Chapter 11: Stock Valuation and Risk

Since the values of stocks change continuously, so do stock prices. Institutional and individual investors constantly value stocks so that they can capitalize on expected changes in stock prices.

The specific objectives of this chapter are to:
- explain methods of valuing stocks and determining the required rate of return on stocks,
- identify the factors that affect stock prices,
- explain how analysts affect stock prices,
- explain how to measure the risk of stocks, and
- explain the concept of stock market efficiency.

Stock Valuation Methods

Investors conduct valuations of stocks when making their investment decisions. They consider investing in undervalued stocks and selling their holdings of stocks that they consider to be overvalued. There are many different methods of valuing stocks. Fundamental analysis relies on fundamental financial characteristics (such as earnings) about the firm and its corresponding industry that are expected to influence stock values. Technical analysis relies on stock price trends to determine stock values. Our focus is on fundamental analysis. Investors who rely on fundamental analysis commonly use the price-earnings method, the dividend discount model, or the free cash flow model to value stocks. Each of these methods is described in turn.

Price-Earnings (PE) Method

A relatively simple method of valuing a stock is to apply the mean price-earnings (PE) ratio (based on expected rather than recent earnings) of all publicly traded competitors in the respective industry to the firm’s expected earnings for the next year.

Consider a firm that is expected to generate earnings of $3 per share next year. If the mean ratio of share price to expected earnings of competitors in the same industry is 15, then the valuation of the firm’s shares is

\[
\text{Valuation per share} = \frac{\text{Expected earnings of firm per share}}{\text{Mean industry PE ratio}}
\]

\[
= \frac{3}{15}
\]

\[
= \$45
\]
The logic of this method is that future earnings are an important determinant of a firm's value. Although earnings beyond the next year are also relevant, this method implicitly assumes that the growth in earnings in future years will be similar to that of the industry.

**Reasons for Different Valuations** This method has several variations, which can result in different valuations. For example, investors may use different forecasts for the firm's earnings or the mean industry earnings over the next year. The previous year's earnings are often used as a base for forecasting future earnings, but the recent year's earnings do not always provide an accurate forecast of the future.

A second reason for different valuations when using the PE method is that investors disagree on the proper measure of earnings. Some investors prefer to use operating earnings or exclude some unusually high expenses that result from onetime events. A third reason is that investors may disagree on which firms represent the industry norm. Some investors use a narrow industry composite composed of firms that are very similar (in terms of size, lines of business, etc.) to the firm being valued; other investors prefer a broad industry composite. Consequently, even if investors agree on a firm's forecasted earnings, they may still derive different values for that firm as a result of applying different PE ratios. Furthermore, even if investors agree on the firms to include in the industry composite, they may disagree on how to weight each firm.

**Limitations of the PE Method** The PE method may result in an inaccurate valuation for a firm if errors are made in forecasting the firm's future earnings or in choosing the industry composite used to derive the PE ratio. In addition, some question whether an investor should trust a PE ratio, regardless of how it is derived. In 1994, the mean PE ratio for a composite of 500 large firms was 14. By 1998, the mean PE ratio for this same group of firms was 28, which implies that the valuation for a given level of earnings had doubled. Some investors may interpret such increases in PE ratios as a sign of irrational optimism in the stock market.

**Dividend Discount Model**

One of the first models used for pricing stocks was developed by John B. Williams in 1931. This model is still applicable today. Williams stated that the price of a stock should reflect the present value of the stock's future dividends, or

\[
\text{Price} = \sum_{t=1}^{\infty} \frac{D_t}{(1 + k)^t}
\]

where

- \( t = \) period
- \( D_t = \) dividend in period \( t \)
- \( k = \) discount rate

The model can account for uncertainty by allowing \( D_t \) to be revised in response to revised expectations about a firm's cash flows, or by allowing \( k \) to be revised in response to changes in the required rate of return by investors.

**Illustration**

To illustrate how the dividend discount model can be used to value a stock, consider a stock that is expected to pay a dividend of $7 per share per year forever. This constant dividend represents a perpetuity, or an annuity that lasts forever. The present value of the cash flows (dividend payments) to investors in this example is the present value of a perpetuity. Assuming that the required rate of return (\( k \))
on the stock of concern is 14 percent, the present value (PV) of the future dividends is

\[
PV_{\text{of stock}} = \frac{D}{k} \\
= \$7/0.14 \\
= \$50 \text{ per share}
\]

