Chapter 4: The Value of Common Stocks

4.1. Dividend discount model

Assume that an investor own one stock of a company. The cash payoff that he expects comes in two forms: (1) cash dividends and (2) capital gains or losses. Suppose that the current price of the stock is P_0, the expected price at the end of the year is P_1 and the expected dividend per share is D_1. The rate of return that he expects over the next year is:

$$\boxed{r = \frac{D_1 + P_1 - P_0}{P_0}}$$

This expected return is often called the **market capitalization rate** (also known as the **cost of equity**).
For example, suppose that General Electric's (GE) stock is selling for $100 a share ($P_0$ = 100). Investors expect a $5 cash dividend over the next year (D_1 = 5). They also expect stock to sell for $110 a year hence ($P_1$ = 110). Then, the expected return to the stockholders is:

$$r = \frac{D_1 + P_1 - P_0}{P_0} = \frac{5 + 110 - 100}{100} = 0.15 \text{ or } 15\%$$

On the other hand, if you are given investors' forecasts of dividend and price and the expected return offered by other equally risky stock, you can predict today's price:

$$\boxed{P_0 = \frac{D_1 + P_1}{1 + r}} \qquad (1)$$

For GE D_1 = 5, P_1 = 110. If r, the expected return on securities in the same risk class as GE, is 15%, then today's price should be $100.
The $100 is the right price in a competitive capital market. If P_0 were above $100 then GE would offer an expected rate of return that was lower than other securities of equivalent risk. Investors would shift their capital to the other securities and in the process would force down the price of GE stock. If P_0 were less than $100 the process would reverse. GE's stock would offer a higher rate of return than comparable securities. In that case, investors would rush to buy, forcing the price up to $100. Summarizing, *all securities in an equivalent risk class are priced to offer the same expected return*.

The formula we established will also hold to predict the price the year 1 using the price and dividend of year 2:

$$\boxed{P_1 = \frac{D_2 + P_2}{1 + r}} \qquad (2)$$

Substituting (2) into (1) yields:

$$P_0 = \frac{1}{1+r}\left(D_1 + \frac{D_2 + P_2}{1+r}\right) = \frac{D_1}{1+r} + \frac{D_2 + P_2}{(1+r)^2}$$

Thus,

$$\boxed{P_0 = \frac{D_1}{1+r} + \frac{D_2 + P_2}{(1+r)^2}} \qquad (3)$$

Equations (1) and (3) are equivalent. They both give us the current price of the stock. Equation (1) uses the price and dividend forecasts of the next year, while equation (2) uses the price and dividend forecasts of the next two years.
Suppose that the cash dividend received the year 2, for the GE stock, is expected to be equal to \$5.50 (D_2 = 5.50) and the price at the price at the end of year 2 is expected to be \$121 (P_2 = 121). Thus,

$$P_1 = \frac{D_2 + P_2}{1+r} = \frac{5.50 + 121}{1+0.15} = \$110$$

Today's price can then computed either from equation (1)

$$P_0 = \frac{D_1 + P_1}{1+r} = \frac{5 + 110}{1+0.15} = \$100$$

or from equation (3)

$$P_0 = \frac{D_1}{1+r} + \frac{D_2 + P_2}{(1+r)^2} = \frac{5}{1.15} + \frac{5.50+121}{1.15^2} = \$100$$

The two-period approach that it was used to price a stock (see equation (3)) can be generalized to three, four or more periods. If we denote N the final period then, the general stock price formula is given by:

$$\boxed{P_0 = \frac{D_1}{1+r} + \frac{D_2}{(1+r)^2} + \ldots + \frac{D_N + P_N}{(1+r)^N} = \sum_{t=1}^{N} \frac{D_t}{(1+r)^t} + \frac{P_N}{(1+r)^N}} \quad (4)$$

