There are many other cases of corporations with different classes of stock. For example, at one time, General Motors had its “GM Classic” shares (the original) and two additional classes, Class E (“GME”) and Class H (“GMH”). These classes were created to help pay for two large acquisitions, Electronic Data Systems and Hughes Aircraft. Another good example is Google, the Web search company, which only recently became publicly owned. Google has two classes of common stock, A and B. The Class A shares are held by the public, and each share has one vote. The Class B shares are held by company insiders, and each Class B share has 10 votes. As a result, Google’s founders and managers control the company.

Historically, the New York Stock Exchange did not allow companies to create classes of publicly traded common stock with unequal voting rights. Exceptions (like Ford) appear to have been made. In addition, many non-NYSE companies have dual classes of common stock.

A primary reason for creating dual or multiple classes of stock has to do with control of the firm. If such stock exists, management of a firm can raise equity capital by issuing nonvoting or limited-voting stock while maintaining control.

The subject of unequal voting rights is controversial in the United States, and the idea of one share, one vote has a strong following and a long history. Interestingly, however, shares with unequal voting rights are quite common in the United Kingdom and elsewhere around the world.

**Other Rights** The value of a share of common stock in a corporation is directly related to the general rights of shareholders. In addition to the right to vote for directors, shareholders usually have the following rights:

1. The right to share proportionally in dividends paid.
2. The right to share proportionally in assets remaining after liabilities have been paid in a liquidation.
3. The right to vote on stockholder matters of great importance, such as a merger. Voting is usually done at the annual meeting or a special meeting.

In addition, stockholders sometimes have the right to share proportionally in any new stock sold. This is called the *preemptive right*.

Essentially, a preemptive right means that a company that wishes to sell stock must first offer it to the existing stockholders before offering it to the general public. The purpose is to give stockholders the opportunity to protect their proportionate ownership in the corporation.

**dividends**

Payments by a corporation to shareholders, made in either cash or stock.

**Dividends** A distinctive feature of corporations is that they have shares of stock on which they are authorized by law to pay dividends to their shareholders. **Dividends** paid to shareholders represent a return on the capital directly or indirectly contributed to the corporation by the shareholders. The payment of dividends is at the discretion of the board of directors.

Some important characteristics of dividends include the following:

1. Unless a dividend is declared by the board of directors of a corporation, it is not a liability of the corporation. A corporation cannot default on an undeclared dividend. As a consequence, corporations cannot become bankrupt because of nonpayment of dividends. The amount of the dividend and even whether it is paid are decisions based on the business judgment of the board of directors.
2. The payment of dividends by the corporation is not a business expense. Dividends are not deductible for corporate tax purposes. In short, dividends are paid out of the corporation's aftertax profits.
3. Dividends received by individual shareholders are for the most part considered ordinary income by the IRS and are fully taxable. However, corporations that own stock in other corporations are permitted to exclude 70 percent of the dividend amounts they receive and are taxed on only the remaining 30 percent.<sup>5</sup>

**PREFERRED STOCK FEATURES****preferred stock**

Stock with dividend priority over common stock, normally with a fixed dividend rate, sometimes without voting rights.

**Preferred stock** differs from common stock because it has preference over common stock in the payment of dividends and in the distribution of corporation assets in the event of liquidation. *Preference* means only that the holders of the preferred shares must receive a dividend (in the case of an ongoing firm) before holders of common shares are entitled to anything.

Preferred stock is a form of equity from a legal and tax standpoint. It is important to note, however, that holders of preferred stock sometimes have no voting privileges.

**Stated Value** Preferred shares have a stated liquidating value, usually \$100 per share. The cash dividend is described in terms of dollars per share. For example, General Motors "\$5 preferred" easily translates into a dividend yield of 5 percent of stated value.

**Cumulative and Noncumulative Dividends** A preferred dividend is *not* like interest on a bond. The board of directors may decide not to pay the dividends on preferred shares, and their decision may have nothing to do with the current net income of the corporation.

Dividends payable on preferred stock are either *cumulative* or *noncumulative*; most are cumulative. If preferred dividends are cumulative and are not paid in a particular year, they will be carried forward as an *arrearage*. Usually, both the accumulated (past) preferred dividends and the current preferred dividends must be paid before the common shareholders can receive anything.

Unpaid preferred dividends are *not* debts of the firm. Directors elected by the common shareholders can defer preferred dividends indefinitely. However, in such cases, common shareholders must also forgo dividends. In addition, holders of preferred shares are often

<sup>5</sup>For the record, the 70 percent exclusion applies when the recipient owns less than 20 percent of the outstanding stock in a corporation. If a corporation owns more than 20 percent but less than 80 percent, the exclusion is 80 percent. If more than 80 percent is owned, the corporation can file a single "consolidated" return and the exclusion is effectively 100 percent.

granted voting and other rights if preferred dividends have not been paid for some time. For example, as of summer 1996, USAir had failed to pay dividends on one of its preferred stock issues for six quarters. As a consequence, the holders of the shares were allowed to nominate two people to represent their interests on the airline's board. Because preferred stockholders receive no interest on the accumulated dividends, some have argued that firms have an incentive to delay paying preferred dividends; but, as we have seen, this may mean sharing control with preferred stockholders.

**Is Preferred Stock Really Debt?** A good case can be made that preferred stock is really debt in disguise, a kind of equity bond. Preferred shareholders receive a stated dividend only; and if the corporation is liquidated, preferred shareholders get a stated value. Often, preferred stocks carry credit ratings much like those of bonds. Furthermore, preferred stock is sometimes convertible into common stock, and preferred stocks are often callable.

In addition, many issues of preferred stock have obligatory sinking funds. The existence of such a sinking fund effectively creates a final maturity because it means that the entire issue will ultimately be retired. For these reasons, preferred stock seems to be a lot like debt. However, for tax purposes, preferred dividends are treated like common stock dividends.

In the 1990s, firms began to sell securities that looked a lot like preferred stocks but are treated as debt for tax purposes. The new securities were given interesting acronyms like TOPrS (trust-originated preferred securities, or toppers), MIPS (monthly income preferred securities), and QUIPS (quarterly income preferred securities), among others. Because of various specific features, these instruments can be counted as debt for tax purposes, making the interest payments tax deductible. Payments made to investors in these instruments are treated as interest for personal income taxes. Until 2003, interest payments and dividends were taxed at the same marginal tax rate. When the tax rate on dividend payments was reduced, these instruments were not included, so individuals must still pay their higher income tax rate on dividend payments received from these instruments.

### Concept Questions

- 8.2a What is a proxy?
- 8.2b What rights do stockholders have?
- 8.2c Why is preferred stock called *preferred*?

## The Stock Markets

Back in Chapter 1, we briefly mentioned that shares of stock are bought and sold on various stock exchanges, the two most important of which are the New York Stock Exchange and the NASDAQ. From our earlier discussion, recall that the stock market consists of a **primary market** and a **secondary market**. In the primary, or new issue, market, shares of stock are first brought to the market and sold to investors. In the secondary market, existing shares are traded among investors.

In the primary market, companies sell securities to raise money. We will discuss this process in detail in a later chapter. We therefore focus mainly on secondary market activity in this section. We conclude with a discussion of how stock prices are quoted in the financial press.