Unfortunately, the valuation of most stocks is not this simple because their dividends are not expected to remain constant forever. If the dividend is expected to grow at a constant rate, however, the stock can be valued by applying the constant-growth dividend discount model:

\[
PV_{\text{of stock}} = \frac{D_1}{k - g}
\]

where \(D_1\) is the expected dividend per share to be paid over the next year, \(k\) is the required rate of return by investors, and \(g\) is the rate at which dividends are expected to grow. For example, if a stock is expected to provide a dividend of $7 per share next year, the dividend is expected to increase by 4 percent per year, and the required rate of return is 14 percent, the stock can be valued as

\[
PV_{\text{of stock}} = \frac{7}{0.14 - 0.04} \\
= \$70 \text{ per share}
\]

Relationship between Dividend Discount Model and PE Ratio for Valuing Firms

The dividend discount model and the PE ratio may seem to be unrelated, since the dividend discount model is highly dependent on the required rate of return and the growth rate, whereas the PE ratio is driven by the mean multiple of competitors’ stock prices relative to their earnings expectations, along with the earnings expectations of the firm being valued. Nevertheless, the PE multiple is influenced by the required rate of return on stocks of competitors and the expected growth rate of competitor firms. When using the PE ratio for valuation, the investor implicitly assumes that the required rate of return and the growth rate for the firm being valued are similar to those of its competitors. When the required rate of return on competitor firms is relatively high, the PE multiple will be relatively low, which results in a relatively low valuation of the firm for its level of expected earnings. When the competitors’ growth rate is relatively high, the PE multiple will be relatively high, which results in a relatively high valuation of the firm for its level of expected earnings. Thus, the inverse relationship between required rate of return and value exists when applying either the PE ratio or the dividend discount model. In addition, there is a positive relationship between a firm’s growth rate and its value when applying either method.

Limitations of the Dividend Discount Model

The dividend discount model may result in an inaccurate valuation of a firm if errors are made in determining the dividend to be paid over the next year, or the growth rate, or the required rate of return by investors. The limitations of this model are more pronounced when valuing firms that retain most of their earnings, rather than distributing them as dividends, because the model relies on the dividend as the base for applying the growth rate. For example, many Internet-related stocks retain any earnings to support growth and thus are not expected to pay any dividends.

Adjusting the Dividend Discount Model

The dividend discount model can be adapted to assess the value of any firm, even those that retain most or all of their earnings. From the investor’s perspective, the value of the stock is (1) the present value of the future dividends to be received over the investment horizon, plus (2) the present value of the forecasted price at which the stock will be sold at the end of the investment horizon. To forecast the price at which
the stock can be sold, investors must estimate the firm’s earnings per share (after re-
moving any nonrecurring effects) in the year that they plan to sell the stock. This es-
timate is derived by applying an annual growth rate to the prevailing annual earnings
per share. Then, the estimate can be used to derive the expected price per share at
which the stock can be sold.

Assume that a firm currently has earnings of $12 per share. Future
earnings can be forecasted by applying the expected annual growth
rate to the firm’s existing earnings (E):

\[
\text{Forecasted earnings in } n \text{ years} = E(1 + G)^n
\]

where \( G \) is the expected growth rate of earnings and \( n \) is the number of years until
the stock is to be sold.

If investors expect that the earnings per share will grow by 2 percent per year and
expect to sell the firm’s stock in three years, the earnings per share in three years are
forecasted to be

\[
\text{Earnings in three years} = 12 \times (1 + .02)^3
\]

\[
= 12 \times 1.0612
\]

\[
= 12.73
\]

The forecasted earnings per share can be multiplied by the PE ratio of the firm’s in-
dustry to forecast the future stock price. If the mean PE ratio of all other firms in the
same industry is 6, the stock price in three years can be forecasted as follows

\[
\text{Stock price in three years} = (\text{Earnings in three years}) \times (\text{PE ratio of industry})
\]

\[
= 12.73 \times 6
\]

\[
= 76.38
\]

This forecasted stock price can be used along with expected dividends and the inves-
tor’s required rate of return to value the stock today. If the firm is expected to pay a
dividend of $4 per share over the next three years, and if the investor’s required rate
of return is 14 percent, the present value of expected cash flows to be received by the
investor is

\[
PV = \frac{4}{(1.14)}^1 + \frac{4}{(1.14)}^2 + \frac{4}{(1.14)}^3 + \frac{76.38}{(1.14)}^3
\]

\[
= 3.51 + 3.08 + 2.70 + 51.55
\]

\[
= 60.84
\]

In this example, the present value of the cash flows is based on (1) the present
value of dividends to be received over the three-year investment horizon, which is
$9.29 per share ($3.51 + $3.08 + $2.70), and (2) the present value of the forecasted
price at which the stock can be sold at the end of the three-year investment horizon,
which is $51.55 per share.