In principle the horizon period N could be infinitely distant. Common stocks do not expire occasionally, we can even assume that are immortal. As N approach infinity the present value of the terminal price P_N approaches zero. Therefore, we can express today's price as the present value of a perpetual stream of cash dividends. This is written as:

$$\boxed{P_0 = \sum_{t=1}^{\infty} \frac{D_t}{(1+r)^t}} \quad (5)$$

The last formula gives us a complete characterization for pricing stocks, but it is very difficult to apply it in its general form. We can, however, use some simplified versions of the basic present value formula to make it more applicable.
Suppose that we forecast a constant growth rate for a company's dividend. This means that expected dividends grow at a constant scale. Such an investment is just an example of the growing perpetuity that we presented in Chapter 3. Thus, the current stock price is:

$$\boxed{P_0 = \frac{D_1}{r-g}} \quad (6)$$

where D_1 is the cash dividend received next year and g the anticipated growth rate. This is the **Gordon growth model**. Thus, the above formula explains P_0 in terms of next year's expected dividend, the growth rate and the expected rate of return, denoted r, on other securities of comparable risk. Alternatively, this formula can be used to obtain an estimate of r from P_0, D_1 and g:

$$\boxed{r = \frac{D_1}{P_0} + g} \quad (7)$$

The market capitalization rate equals the **dividend yield** (D_1/P_0) plus the expected rate of growth in dividends.

Example: Assume that GE is expected to pay a dividend of \$5 in the first year, and thereafter the dividend is predicted to increase by 10% a year. If the market capitalization rate is r = 15% then the current stock price is:

$$P_0 = \frac{D_1}{r-g} = \frac{5}{0.15-0.10} = \$100$$

Alternatively, if the current stock price is P_0 = \$100, then the market capitalization rate equals:

$$r = \frac{D_1}{P_0} + g = \frac{5}{100} + 0.10 = 0.15$$

Suppose that we would like to estimate the expected return for firm A using formula (7). Its stock is currently selling for \$41.67 per share. Dividend payments for the next year were expected to be \$1.49 a share. Thus the dividend yield, i.e., the first part of formula (7), is

$$\frac{D_1}{P_0} = \frac{1.49}{41.67} = 0.036$$

The difficult part is to estimate g, i.e., the second part of (7), which is the expected rate of dividend growth. One approach is to start with the **payout ratio**, the ratio of dividends to **earnings per share** (**EPS**). EPS is the fraction of the total earnings of the company that correspond to each share. For firm A the payout ratio is forecasted to 62%. In other words, each year the company was plowing back into the business about 38% of EPS:

$$\text{Plowback ratio} = 1 - \text{payout ratio} = 1 - \frac{D}{EPS} = 1 - 0.62 = 0.38$$

Also, firm A's ratio of EPS to book equity per share was about 10%.[1] Thus is its **return on equity** (**ROE**):

$$ROE = \frac{EPS}{\text{book equity per share}} = 0.1$$

If firm A earns 10% of book to equity and reinvests 38% of income, then book equity will increase by $0.1 \times 0.38 = 0.038$ or 3.8%.[2] If the ROE and the plowback ratio remains constant through time, earnings and dividends per share will also increase by 3.8%, thus,

$$g = \text{plowback ratio} \times ROE = 0.38 \times 0.1 = 0.038$$

Thus,

$$r = \frac{D_1}{P_0} + g = 0.036 + 0.038 = 0.074$$

So the market capitalization rate of firm A's common stock is 7.4%.

[1] The book equity per share represents the equity a common shareholder has in the net assets of the firm from owning one share. It is equal to the shareholder's equity (paid-up capital plus retained earnings) divided by the number of shares outstanding.

[2] Technically this can be shown by multiplying the ROE with the plowback ratio. It yields

$$\left(1 - \frac{D}{EPS}\right)\frac{EPS}{BEPS} = \frac{EPS - D}{BEPS}$$

where BEPS denotes the book equity per share. The nominator is how much the book equity will increase after dividends are paid out.

The above simple formula to estimate the cost of equity should be used with caution, especially with firms that have high current rates of growth. Formula (7) assumes that such growth will be sustained indefinitely, but this is practically impossible. For example consider firm B with D_1 = \$0.5 and P_0 = \$50. The firm has plowed back 80% of earnings and has a ROE = 25%. This means that *in the past* the dividend growth rate was $g = 0.8 \times 0.25 = 0.2$. The temptation is to assume that the *future* growth rate also equals 20%. This would imply

$$r = \frac{0.5}{50} + 0.2 = 0.21$$

This means that the firm would provide an expected return of 21% per annum for the following years. This number is very high and it is due to the assumption that the firm will continue to grow by 20% per year forever. But this is an unreasonable assumption. Eventually profitability will fall and firm will respond by investing less. In real life ROE will decline gradually over time, and the firm will respond by decreasing the plowback ratio. Table 1 summarizes the forecasted earnings and dividends for this firm up to year 4.