### 8.3

#### primary market

The market in which new securities are originally sold to investors.

#### secondary market

The market in which previously issued securities are traded among investors.

**dealer**

An agent who buys and sells securities from inventory.

**broker**

An agent who arranges security transactions among investors.



*How big is the bid-ask spread on your favorite stock? Check out the latest quotes at [www.bloomberg.com](http://www.bloomberg.com).*

**DEALERS AND BROKERS**

Because most securities transactions involve dealers and brokers, it is important to understand exactly what is meant by the terms *dealer* and *broker*. A **dealer** maintains an inventory and stands ready to buy and sell at any time. In contrast, a **broker** brings buyers and sellers together but does not maintain an inventory. Thus, when we speak of used car dealers and real estate brokers, we recognize that the used car dealer maintains an inventory, whereas the real estate broker does not.

In the securities markets, a dealer stands ready to buy securities from investors wishing to sell them and sell securities to investors wishing to buy them. Recall from our previous chapter that the price the dealer is willing to pay is called the *bid price*. The price at which the dealer will sell is called the *ask price* (sometimes called the asked, offered, or offering price). The difference between the bid and ask prices is called the *spread*, and it is the basic source of dealer profits.

Dealers exist in all areas of the economy, not just the stock markets. For example, your local college bookstore is probably both a primary and a secondary market textbook dealer. If you buy a new book, this is a primary market transaction. If you buy a used book, this is a secondary market transaction, and you pay the store's ask price. If you sell the book back, you receive the store's bid price (often half of the ask price). The bookstore's spread is the difference between the two prices.

In contrast, a securities broker arranges transactions between investors, matching investors wishing to buy securities with investors wishing to sell securities. The distinctive characteristic of security brokers is that they do not buy or sell securities for their own accounts. Facilitating trades by others is their business.

**ORGANIZATION OF THE NYSE**

The New York Stock Exchange, or NYSE, popularly known as the Big Board, celebrated its bicentennial a few years ago. It has occupied its current location on Wall Street since the turn of the twentieth century. Measured in terms of dollar volume of activity and the total value of shares listed, it is the largest stock market in the world.

**Members** The NYSE has 1,366 exchange **members**. Prior to 2006, the exchange members were said to own "seats" on the exchange, and collectively the members of the exchange were also the owners. For this and other reasons, seats were valuable and were bought and sold fairly regularly. Seat prices reached a record \$4 million in 2005.

In 2006, all of this changed when the NYSE became a publicly owned corporation called NYSE Group, Inc. Naturally, its stock is listed on the NYSE. Now, instead of purchasing seats, exchange members must purchase trading licenses, the number of which is still limited to 1,366. In 2006, a license would set you back a cool \$54,000—per year. Having a license entitles you to buy and sell securities on the floor of the exchange. Different members play different roles in this regard.

The largest number of NYSE members are registered as **commission brokers**. The business of a commission broker is to execute customer orders to buy and sell stocks. A commission broker's primary responsibility to customers is to get the best possible prices for their orders. The exact number varies, but, usually about 500 NYSE members are commission brokers. NYSE commission brokers typically are employees of brokerage companies such as Merrill Lynch.

Second in number of NYSE members are **specialists**, so named because each of them acts as an assigned dealer for a small set of securities. With a few exceptions, each security listed for trading on the NYSE is assigned to a single specialist. Specialists are also called

**member**

As of 2006, a member is the owner of a trading license on the NYSE.

**commission brokers**

NYSE members who execute customer orders to buy and sell stock transmitted to the exchange floor.

**specialist**

A NYSE member acting as a dealer in a small number of securities on the exchange floor; often called a *market maker*.

*market makers* because they are obligated to maintain a fair, orderly market for the securities assigned to them.

Specialists post bid prices and ask prices for securities assigned to them. Specialists make a market by standing ready to buy at bid prices and sell at asked prices when there is a temporary disparity between the flow of buy orders and that of sell orders for a security. In this capacity, they act as dealers for their own accounts.

Third in number of exchange members are **floor brokers**. Floor brokers are used by commission brokers who are too busy to handle certain orders themselves. Such commission brokers will delegate some orders to floor brokers for execution. Floor brokers are sometimes called *\$2 brokers*, a name earned when the standard fee for their service was only \$2.

In recent years, floor brokers have become less important on the exchange floor because of the efficient **SuperDOT system** (the *DOT* stands for Designated Order Turnaround), which allows orders to be transmitted electronically directly to the specialist. SuperDOT trading now accounts for a substantial percentage of all trading on the NYSE, particularly on smaller orders.

Finally, a small number of NYSE members are **floor traders** who independently trade for their own accounts. Floor traders try to anticipate temporary price fluctuations and profit from them by buying low and selling high. In recent decades, the number of floor traders has declined substantially, suggesting that it has become increasingly difficult to profit from short-term trading on the exchange floor.

**Operations** Now that we have a basic idea of how the NYSE is organized and who the major players are, we turn to the question of how trading actually takes place. Fundamentally, the business of the NYSE is to attract and process **order flow**. The term *order flow* means the flow of customer orders to buy and sell stocks. The customers of the NYSE are the millions of individual investors and tens of thousands of institutional investors who place their orders to buy and sell shares in NYSE-listed companies. The NYSE has been quite successful in attracting order flow. Currently, it is not unusual for well over a billion shares to change hands in a single day.

**Floor Activity** It is quite likely that you have seen footage of the NYSE trading floor on television, or you may have visited the NYSE and viewed exchange floor activity from the visitors' gallery (it's worth the trip). Either way, you would have seen a big room, about the size of a basketball gym. This big room is called, technically, "the Big Room." There are a few other, smaller rooms that you normally don't see, one of which is called "the Garage" because that is what it was before it was taken over for trading.

On the floor of the exchange are a number of stations, each with a roughly figure-eight shape. These stations have multiple counters with numerous terminal screens above and on the sides. People operate behind and in front of the counters in relatively stationary positions.

Other people move around on the exchange floor, frequently returning to the many telephones positioned along the exchange walls. In all, you may be reminded of worker ants moving around an ant colony. It is natural to wonder, "What are all those people doing down there (and why are so many wearing funny-looking coats)?"

As an overview of exchange floor activity, here is a quick look at what goes on. Each of the counters at a figure-eight-shaped station is a **specialist's post**. Specialists normally operate in front of their posts to monitor and manage trading in the stocks assigned to them. Clerical employees working for the specialists operate behind the counter. Moving from the many telephones lining the walls of the exchange out to the exchange floor and back again are swarms of commission brokers, receiving telephoned customer orders, walking

### floor brokers

NYSE members who execute orders for commission brokers on a fee basis; sometimes called *\$2 brokers*.

### SuperDOT system

An electronic NYSE system allowing orders to be transmitted directly to the specialist.

### floor traders

NYSE members who trade for their own accounts, trying to anticipate temporary price fluctuations.

### order flow

The flow of customer orders to buy and sell securities.



Take a virtual field trip to the New York Stock Exchange at [www.nyse.com](http://www.nyse.com).