Table 1: Forecasted earnings and dividends

	Year			
	1	2	3	4
Book equity	10	12	14.4	15.55
EPS	2.5	3	2.3	2.49
ROE	0.25	0.25	0.16	0.16
Plowback ratio	0.8	0.8	0.5	0.5
Dividends	0.5	0.6	1.15	1.24
Growth rate of dividends	0.2	0.2	0.92	0.08

Firm B starts at year 1 with book equity of \$10 per share. It earns \$2.5, pays out \$0.5 as dividends, and plows back \$2. Thus it starts at year 2 with book equity 10 + 2 = \$12. After another year at the same ROE and plowback ratio, it starts year 3 with book equity of \$14.4. However, the firm earns only \$2.3 and the ROE drops to 0.16. Dividends go up to \$1.15, because the plowback ratio decreases, and the firm plows back only \$1.15. Therefore subsequent growth in earnings and dividends drops to 8%. How can we estimate the cost of equity in this case? We must return to the general discounted cash flow formula (4) and apply it for N = 3. This formula yields:

$$P_0 = \frac{D_1}{1+r} + \frac{D_2}{(1+r)^2} + \frac{D_3 + P_3}{(1+r)^3}$$

Investors in year 3 will view firm B as offering 8% per year dividend growth. So we can use formula (6) to calculate P_3:

$$P_3 = \frac{D_4}{r-g}$$

Thus,

$$P_0 = \frac{D_1}{1+r} + \frac{D_2}{(1+r)^2} + \frac{D_3 + D_4/(r-g)}{(1+r)^3} \Rightarrow$$

$$50 = \frac{0.5}{1+r} + \frac{0.6}{(1+r)^2} + \frac{1.15 + 1.24/(r-0.08)}{(1+r)^3}$$

Using now the Solver command in Excel we can calculate r. We find that r implied by these more realistic forecasts is 9.9% quite different from 21% provided by the over-simplistic constant growth formula (7). These estimates of r, are also called the **implied cost of equity**.

4.2. The variation of dividend yields

Now return to formula (6). This can be written as:

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

which is equivalent to

$$\frac{D_0}{P_0} = \frac{r - g}{1 + g}$$

If the Gordon growth model is correctly specified, then the dividend yield (also known as the dividend-price ratio) should be time-invariant, as r and g do not change across time. However, this is not the case. Figure 1 plots the dividend yield of the US market. As it is seen this varies across time, thus the model is not correct. However, the implication of the model is still valid. The dividend yield varies either because r or g (or both) are time-varying. In other words, the dividend yield should predict something (this is why, is an important measure in finance). An increase in this yield (which is equivalent to a decrease in price) should be related either to an increase in r, that is, investors anticipate higher expected returns, or to a decrease in g, that is, investors anticipate a decrease in the dividend growth rate. So, prices decrease either because investors anticipate a decrease in dividends or because they anticipate a higher return.

Figure 1 also plots the subsequent 5-year return of the US market. We observe that the two series move together. High dividend yields, that is, low prices relative to dividends, have reliably preceded many years of good returns. Low prices have preceded high returns. Low prices relative to dividends in the 1950s preceded the boom market of the early 1960s, the low dividend yield of the mid-1960s preceded the poor returns of the 1970s, and the high dividend-price ratio of the late-1970s preceded the high returns of the 1980s.

Table 2 reports the results from regressing dividend yields on 5-year subsequent returns. The results of the table indicate that (for the post-war period), 35% of the variation in returns can be explained by the variation of the dividend-price ratio. As the coefficient indicates, a 1% increase in this ratio predicts a 2.65% increase in expected returns.

Table 2: OLS regressions of 5-year returns on the D/P ratio

Model: $r_{t,t+5} = \beta_0 + \beta_1 \left(D_t / P_t\right) + \varepsilon_t$				
Sample	β_1	t-stat	σ	R^2
1871-2008	1.04	9.35	7.4	5.05
1946-2008	2.65	20.13	5.1	35.2

Research studies have also shown that the variation of returns is also related to other variables, such as the term-spread (the difference between the yield of long- and short-term bonds), the default spread (the difference between the yields of corporate and governments bonds) and the Treasury bill rate. Most of these variables are correlated with each other and correlated with or forecast business cycles. This fact suggests a natural explanation: Expected returns vary over business cycles; it takes a high expected return to get people to hold stocks at the bottom of a recession. When expected returns go up, prices go down. We see that the low prices, followed by the higher returns expected and required by the market.

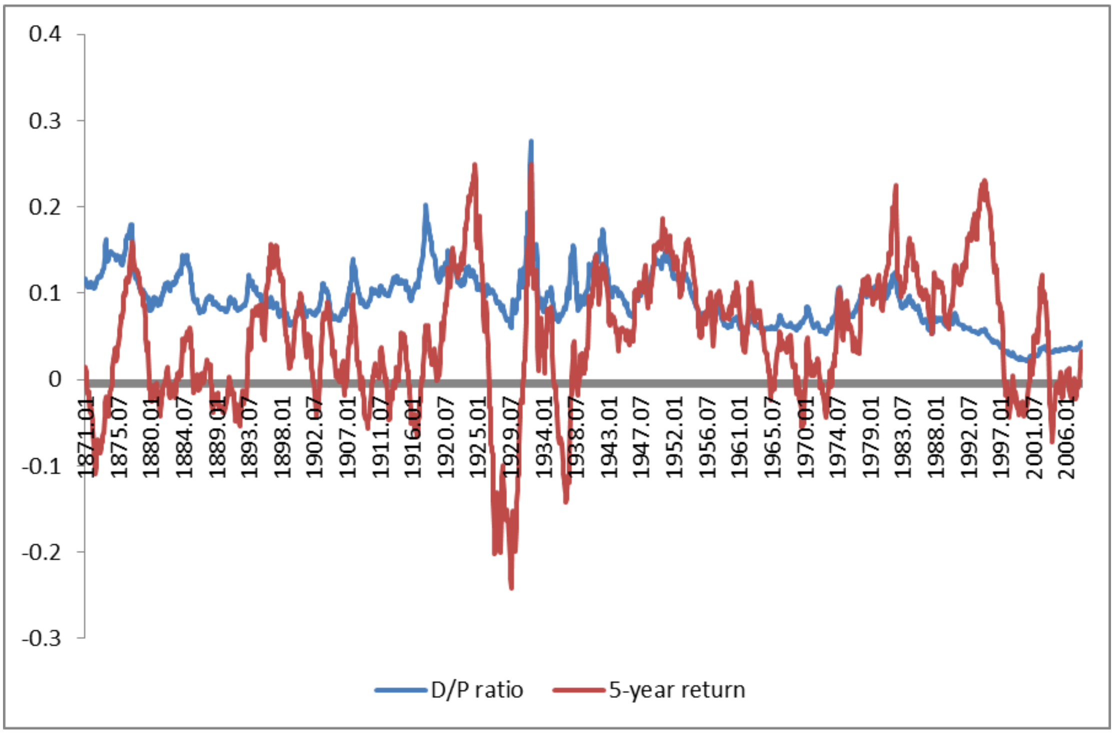

Figure 1: Dividend yield and 5-year subsequent return for the US market, 1871-2008.

4.3. The link between stock price and earnings per share

Suppose that a company does not grow at all. It does not reinvest any earnings and simply produces a perpetual constant stream of dividends. Thus, the expected on our share would be equal to the yearly dividend divided by the share price (i.e. the dividend yield). Since all earnings are paid out as dividends, the expected return is also equal to the earnings per share divided by the share price (i.e. the earnings-price ratio), i.e.

$$r = \frac{D_1}{P_0} = \frac{EPS_1}{P_0}$$

For example, if the dividend is $10 a share and the stock price is $100 we have that:

$$r = \frac{EPS_1}{P_0} = \frac{10}{100} = 0.10$$

Thus, in a *no-growing* firm the market capitalization rate equals the earnings-price ratio (also known as the E/P ratio).