### specialist's post

A fixed place on the exchange floor where the specialist operates.

out to specialists' posts where the orders can be executed, and returning to confirm order executions and receive new customer orders.

To better understand activity on the NYSE trading floor, imagine yourself as a commission broker. Your phone clerk has just handed you an order to sell 20,000 shares of Wal-Mart for a customer of the brokerage company that employs you. The customer wants to sell the stock at the best possible price as soon as possible. You immediately walk (running violates exchange rules) to the specialist's post where Wal-Mart stock is traded.

As you approach the specialist's post where Wal-Mart is traded, you check the terminal screen for information on the current market price. The screen reveals that the last executed trade was at 60.10 and that the specialist is bidding 60 per share. You could immediately sell to the specialist at 60, but that would be too easy.

Instead, as the customer's representative, you are obligated to get the best possible price. It is your job to "work" the order, and your job depends on providing satisfactory order execution service. So, you look around for another broker who represents a customer who wants to buy Wal-Mart stock. Luckily, you quickly find another broker at the specialist's post with an order to buy 20,000 shares. Noticing that the specialist is asking 60.10 per share, you both agree to execute your orders with each other at a price of 60.05. This price is exactly halfway between the specialist's bid and ask prices, and it saves each of your customers  $.05 \times 20,000 = \$1,000$  as compared to dealing at the posted prices.

For a very actively traded stock, there may be many buyers and sellers around the specialist's post, and most of the trading will be done directly between brokers. This is called trading in the "crowd." In such cases, the specialist's responsibility is to maintain order and to make sure that all buyers and sellers receive a fair price. In other words, the specialist essentially functions as a referee.

More often, however, there will be no crowd at the specialist's post. Going back to our Wal-Mart example, suppose you are unable to quickly find another broker with an order to buy 20,000 shares. Because you have an order to sell immediately, you may have no choice but to sell to the specialist at the bid price of 60. In this case, the need to execute an order quickly takes priority, and the specialist provides the liquidity necessary to allow immediate order execution.

Finally, note that colored coats are worn by many of the people on the floor of the exchange. The color of the coat indicates the person's job or position. Clerks, runners, visitors, exchange officials, and so on wear particular colors to identify themselves. Also, things can get a little hectic on a busy day, with the result that good clothing doesn't last long; the cheap coats offer some protection.

## NASDAQ OPERATIONS

In terms of total dollar volume of trading, the second largest stock market in the United States is NASDAQ (say "Naz-dak"). The somewhat odd name originally was an acronym for the National Association of Securities Dealers Automated Quotations system, but NASDAQ is now a name in its own right.

Introduced in 1971, the NASDAQ market is a computer network of securities dealers and others that disseminates timely security price quotes to computer screens worldwide. NASDAQ dealers act as market makers for securities listed on NASDAQ. As market makers, NASDAQ dealers post bid and ask prices at which they accept sell and buy orders, respectively. With each price quote, they also post the number of stock shares that they obligate themselves to trade at their quoted prices.

Like NYSE specialists, NASDAQ market makers trade on an inventory basis—that is, using their inventory as a buffer to absorb buy and sell order imbalances. Unlike the NYSE

specialist system, NASDAQ features multiple market makers for actively traded stocks. Thus, there are two key differences between the NYSE and NASDAQ:

1. NASDAQ is a computer network and has no physical location where trading takes place.
2. NASDAQ has a multiple market maker system rather than a specialist system.

Traditionally, a securities market largely characterized by dealers who buy and sell securities for their own inventories is called an **over-the-counter (OTC) market**. Consequently, NASDAQ is often referred to as an OTC market. However, in their efforts to promote a distinct image, NASDAQ officials prefer that the term OTC not be used when referring to the NASDAQ market. Nevertheless, old habits die hard, and many people still refer to NASDAQ as an OTC market.

By 2006, the NASDAQ had grown to the point that it was, by some measures, bigger than the NYSE. For example, on May 10, 2006, 2.0 billion shares were traded on the NASDAQ versus 1.6 billion on the NYSE. In dollars, NASDAQ trading volume for the day was \$48.8 billion compared to \$64.5 billion for the NYSE.

The NASDAQ is actually made up of two separate markets: the NASDAQ National Market (NNM) and the NASDAQ Capital Market. As the market for NASDAQ's larger and more actively traded securities, the NASDAQ National Market lists about 3,200 companies, including some of the best-known companies in the world. The NASDAQ Capital Market is for small companies and lists about 700 individual companies. As you might guess, an important difference between the two markets is that the National Market has more stringent listing requirements. Of course, as Capital Market companies become more established, they may move up to the National Market.

**NASDAQ Participants** As we mentioned previously, the NASDAQ has historically been a dealer market, characterized by competing market makers. Typically there have been about a dozen or so per stock. The biggest market makers cover thousands of stocks.

In a very important development, in the late 1990s, the NASDAQ system was opened to so-called **electronic communications networks (ECNs)**. ECNs are basically Web sites that allow investors to trade directly with one another. Our nearby *Work the Web* box describes one of the biggest ECNs, INET ([www.island.com](http://www.island.com)), and contains important information about ECN "order books." Be sure to read it.

Investor buy and sell orders placed on ECNs are transmitted to the NASDAQ and displayed along with market maker bid and ask prices. As a result, the ECNs open up the NASDAQ by essentially allowing individual investors to enter orders, not just market makers. Thus, the ECNs increase liquidity and competition.

If you check prices on the Web for both NASDAQ- and NYSE-listed stocks, you'll notice an interesting difference. For NASDAQ issues, you can actually see the bid and ask prices as well as recent transaction information. The bid and ask prices for the NASDAQ listings represent the **inside quotes**: the highest bid and the lowest ask prices. For a relatively small fee (or possibly free from your broker), you can even have access to "Level II" quotes, which show all of the posted bid and ask prices and frequently the identity of the market maker. Of course, NYSE specialists post bid and ask prices as well; they are just not disclosed to the general public (they are available by subscription at a cost substantially higher than that for Level II NASDAQ quotes).

The success of the NASDAQ National Market as a competitor to the NYSE and other organized exchanges can be judged by its ability to attract stock listings by companies that traditionally might have chosen to be listed on the NYSE. Such well-known companies as Microsoft, Apple Computer, Intel, Dell, Yahoo!, and Starbucks list their securities on NASDAQ.

### over-the-counter (OTC) market

Securities market in which trading is almost exclusively done through dealers who buy and sell for their own inventories.



NASDAQ ([www.nasdaq.com](http://www.nasdaq.com)) has a great Web site; check it out!

### electronic communications network (ECN)

A Web site that allows investors to trade directly with each other.

### inside quotes

The highest bid quotes and lowest ask quotes offered by dealers for a security.

## WORK THE WEB



You can actually watch trading take place on the Web by visiting one of the biggest ECNs, INET (www.island.com), formerly called Island. INET is somewhat unique in that the “order book,” meaning the list of buy and sell orders, is public in real time.

As shown, we have captured a sample order book for Johnson & Johnson. On the left are the buy orders (bids); sell orders (asks) are on the right. All orders are “limit” orders, which means the customer has specified the most she will pay (for buy orders) or the least she will accept (for sell orders). The inside quotes (the highest bid, or buy, and the lowest ask, or sell) in this market are the ones at the top, so we sometimes hear the expression “top of the book” quotes.

If you visit this site, you can see trading take place as orders are entered and executed. Notice that on this particular day, by about 2:00 PM, INET had traded about 480,000 shares of Johnson & Johnson. At that time, the inside quotes for Johnson & Johnson were 2,800 shares bid at \$58.90 and a total of 576 shares offered at \$58.92.

INET home		system stats		help	
 <b>JNJ</b>		GET STOCK		<input type="text" value="JNJ"/> <input type="button" value="go"/>	
		<input type="checkbox"/> Aggregate by Price			
<b>LAST MATCH</b>			<b>TODAY'S ACTMITY</b>		
Price	58.9200		Orders	22,993	
Time	14:03:58		Volume	476,899	
<b>BUY ORDERS</b>			<b>SELL ORDERS</b>		
SHARES	PRICE		SHARES	PRICE	
1,200	58.9000		74	58.9200	
200	58.9000		154	58.9200	
1,000	58.9000		148	58.9200	
400	58.9000		200	58.9200	
300	58.8900		154	58.9300	
100	58.8800		3,400	58.9300	
300	58.8700		100	58.9400	
1,200	58.8700		154	58.9400	
100	58.8600		1,200	58.9400	
300	58.8500		1,200	58.9500	
1,000	58.8900		100	58.9600	
500	58.5900		200	58.9700	
1,000	58.3200		100	59.0000	
1,000	58.2900		89	59.0000	
100	58.2500		500	59.1600	
(55 more)			(72 more)		

## STOCK MARKET REPORTING

If you look through the pages of *The Wall Street Journal* (or another financial newspaper), you will find information on a large number of stocks in several different markets. Figure 8.2 reproduces a small section of the stock page for the New York Stock Exchange from June 30, 2006. Information on most NASDAQ issues is reported in the same way. In Figure 8.2, locate the line for motorcycle maker Harley-Davidson (HarleyDav). With the column headings, the line reads:

52 WEEK HI	52 WEEK LO	STOCK (DIV)	YLD %	PE	VOL 100s	CLOSE	NET CHG
55.93	44.40	HarleyDav .84f	1.5	16	24726	54.25	1.18

The first two numbers, 55.93 and 44.40, are the highest and lowest prices for the stock over the past 52 weeks. The .84 is the annual dividend in dollars. Because Harley, like most

**NEW YORK STOCK EXCHANGE COMPOSITE TRANSACTIONS**

29.29	18.83	GtAtlPac s 7.25e	31.8	2	4798	22.83	0.60
21.14	15.23	GtLakesBcp	...	dd	83	17.29	0.14
141	101	GtNorIron 10.00e	8.9	11	18112		-2.50
32.78	27.08	GrtPlnsEngy 1.66	6.0	15	3333	27.75	0.16
30.40	19.10	Greatbatch	...	42	1330	23.20	0.63
33.90	26.62	GreenMTPwr 1.12	3.3	15	78	33.98	0.10
<b>46.63</b>	<b>24.67</b>	<b>Greenbrier .32</b>	<b>1.0</b>	<b>15</b>	<b>6897</b>	<b>33.62</b>	<b>2.57</b>
<b>77.10</b>	<b>37.59</b>	<b>Greenhill .64</b>	<b>1.1</b>	<b>25</b>	<b>4389</b>	<b>59.49</b>	<b>3.69</b>
71.38	53.61	Greif A 1.44f	2.0	16	1203	73.10	3.27
66.16	53.10	Greif B 1.61e	2.4	12	32	67.50	2.50
28.55	21.11	Griffon	...	17	1408	26.14	0.85
63.97	24.05	Gp1Auto .27e	5	18	6707	56.29	0.95
<b>15.74</b>	<b>8.60</b>	<b>Gruema ADS .30e</b>	<b>2.9</b>	<b>...</b>	<b>357</b>	<b>10.27</b>	<b>0.69</b>
39.35	27.49	GpAerPa ADS 1.18p	...	...	1436	30.75	0.60
41.79	28.93	GpoAsur ADS B .60e	1.8	...	455	33.20	0.20
22.60	15.30	GpoSaba ADS .49e	2.5	...	22	19.74	-0.25
22.99	15.43	GpoTeva ADS s 1.5e	.8	...	40753	19.19	0.82
5.70	3	GpoTMM ADS	...	dd	3119	4.02	0.17
35	28.27	Gtech .34	1.0	22	5749	34.70	0.09
22.72	13.07	GungshnRail .75e	4.1	...	463	18.23	0.73
<b>47.25</b>	<b>16.48</b>	<b>Guess</b>	<b>...</b>	<b>29</b>	<b>6749</b>	<b>41.84</b>	<b>2.39</b>
25.50	21.81	GulfPwr nts 1.47	6.7	...	14	22	-0.10

**H**

57.17	41.99	HCA .68	1.6	13	20611	42.13	-0.04
34.92	25.11	HCClnsHdg sx 40f	1.3	15	4437	29.68	0.49
<b>63.60</b>	<b>41.96</b>	<b>HDFC Bnk .36e</b>	<b>7</b>	<b>...</b>	<b>2864</b>	<b>52.96</b>	<b>3.40</b>
62.41	45.12	HNI .72	1.6	17	3981	44.96	-0.40
13.25	10.18	HRPT Prop .84	7.4	10	4866	11.39	0.05
92.35	77.23	HSBC ADS 3.70e	4.2	...	11927	87.55	1.87
55.71	38.58	Haemonetic	...	19	3809	47.40	0.39
83.97	45.76	Hallbrtn .60	.8	16	81589	73.72	3.13
7.32	2.99	HnckFabrcs lf	...	dd	800	3.35	0.04
17.86	8.25	Handleman .32	3.7	7	4018	8.54	-0.01
8.95	5.03	HangerOrtho	...	17	1474	8.42	0.26
<b>21.10</b>	<b>11.45</b>	<b>HanovrCmprsr</b>	<b>...</b>	<b>dd</b>	<b>13712</b>	<b>18.45</b>	<b>0.88</b>
54.43	36.74	HanoverIns .25e	5	dd	2893	46.67	0.65
69.74	45.87	Hanson ADS 3.06e	5.1	...	208	60.19	1.81
45.12	35.02	Harland .60	1.4	15	2893	43.41	0.03
<b>55.93</b>	<b>44.40</b>	<b>HarleyDav .84f</b>	<b>1.5</b>	<b>16</b>	<b>24726</b>	<b>54.25</b>	<b>1.18</b>
115.85	78.52	HarmanInt .05	1	22	4484	84.30	4.00
18.84	7.21	HrmnyGld ADS	...	...	17974	15.56	1.13
83.33	57.29	HarrahEntn 1.45	2.1	36	16694	70.25	0.78
49.78	30.91	Harris .32	.8	27	16428	41.90	3.22
89.70	53.56	Harsco 1.30	1.7	19	1630	77.43	2.90
31	24.33	HarteHanks .24	.9	19	2106	25.50	0.77
94.03	73.53	HrtfrdFnl 1.60	1.9	11	16174	84.51	2.26
82.53	65.75	HrtfrdFnl 7.0m 3.50e	4.7	...	13	74.80	1.80
81.65	64.75	HrtfrdFnl un 3.00	4.0	...	33	74.25	1.82
<b>10.37</b>	<b>6.09</b>	<b>Hartmarx</b>	<b>...</b>	<b>11</b>	<b>12552</b>	<b>6.36</b>	<b>-0.81</b>
33.69	23.85	HvstEnglyr n 4.56p	15.4	...	2871	29.67	0.89
14.83	7.83	HvstNatRes	...	11	3814	13.49	0.59
22.35	17.75	Hasbro .48	2.7	17	19455	18.05	0.05
16.55	11.53	HavtyFurn .27	1.7	21	1355	16	0.41
16.30	11.92	HavtyFurn A .25	1.6	21	3	15.90	0.10
28.76	25.50	HawEllnd 1.24	4.5	17	2856	27.81	0.47
<b>45.75</b>	<b>24.01</b>	<b>Headwaters</b>	<b>...</b>	<b>8</b>	<b>10412</b>	<b>25.30</b>	<b>1.27</b>
28.92	24.25	HlthCrProp 1.70	6.4	24	3731	26.68	0.67
39.20	32.80	HlthCr Reit 2.56f	7.3	30	3376	34.97	0.56
26.48	19.35	HlthMgt A .24	1.2	13	25146	19.57	0.01