Suppose now a *growing* company, which has the opportunity to invest $10 a share next year. This will mean no dividend at t = 1. However, the company expects that in each subsequent year the project would earn $1 per share, so that the dividend could be increased to $11 a share. Let assume that the investment opportunity has about the same risk as the existing business. Then we can discount its cash flow at the 10% to find its NPV at year 1:

$$\text{NPV} = -10 + \frac{1}{0.10} = 0$$

The EPS the year 1 is still $10 and the stock price is unaffected, equal to $100, by the new investment since it does not add wealth to the company. Thus,

$$r = \frac{\text{EPS}_1}{P_0} = \frac{10}{100} = 0.10$$

Once again, the market capitalization rate equals the earnings-price ratio.
Suppose now that the company expects that in each subsequent year the project would earn $1.50 per share, so the dividend could be increased to $11.5 a share. The NPV at year 1 is:

$$\text{NPV} = -10 + \frac{1.50}{0.10} = \$5$$

This time the stock price would change. It would be equal to:

$$P_0 = 100 + \frac{5}{1.10} = 100 + 4.55 = \$104.55$$

Thus, the earnings-price ratio would be:

$$\frac{\text{EPS}_1}{P_0} = \frac{10}{104.55} = 0.096$$

We observe that the earnings-price ratio is not equal to the market capitalization rate, it underestimates it.

Conclusion: The earnings-price ratio equals the market capitalization rate only when the new project's NPV = 0.

In general, we can think of stock price as the capitalized value of average earnings under a no-growth policy, plus the **net present value of growth opportunities (PVGO)**:

$$\boxed{P_0 = \frac{\text{EPS}_1}{r} + \text{PVGO}} \qquad (8)$$

The earnings-price ratio, therefore, equals:

$$\boxed{\frac{\text{EPS}_1}{P_0} = r\left(1 - \frac{\text{PVGO}}{P_0}\right)}$$

In the previous example the PVGO was equal to:

$$\text{PVGO} = P_0 - \frac{\text{EPS}_1}{r} = 104.55 - \frac{10}{0.10} = 104.55 - 100 = \$4.55$$

which is nothing else than the present value of the NPV of the new project.

Equation (8) gives us an insight about the distinction made by investors between **growth stocks** and **income stocks**.

A growth stock is one for which PVGO is large relative to the capitalized value of EPS. Most growth stocks are stocks of rapidly expanding firms, but expansion alone does not create a high PVGO. What matters is the profitability of the new investments. Some companies have such extensive growth opportunities that they prefer to pay no dividends for long period of time. For example, Amazon or Dell Computer had never paid dividend, because any cash paid out to investors would have meant either slower growth or raising capital by some other means. Investors were happy to forgo immediate cash dividends in exchange for increasing earnings and expectation of high dividends some time in the future.
An income stock is one for which its value derives from the earning power of the existing assets, thus the capitalized value of EPS is large relative to the PVGO. Investors buy these stocks primarily for the cash dividends.

4.4. Market efficiency

We started the chapter by determining the current value of a common stock using a dividend discount model. We also stated that this current value should be equal to the market price of the stock. In this section we develop more fully the reasoning behind this statement.
Start with a simple example. Sometimes a firm's stock price "jumps" in response to a public announcement conveying news about the company's future prospects. If the announcement is expected to have a positive impact on future cash flows then stock price will increase. On the other hand, if the announcement is bad then stock price would decline. In such situations, people say that the stock market is "reacting" to the information contained in these announcements. Implicit in this statement is the view that at least some of the investors who buy or sell the stock are paying attention to the fundamental factors that determine the stock's value. When those fundamentals change, so does the stock price. Indeed, if the stock price does not move when an important news item is officially made public, many observers of the stock market would say that the news was already reflected in the stock price. It is this idea that is behind the **efficient market hypothesis (EMH)**.
In general, the price of a stock represents the product of a process in which investors use the information available on the stock to form expectations about the future and to determine the current value of the stock. Thus, the market price of the stock is an estimate of its value. The price can deviate from the value of the asset for three reasons. First, the information available may be insufficient or incorrect; then expectations based on this information will also be wrong. Second, investors may not do a good job of processing the information to arrive at expectations. Third, even if the information is correct and investors form expectations properly, there might still be investors who are willing to trade at prices that do not reflect these expectations. Thus, an investor who assesses that the value of the stock to be $50 might still be willing to buy the stock for $60 because he believes that it can be sold to someone else for $75 later.
There are three ways to defining or measuring market efficiency. One is to look at how much and for how long prices deviate from true value. The second is to measure how quickly and completely prices adjust to reflect new information. The third is to

measure whether some investors consistently earn higher returns than others who are exposed to the same amount of risk.

The first definition indicates that the smaller and less persistent the deviations are, the more efficient a market is. Market efficiency does not require that the market price to be equal to true value at every point of time. All it requires is that the errors in the market price be unbiased – that is, prices can be greater than or less than true value, as long as these deviations are random.