52-WEEK		STOCK (DIV)	YLD %	VOL PE	NET CLOSE	CHG	
HI	LO						
91.91	43.30	JonsnLgLaSal .50e	.6	24	4543	84	5.57
16.85	10.85	JournalComm A .26	2.3	14	2818	11.24	0.04
19.45	8.72	JrnlRgstr .08	.9	9	4505	8.98	0.20

**K**

20.05	14.75	K&F IndHldg n	...	16	1046	16.98	0.78
85.45	41.95	KB Home 1.00	2.1	4	27304	46.92	1.92
31.45	17.37	KCS Engy	...	12	6732	29.49	1.08
40.25	30.91	KSeaTrnsp 2.40f	7.5	47	227	31.90	0.12
24.29	19.64	KT Crp ADS 1.47e	6.9	...	4236	21.36	0.77
25.22	15.45	KV Pharm A	...	81	1872	18.64	0.52
24.91	15.40	KV Pharm B	...	81	6	18.60	0.48
13.66	8.25	K2	...	dd	4861	10.70	0.05
<b>27.10</b>	<b>16.50</b>	<b>KadantInc</b>	<b>...</b>	<b>47</b>	<b>545</b>	<b>22.80</b>	<b>1.21</b>
<b>28.42</b>	<b>19.47</b>	<b>KSCitySo</b>	<b>...</b>	<b>29</b>	<b>12838</b>	<b>26.25</b>	<b>1.26</b>
44.33	26.77	Kaydon .48	1.3	15	2222	37.30	1.03
28.44	23.28	KynAndrsMLP 1.76f	6.9	...	789	25.54	-0.27
16.50	10	KeaneInc	...	24	2682	12.22	0.18
16.55	11.36	KeithlyInstr .15	1.2	24	797	12.22	0.57
48.30	42.41	Kelllogg 1.16f	2.4	20	13028	48.29	0.63
34.57	21.83	Kellwood .64	2.2	dd	5846	29.41	1.08
<b>11.58</b>	<b>6.23</b>	<b>KemetCp</b>	<b>...</b>	<b>cc</b>	<b>7967</b>	<b>9.21</b>	<b>0.60</b>
67.38	44.65	Kenmettl .76	1.3	...	3689	60.42	2.51
35.29	22.65	KenCole A .72	3.1	...	1441	23	0.04
69.45	36.04	KerrMcGee s.13	2	5	60533	69.45	0.19
80.85	52.49	KerznerIntl	...	65	1903	79.32	0.07
38.31	30.10	KeyCp 1.38	3.9	13	11933	35.69	0.61
41.52	32.66	KeySpan 1.86	4.6	19	3929	40.40	0.18
78.04	46.68	KilroyRlty 2.12	3.2	78	2328	67.29	1.52
64.99	55.60	KimbClark 1.96	3.2	21	15483	61.87	0.86
42	27.81	KimcoRlty s 1.32	3.6	23	7807	36.29	1.00
56.22	43.62	KindrMrgEgy 3.24f	7.0	29	1592	46.11	0.37
103.75	81	KindrMrgan 3.50	3.5	...	12242	99.90	0.35
47.54	40.09	KindrMrgMg 3.24f	7.0	43	703	42.81	0.12
42.11	19.70	Kindred	...	9	4565	25.76	0.76
64	33	KineticCnpts	...	24	3598	43.08	-0.01
20	10.11	KingPharm	...	40	15183	16.57	0.52
21.81	15.97	KingswayFin .25g	...	...	89	18.04	0.05
<b>13.12</b>	<b>5.52</b>	<b>KinrossGld</b>	<b>...</b>	<b>...</b>	<b>13837</b>	<b>10.33</b>	<b>0.77</b>
40.59	22.06	KirbyCp s	...	25	5469	36.83	1.79
16.52	14.04	KiteRltyTr .75	4.9	...	1026	15.38	0.61
25.01	20.51	KKR Fnl 1.57e	7.3	19	3775	21.38	-0.02
10.70	7.60	KMG America	...	40	4615	8.40	0.13
22.51	14.67	KnightTrnsp s .08	.4	27	4549	19.96	0.92
22.95	14.75	Knoll .40	2.1	26	2945	19	0.16
58.90	42.78	KohlsCp	...	23	42461	58.77	1.85
26.83	19	Konami ADS 46e	2.0	...	18	22.55	0.85
<b>98.60</b>	<b>45.12</b>	<b>Kookmin ADS</b>	<b>...</b>	<b>...</b>	<b>8272</b>	<b>81.56</b>	<b>4.71</b>
12.95	9.17	KoorInd	...	62	10.33	0.17	
23.60	14.50	KoppersHldg n 27e	1.4	...	953	19.58	0.50
24.97	14.96	KoreaElecPwr .56e	2.9	...	4865	19.34	0.79
21.59	14.30	KornFerry	...	15	3722	19.59	0.59
33.31	27.44	KrftFoods .92	3.0	18	27886	30.97	0.20
12.11	3.35	KrspsyKrm lf	...	dd	5508	8.10	0.25
21.39	18.05	Kroger .13e	.6	16	55143	21.72	0.36
33.47	27.48	KronosWldwd 1.00	3.5	21	204	28.20	-0.18
<b>60.60</b>	<b>27.67</b>	<b>Kubota ADS .37e</b>	<b>.8</b>	<b>...</b>	<b>731</b>	<b>47.27</b>	<b>2.28</b>
<b>98.01</b>	<b>62.58</b>	<b>Kyocera .80e</b>	<b>1.1</b>	<b>...</b>	<b>513</b>	<b>78.15</b>	<b>3.75</b>

FIGURE 8.2

Sample Stock Quotation from *The Wall Street Journal*

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companies, pays dividends quarterly, this \$.84 is actually the latest quarterly dividend multiplied by 4. So, the cash dividend paid was \$.84/4 = \$.21, or 21 cents per share. The small *f* following the .84 indicates a footnote, which in this case tells us the dividend was just increased.

Jumping ahead just a bit, “CLOSE” is the closing price of the day (the last price at which a trade took place before the NYSE closed for the day). The “NET CHG” of 1.18 tells us that the closing price of \$54.25 is \$1.18 higher than it was the day before; so, we say that Harley was up 1.18 for the day.

 You can get real-time stock quotes on the Web. See finance.yahoo.com for details.

The column marked “YLD %” gives the dividend yield based on the current dividend and the closing price. For Harley, this is  $\$.84/54.25 = .015$ , or about 1.5 percent, the number shown. The next column, labeled “PE,” is the price–earnings ratio we discussed in Chapter 3. It is calculated as the closing price divided by annual earnings per share (based on the most recent four quarters). In the jargon of Wall Street, we might say that Harley “sells for 16 times earnings.”

Finally, the column marked “VOL 100s” tells us how many shares traded during the day (in hundreds). For example, the 24726 for Harley tells us that 2,472,600, or close to 2.5 million shares, changed hands on this day alone. If the average price during the day was \$55 or so, then the dollar volume of transactions was on the order of  $\$55 \times 2.5 \text{ million} = \$135 \text{ million}$  worth for Harley alone. This was a fairly routine day of trading in Harley shares, so this amount is not unusual and serves to illustrate how active the market can be for well-known companies.

If you look over Figure 8.2, you will notice quite a few other footnote indicators (small letters) and special symbols. To learn more about these, pick up any *Wall Street Journal* and consult the stock pages.

### Concept Questions

- 8.3a** What is the difference between a securities broker and a securities dealer?
- 8.3b** Which is bigger, the bid price or the ask price? Why?
- 8.3c** What are the four types of members of the New York Stock Exchange (NYSE)?
- 8.3d** How does NASDAQ differ from the NYSE?

## 8.4

## Summary and Conclusions

This chapter has covered the basics of stocks and stock valuation:

1. The cash flows from owning a share of stock come in the form of future dividends. We saw that in certain special cases it is possible to calculate the present value of all the future dividends and thus come up with a value for the stock.
2. As the owner of shares of common stock in a corporation, you have various rights, including the right to vote to elect corporate directors. Voting in corporate elections can be either cumulative or straight. Most voting is actually done by proxy, and a proxy battle breaks out when competing sides try to gain enough votes to elect their candidates for the board.
3. In addition to common stock, some corporations have issued preferred stock. The name stems from the fact that preferred stockholders must be paid first, before common stockholders can receive anything. Preferred stock has a fixed dividend.
4. The two biggest stock markets in the United States are the NYSE and NASDAQ. We discussed the organization and operation of these two markets, and we saw how stock price information is reported in the financial press.

This chapter completes Part 3 of our book. By now, you should have a good grasp of what we mean by *present value*. You should also be familiar with how to calculate present values, loan payments, and so on. In Part 4, we cover capital budgeting decisions. As you will see, the techniques you learned in Chapters 5–8 form the basis for our approach to evaluating business investment decisions.

## CHAPTER REVIEW AND SELF-TEST PROBLEMS

- 8.1 Dividend Growth and Stock Valuation** The Brigapenski Co. has just paid a cash dividend of \$2 per share. Investors require a 16 percent return from investments such as this. If the dividend is expected to grow at a steady 8 percent per year, what is the current value of the stock? What will the stock be worth in five years?
- 8.2 More Dividend Growth and Stock Valuation** In Self-Test Problem 8.1, what would the stock sell for today if the dividend was expected to grow at 20 percent per year for the next three years and then settle down to 8 percent per year, indefinitely?

## ANSWERS TO CHAPTER REVIEW AND SELF-TEST PROBLEMS

- 8.1** The last dividend,  $D_0$ , was \$2. The dividend is expected to grow steadily at 8 percent. The required return is 16 percent. Based on the dividend growth model, we can say that the current price is:

$$\begin{aligned} P_0 &= D_1 / (R - g) = D_0 \times (1 + g) / (R - g) \\ &= \$2 \times 1.08 / (.16 - .08) \\ &= \$2.16 / .08 \\ &= \$27 \end{aligned}$$

We could calculate the price in five years by calculating the dividend in five years and then using the growth model again. Alternatively, we could recognize that the stock price will increase by 8 percent per year and calculate the future price directly. We'll do both. First, the dividend in five years will be:

$$\begin{aligned} D_5 &= D_0 \times (1 + g)^5 \\ &= \$2 \times 1.08^5 \\ &= \$2.9387 \end{aligned}$$

The price in five years would therefore be:

$$\begin{aligned} P_5 &= D_5 \times (1 + g) / (R - g) \\ &= \$2.9387 \times 1.08 / .08 \\ &= \$3.1738 / .08 \\ &= \$39.67 \end{aligned}$$

Once we understand the dividend model, however, it's easier to notice that:

$$\begin{aligned} P_5 &= P_0 \times (1 + g)^5 \\ &= \$27 \times 1.08^5 \\ &= \$27 \times 1.4693 \\ &= \$39.67 \end{aligned}$$

Notice that both approaches yield the same price in five years.

- 8.2** In this scenario, we have supernormal growth for the next three years. We'll need to calculate the dividends during the rapid growth period and the stock price in three years. The dividends are:

$$\begin{aligned} D_1 &= \$2.00 \times 1.20 = \$2.400 \\ D_2 &= \$2.40 \times 1.20 = \$2.880 \\ D_3 &= \$2.88 \times 1.20 = \$3.456 \end{aligned}$$

After three years, the growth rate falls to 8 percent indefinitely. The price at that time,  $P_3$ , is thus:

$$\begin{aligned} P_3 &= D_3 \times (1 + g)/(R - g) \\ &= \$3.456 \times 1.08 / (.16 - .08) \\ &= \$3.7325 / .08 \\ &= \$46.656 \end{aligned}$$

To complete the calculation of the stock's present value, we have to determine the present value of the three dividends and the future price:

$$\begin{aligned} P_0 &= \frac{D_1}{(1 + R)^1} + \frac{D_2}{(1 + R)^2} + \frac{D_3}{(1 + R)^3} + \frac{P_3}{(1 + R)^3} \\ &= \frac{\$2.40}{1.16} + \frac{2.88}{1.16^2} + \frac{3.456}{1.16^3} + \frac{46.656}{1.16^3} \\ &= \$2.07 + 2.14 + 2.21 + 29.89 \\ &= \$36.31 \end{aligned}$$