The second definition is related to how quickly and how well markets react to new information. The value of the stock should change when new information that affects any of the inputs into value – the cash flows, the growth or the expected return – reaches the market. In an efficient market, the price of the asset will adjust instantaneously and, on average, correctly to the new information.

Finally, the third dimension on which we can define and measure market efficiency, indicates that, if the market is efficient, then some investors should not be able consistently to earn higher returns than other investors who are exposed to the same amount of risk. This requires that we define risk and determine how much return an investor exposed to that risk can expect to make. We consider this question in subsequent chapters. The difference between the realized return made by investors and the return they could have expected to make is called an **excess or abnormal return**. In an efficient market, investors can expect to make no excess returns, no matter how sophisticated their models and trading methods.

Using all three measures of market efficiency, we have substantial evidence from financial markets about how efficient they are. In general, stocks with higher expected cash flows and higher growth are generally priced higher than assets with lower cash flows and lower growth. There is, however, a significant amount of error in the process, especially for firms where only limited information is available to investors. The market also reacts quickly to new information about the stock or about the overall economy. Thus, when the firm reports earnings that are higher than expected, the stock price tends to increase immediately. There is mixed evidence as to whether the initial assessment is appropriate. Some studies suggest that markets overreact to good or bad information, while others indicate that, at least in the short term, they underreact to information announcements. Finally, there is little evidence that investors can earn excess returns in practice after taking into account transaction costs and problem in execution of complicated trading strategies.

4.5. Market efficiency and corporate financing

The EMH gives us the following five important lessons for the financial manager of a firm. After reviewing these lessons we will discuss what market inefficiency can mean for the manager.

1. **Markets have no memory**: The weak form of the EMH states that the sequence of past price contains no information about future changes. Sometimes financial managers seem to act as if this were not the case. For example, after an abnormal market rise, managers prefer to issue stocks rather than debt. The idea is to catch the market while it is high. Similarly, they are often reluctant to issue after a fall in price. But we know that the market has no memory and the cycles that financial managers seem to rely do not exist.

2. **Trust market prices**: In efficient markets, prices reflect all available information about the value of the securities. There is no way for any investor to make consistently superior rates of returns. This is an important message for the financial manager who should act under the assumption that there is no way to make superior gains. For example, one company should not purchase another simply because its management thinks that the stock is undervalued.
3. **Prices reflect the future**: In efficient markets, prices are equal to the present value of future cash flows. So prices reflect the market's opinion about the future profitability of the security. Thus, if the company's bonds are offering a much higher yield than the average, you can deduce that the market doubt about the ability of the firm to repay its debt. Also, the difference between short-term and long-term interest rates says something about future short-term rates. If for example the long-term rates are higher than the short-term rates then this means that investors are reluctant to offer capital in long-term. This could imply that investors expect future short-term rates to rise.
4. **There are no financial illusions**: In an efficient market investors are concerned with the firm's cash flows and the fraction of those cash flows to which they are entitled. This means that any effort from the part of the firm to manipulate earnings using "creative accounting" has no effect on the market price of the firm's securities.
5. **Alternative investment strategies**: In an efficient market investors will not pay others for what they can do equally well themselves. For example, companies often justify mergers on the grounds that they produce a more diversified, and thus a less exposed to market risk, firm. But if investors can hold the stocks of both companies why should they pay more in order to buy the stock of the combined company? It is much easier and cheaper for them to diversify than it is for the firm. The financial manager needs to ask the same question when considering whether it is better to finance a new project by issuing stocks or debt. If the firm issue debt, the stock of the firm will be more risky and will offer a higher expected return. But stockholders can increase their risk exposure by themselves: they can borrow on their own accounts. The problem of the financial manager is, therefore, to decide whether the company can issue debt more cheaply than the individual stockholder.