### CONCEPTS REVIEW AND CRITICAL THINKING QUESTIONS

- 1. Stock Valuation** Why does the value of a share of stock depend on dividends?
- 2. Stock Valuation** A substantial percentage of the companies listed on the NYSE and NASDAQ don't pay dividends, but investors are nonetheless willing to buy shares in them. How is this possible given your answer to the previous question?
- 3. Dividend Policy** Referring to the previous questions, under what circumstances might a company choose not to pay dividends?
- 4. Dividend Growth Model** Under what two assumptions can we use the dividend growth model presented in the chapter to determine the value of a share of stock? Comment on the reasonableness of these assumptions.
- 5. Common versus Preferred Stock** Suppose a company has a preferred stock issue and a common stock issue. Both have just paid a \$2 dividend. Which do you think will have a higher price, a share of the preferred or a share of the common?
- 6. Dividend Growth Model** Based on the dividend growth model, what are the two components of the total return on a share of stock? Which do you think is typically larger?
- 7. Growth Rate** In the context of the dividend growth model, is it true that the growth rate in dividends and the growth rate in the price of the stock are identical?
- 8. Voting Rights** When it comes to voting in elections, what are the differences between U.S. political democracy and U.S. corporate democracy?
- 9. Corporate Ethics** Is it unfair or unethical for corporations to create classes of stock with unequal voting rights?
- 10. Voting Rights** Some companies, such as Reader's Digest, have created classes of stock with no voting rights at all. Why would investors buy such stock?
- 11. Stock Valuation** Evaluate the following statement: Managers should not focus on the current stock value because doing so will lead to an overemphasis on short-term profits at the expense of long-term profits.
- 12. Two-Stage Dividend Growth Model** One of the assumptions of the two-stage growth model is that the dividends drop immediately from the high growth rate to the perpetual growth rate. What do you think about this assumption? What happens if this assumption is violated?


**QUESTIONS AND PROBLEMS**

1. **Stock Values** The Jackson–Timberlake Wardrobe Co. just paid a dividend of \$1.60 per share on its stock. The dividends are expected to grow at a constant rate of 6 percent per year indefinitely. If investors require a 12 percent return on The Jackson–Timberlake Wardrobe Co. stock, what is the current price? What will the price be in three years? In 15 years?
2. **Stock Values** The next dividend payment by Top Knot, Inc., will be \$2.50 per share. The dividends are anticipated to maintain a 5 percent growth rate forever. If the stock currently sells for \$48.00 per share, what is the required return?
3. **Stock Values** For the company in the previous problem, what is the dividend yield? What is the expected capital gains yield?
4. **Stock Values** Stairway Corporation will pay a \$3.60 per share dividend next year. The company pledges to increase its dividend by 4.5 percent per year indefinitely. If you require an 11 percent return on your investment, how much will you pay for the company's stock today?
5. **Stock Valuation** Listen Close Co. is expected to maintain a constant 6.5 percent growth rate in its dividends indefinitely. If the company has a dividend yield of 3.6 percent, what is the required return on the company's stock?
6. **Stock Valuation** Suppose you know that a company's stock currently sells for \$60 per share and the required return on the stock is 12 percent. You also know that the total return on the stock is evenly divided between a capital gains yield and a dividend yield. If it's the company's policy to always maintain a constant growth rate in its dividends, what is the current dividend per share?
7. **Stock Valuation** No More Corp. pays a constant \$11 dividend on its stock. The company will maintain this dividend for the next eight years and will then cease paying dividends forever. If the required return on this stock is 10 percent, what is the current share price?
8. **Valuing Preferred Stock** Ayden, Inc., has an issue of preferred stock outstanding that pays a \$6.50 dividend every year in perpetuity. If this issue currently sells for \$113 per share, what is the required return?
9. **Stock Valuation** Great Pumpkin Farms just paid a dividend of \$3.50 on its stock. The growth rate in dividends is expected to be a constant 5 percent per year indefinitely. Investors require a 16 percent return on the stock for the first three years, a 14 percent return for the next three years, and an 11 percent return thereafter. What is the current share price?
10. **Nonconstant Growth** Metallica Bearings, Inc., is a young start-up company. No dividends will be paid on the stock over the next nine years because the firm needs to plow back its earnings to fuel growth. The company will pay a \$10 per share dividend in 10 years and will increase the dividend by 6 percent per year thereafter. If the required return on this stock is 13 percent, what is the current share price?
11. **Nonconstant Dividends** Spears, Inc., has an odd dividend policy. The company has just paid a dividend of \$7 per share and has announced that it will increase the dividend by \$4 per share for each of the next four years, and then never pay another dividend. If you require an 11 percent return on the company's stock, how much will you pay for a share today?

**BASIC**

(Questions 1–8)


**INTERMEDIATE**

(Questions 9–20)



- X** 12. **Nonconstant Dividends** North Side Corporation is expected to pay the following dividends over the next four years: \$8, \$7, \$5, and \$2. Afterward, the company pledges to maintain a constant 5 percent growth rate in dividends forever. If the required return on the stock is 11 percent, what is the current share price?
13. **Supernormal Growth** Rizzi Co. is growing quickly. Dividends are expected to grow at a 25 percent rate for the next three years, with the growth rate falling off to a constant 7 percent thereafter. If the required return is 13 percent and the company just paid a \$3.10 dividend, what is the current share price?
14. **Supernormal Growth** Janicek Corp. is experiencing rapid growth. Dividends are expected to grow at 25 percent per year during the next three years, 15 percent over the following year, and then 8 percent per year indefinitely. The required return on this stock is 14 percent, and the stock currently sells for \$65 per share. What is the projected dividend for the coming year?
15. **Negative Growth** Antiques R Us is a mature manufacturing firm. The company just paid a \$10 dividend, but management expects to reduce the payout by 6 percent per year indefinitely. If you require an 11 percent return on this stock, what will you pay for a share today?
16. **Finding the Dividend** Ames Corporation stock currently sells for \$50 per share. The market requires a 13 percent return on the firm's stock. If the company maintains a constant 5 percent growth rate in dividends, what was the most recent dividend per share paid on the stock?
17. **Valuing Preferred Stock** Best Rate Bank just issued some new preferred stock. The issue will pay a \$10 annual dividend in perpetuity, beginning 10 years from now. If the market requires a 7 percent return on this investment, how much does a share of preferred stock cost today?
18. **Using Stock Quotes** You have found the following stock quote for RJW Enterprises, Inc., in the financial pages of today's newspaper. What was the closing price for this stock that appeared in *yesterday's* paper? If the company currently has 25 million shares of stock outstanding, what was net income for the most recent four quarters?

52-WEEK		STOCK (DIV)	YLD	PE	VOL 100s	CLOSE	NET CHG
HI	LO		%				
51.45	44.67	RJW 1.36	2.7	14	17652	??	-0.23

19. **Two-Stage Dividend Growth Model** Formula 51 Corp. just paid a dividend of \$1.45 per share. The dividends are expected to grow at 30 percent for the next eight years and then level off to a 7 percent growth rate indefinitely. If the required return is 13 percent, what is the price of the stock today?
20. **Two-Stage Dividend Growth Model** Chartreuse County Choppers Inc. is experiencing rapid growth. The company expects dividends to grow at 25 percent per year for the next nine years before leveling off at 6 percent into perpetuity. The required return on the company's stock is 12 percent. If the dividend per share just paid was \$1.05, what is the stock price?
21. **Capital Gains versus Income** Consider four different stocks, all of which have a required return of 18 percent and a most recent dividend of \$4.50 per share. Stocks

**CHALLENGE**

(Questions 21–27)



W, X, and Y are expected to maintain constant growth rates in dividends for the foreseeable future of 10 percent, 0 percent, and  $-5$  percent per year, respectively. Stock Z is a growth stock that will increase its dividend by 20 percent for the next two years and then maintain a constant 12 percent growth rate thereafter. What is the dividend yield for each of these four stocks? What is the expected capital gains yield? Discuss the relationship among the various returns that you find for each of these stocks.