These lessons are straightforward implications of the EMH. What should financial managers do when the markets are not efficient? The answer depends on the nature of the inefficiency. Below we present two cases:

1. **Trading opportunities for nonfinancial firms**: Sometimes financial managers of nonfinancial firms notice mispricing in the markets, the kind of mispricing that a hedge fund would attempt to exploit. Should the firm try to take advantage of this mispricing? In general the answer is *no*. First, the firm would face limits to arbitrage that burden the execution of trades in order to exploit the opportunity. Second, the firm probably has no competitive advantages in this kind of business. Since it is a nonfinancial corporation it can hardly compete the experts of financial markets, like hedge funds and financial corporations. So in general nonfinancial corporations gain nothing by speculation in financial markets. They should not try to imitate hedge funds.
2. **Company's stock mispricing**: The financial manager may not have special information about future interest rates or commodity prices, but definitely has special information about the value of his/her own company's stock. The strong

form of market efficiency may not hold, so the financial manager will have information which is not currently reflected in the stock price. We can distinguish two cases:

a. **The stock is overpriced**: When the stock is truly overpriced you can help your current stockholders by selling additional stock and using the cash to invest in other capital market securities. But you should never issue stock to invest in a project that offers a lower return than you could earn elsewhere in the capital market. Such a project would have negative NPV.
b. **The stock is underpriced**: If the stock is underpriced you would not sell these “cheap” stocks to raise money from the markets in order to buy other fairly priced securities or to finance a new investment. In that case, financial managers would prefer to issue debt in order to finance a new project.

EXERCISES – 4

1. Consider the following three stocks:

a. Stock A is expected to provide a dividend of $10 a share forever.
b. Stock B is expected to pay a dividend of $5 next year. Thereafter, dividend growth is expected to be 4% a year forever.
c. Stock C is expected to pay a dividend of $5 next year. Thereafter, dividend growth is expected to be 20% for 5 years (i.e. until year 6) and zero thereafter.

If market capitalization rate for each stock is 10%, which stock is the most valuable? What if the capitalization rate is 7%?

2. Company Q’s current ROE is 14%. It pays out one-half of earnings as cash dividends (payout ratio = 50%). Current book value per share is $50. Book value per share will grow as Q reinvests earnings. Assume that ROE and payout ratio stay constant for the next four years. After that, competition forces ROE down to 11.5% and the payout ratio increases to 0.8. The cost of capital is 11.5%.

a. What are Q’s EPS and dividends net year? How will EPS and dividends grow in years 2, 3, 4, 5 and subsequent years?
b. What is Q’s stock worth per share? How does the value depend on the payout ratio and growth rate after year 4?

3. Mexican Motors stock sells for $200 per share and next year’s dividend is $8.5.

a. Assume that earnings and dividends are expected to grow at 7.5% in perpetuity. What is the cost of equity?
b. Mexican Motors has generally earned about 12% on book equity (ROE = 0.12) and paid out 50% of earnings as dividends. Suppose it maintains the same ROE and payout ratio in the long-run future. What is the implication for g? For r? Should you revise your answer to part (a) of this question?

4. Look again at the financial forecasts for firm B given in Table 1. This time assume you know that the cost of equity is r = 12% (discard the 9.9% calculated in the text). Assume that you don’t know firm B’s stock value. Otherwise follow the assumptions given in the text.

a. Calculate the value of firm B’s stock.
b. What part of that value reflects the discounted value of P_3?
c. What part of P_3 reflects the present value of growth opportunities (PVGO) after year 3?

d. Suppose that competition will catch up with firm B by year 4, so that it can earn only the cost of capital on any investments made in year 4 or subsequently. What is firm B stock worth now under this assumption? (Make additional assumptions if necessary).

5. Geothermal Corporation has just received good news: Its earnings increased by 20% from the last year. Most investors anticipated an increase of 25%. Will Geothermal’s stock price increase or decrease when the announcement is made?

6. Which of the following observations appear to indicate market inefficiency?

a. Tax-exempt municipal bonds offer lower pretax returns than taxable government bonds
b. Managers make superior returns on their purchases of their company’s stock
c. There is a positive relationship between the return on the market in one quarter and the change in aggregate profits in the next quarter
d. There is disputed evidence that stocks which have appreciated unusually in the recent past continue to do so in the future
e. The stock of an acquired firm tends to appreciate in the period before the merger announcement
f. Stocks of companies with unexpectedly high earnings appear to offer high returns for several months after the earnings announcement
g. Very risky stocks on average give higher returns than safe stocks

7. What does the EMH have to say about these statements?

a. “I notice that short-term interest rates are about 1% below long-term rates. We should borrow short-term.”
b. “I notice that interest rates in Japan are lower than rates in the US. We would do better to borrow Japanese yen rather than US dollars.”