22. **Stock Valuation** Most corporations pay quarterly dividends on their common stock rather than annual dividends. Barring any unusual circumstances during the year, the board raises, lowers, or maintains the current dividend once a year and then pays this dividend out in equal quarterly installments to its shareholders.
- Suppose a company currently pays a \$2.40 annual dividend on its common stock in a single annual installment, and management plans on raising this dividend by 6 percent per year indefinitely. If the required return on this stock is 12 percent, what is the current share price?
  - Now suppose the company in (a) actually pays its annual dividend in equal quarterly installments; thus, the company has just paid a \$.60 dividend per share, as it has for the previous three quarters. What is your value for the current share price now? (*Hint:* Find the equivalent annual end-of-year dividend for each year.) Comment on whether you think this model of stock valuation is appropriate.
23. **Nonconstant Growth** Storico Co. just paid a dividend of \$2.75 per share. The company will increase its dividend by 20 percent next year and will then reduce its dividend growth rate by 5 percentage points per year until it reaches the industry average of 5 percent dividend growth, after which the company will keep a constant growth rate forever. If the required return on Storico stock is 13 percent, what will a share of stock sell for today?
24. **Nonconstant Growth** This one's a little harder. Suppose the current share price for the firm in the previous problem is \$60.98 and all the dividend information remains the same. What required return must investors be demanding on Storico stock? (*Hint:* Set up the valuation formula with all the relevant cash flows, and use trial and error to find the unknown rate of return.)
25. **Constant Dividend Growth Model** Assume a stock has dividends that grow at a constant rate forever. If you value the stock using the constant dividend growth model, how many years worth of dividends constitute one-half of the stock's current price?
26. **Two-Stage Dividend Growth** Regarding the two-stage dividend growth model in the chapter, show that the price of a share of stock today can be written as follows:

$$P_0 = \frac{D_0 \times (1 + g_1)}{R - g_1} \times \left[ 1 - \left( \frac{1 + g_1}{1 + R} \right)^t \right] + \left( \frac{1 + g_1}{1 + R} \right)^t \times \frac{D_0 \times (1 + g_2)}{R - g_2}$$

Can you provide an intuitive interpretation of this expression?

27. **Two-Stage Dividend Growth** The chapter shows that in the two-stage dividend growth model, the growth rate in the first stage,  $g_1$ , can be greater than or less than the discount rate,  $R$ . Can they be exactly equal? (*Hint:* Yes, but what does the expression for the value of the stock look like?)

## WEB EXERCISES



- 8.1 Dividend Discount Model** According to the 2006 Value Line *Investment Survey*, the dividend growth for ConocoPhillips (COP) is 9.5 percent. Find the current price quote and dividend information at [finance.yahoo.com](http://finance.yahoo.com). If the growth rate given in the Value Line *Investment Survey* is correct, what is the required return for ConocoPhillips? Does this number make sense to you?
- 8.2 Dividend Discount Model** Go to [www.dividenddiscountmodel.com](http://www.dividenddiscountmodel.com) and enter BA (for Boeing) as the ticker symbol. You can enter a required return in the Discount Rate box and the site will calculate the stock price using the dividend discount model. If you want an 11 percent return, what price should you be willing to pay for the stock? At what required return does the current stock price make sense? You will need to enter different required returns until you arrive at the current stock price. Does this required return make sense? Using this market required return for Boeing, how does the price change if the required return increases by 1 percent? What does this tell you about the sensitivity of the dividend discount model to the inputs of the equation?
- 8.3 Market Operations** How does a stock trade take place? Go to [www.nyse.com](http://www.nyse.com), and click on “The Trading Floor” and “Anatomy of a Trade.” Describe the process of a trade on the NYSE.

## MINICASE

## Stock Valuation at Ragan, Inc.

Ragan, Inc., was founded nine years ago by brother and sister Carrington and Genevieve Ragan. The company manufactures and installs commercial heating, ventilation, and cooling (HVAC) units. Ragan, Inc., has experienced rapid growth because of a proprietary technology that increases the energy efficiency of its units. The company is equally owned by Carrington and Genevieve. The original partnership agreement between the siblings gave each 50,000 shares of stock. In the event either wished to sell stock, the shares first had to be offered to the other at a discounted price.

Although neither sibling wants to sell, they have decided they should value their holdings in the company. To get started, they have gathered the following information about their main competitors:

Expert HVAC Corporation’s negative earnings per share were the result of an accounting write-off last year. Without the write-off, earnings per share for the company would have been \$0.97.

Last year, Ragan, Inc., had an EPS of \$4.32 and paid a dividend to Carrington and Genevieve of \$54,000 each. The company also had a return on equity of 25 percent. The siblings believe that 20 percent is an appropriate required return for the company.

1. Assuming the company continues its current growth rate, what is the value per share of the company’s stock?
2. To verify their calculations, Carrington and Genevieve have hired Josh Schlessman as a consultant. Josh was

Ragan, Inc., Competitors					
	EPS	DPS	Stock Price	ROE	R
Arctic Cooling, Inc.	\$0.82	\$0.16	\$15.19	11%	10%
National Heating & Cooling	1.32	0.52	12.49	14	13
Expert HVAC Corp.	-0.47	0.40	11.47	14	12
Industry Average	\$0.56	\$0.36	\$13.05	13%	11.67%

previously an equity analyst and covered the HVAC industry. Josh has examined the company's financial statements, as well as examining its competitors. Although Ragan, Inc., currently has a technological advantage, his research indicates that other companies are investigating methods to improve efficiency. Given this, Josh believes that the company's technological advantage will last only for the next five years. After that period, the company's growth will likely slow to the industry growth average. Additionally, Josh believes that the required return used by the company is too high. He believes the industry average required return is more appropriate. Under this growth rate assumption, what is your estimate of the stock price?

3. What is the industry average price–earnings ratio? What is the price–earnings ratio for Ragan, Inc.? Is this the relationship you would expect between the two ratios? Why?
4. Carrington and Genevieve are unsure how to interpret the price–earnings ratio. After some head scratching, they've come up with the following expression for the

price–earnings ratio:

$$\frac{P_0}{E_1} = \frac{1-b}{R - (\text{ROE} \times b)}$$

Beginning with the constant dividend growth model, verify this result. What does this expression imply about the relationship between the dividend payout ratio, the required return on the stock, and the company's ROE?

5. Assume the company's growth rate slows to the industry average in five years. What future return on equity does this imply, assuming a constant payout ratio?
6. After discussing the stock value with Josh, Carrington and Genevieve agree that they would like to increase the value of the company stock. Like many small business owners, they want to retain control of the company, but they do not want to sell stock to outside investors. They also feel that the company's debt is at a manageable level and do not want to borrow more money. How can they increase the price of the stock? Are there any conditions under which this strategy would not increase the stock price?