**Limitations of the Adjusted Dividend Discount Model** This
model may result in an inaccurate valuation if errors are made in deriving the present
value of dividends over the investment horizon or the present value of the forecasted
price at which the stock can be sold at the end of the investment horizon. Since the
required rate of return affects both of these factors, the use of an improper required
rate of return will lead to inaccurate valuations. Possible methods for determining the
required rate of return are discussed next.
Free Cash Flow Model

For firms that do not pay dividends, a more suitable valuation may be the free cash flow model, which is based on the present value of future cash flows. The first step is to estimate the free cash flows that will result from operations. Second, subtract existing liabilities to determine the value of the firm. Third, divide the value of the firm by the number of shares to derive a value per share.

Limitations

The limitation of this model is the difficulty of obtaining an accurate estimate of free cash flow per period. One possibility is to start with forecasted earnings and then add a forecast of the firm’s noncash expenses and capital investment and working capital investment required to support the growth in the forecasted earnings. Obtaining accurate earnings forecasts can be difficult, however. Even if earnings can be forecasted accurately, the flexibility of accounting rules can cause major errors in estimating free cash flow based on earnings.

Determining the Required Rate of Return to Value Stocks

When investors attempt to value a firm based on discounted cash flows, they must determine the required rate of return by investors who invest in that stock. Investors require a return that reflects the risk-free interest rate plus a risk premium. Although investors generally require a higher return on firms that exhibit more risk, there is not complete agreement on the ideal measure of risk or the way risk should be used to derive the required rate of return. Two commonly used models for deriving the required rate of return are the capital asset pricing model and the arbitrage pricing model.

Capital Asset Pricing Model

The capital asset pricing model (CAPM) is sometimes used to estimate the required rate of return for any firm with publicly traded stock. The CAPM is based on the premise that the only important risk of a firm is systematic risk, or the risk that results from exposure to general stock market movements. The CAPM is not concerned with so-called unsystematic risk, which is specific to an individual firm, because investors can avoid that type of risk by holding diversified portfolios. That is, any particular adverse condition (such as a labor strike) affecting one particular firm in an investor’s stock portfolio should be offset in a given period by some favorable condition affecting another firm in the portfolio. In contrast, the systematic impact of general stock market movements on stocks in the portfolio cannot be diversified away because most of the stocks would be adversely affected by a general market decline.

The CAPM suggests that the return of an asset \( R_j \) is influenced by the prevailing risk-free rate \( R_f \), the market return \( R_m \), and the covariance between the \( R_j \) and \( R_m \) as follows:

\[
R_j = R_f + B_j(R_m - R_f)
\]

where \( B_j \) represents the beta and is measured as \( \text{COV}(R_j, R_m)/\text{VAR}(R_m) \). This model implies that given a specific \( R_f \) and \( R_m \), investors will require a higher return on an asset that has a higher beta. A higher beta reflects a higher covariance between the asset’s returns and market returns, which contributes more risk to the portfolio of assets held by the investor.

Estimating the Risk-Free Rate and the Market Risk Premium

The yield on newly issued Treasury bonds is commonly used as a proxy
for the risk-free rate. The terms within the parentheses measure the market risk premium, or the excess return of the market above the risk-free rate. Historical data over 30 or more years can be used to determine the average market risk premium over time, which serves as an estimate of the market risk premium that will exist in the future.

**Estimating the Firm's Beta** A firm's beta is a measure of its systematic risk, as it reflects the sensitivity of the stock's return to the market's overall return. For example, a stock with a beta of 1.2 means that for every 1 percent change in the market overall, the stock tends to change by 1.2 percent in the same direction. The beta is typically measured with monthly or quarterly data over the last four years or so. It is reported in investment services such as Value Line, or it can be computed by the individual investor who understands how to apply regression analysis. A stock's sensitivity to market conditions may change over time in response to changes in the firm's operating characteristics. Thus, the beta may adjust as time passes, and the stock's value should also adjust in response.

Investors can measure their exposure to systematic risk by determining how the value of their present stock portfolio has been affected by market movements. They can apply regression analysis by specifying the stock portfolio’s periodic (monthly or quarterly) return over the last 20 or so periods as the dependent variable and the market’s return (as measured by the S&P 500 index or some other suitable proxy) as the independent variable over those same periods. After inputting these data, a computer spreadsheet package such as Excel can be used to run the regression analysis. Specifically, the focus is on the estimation of the slope coefficient by the regression analysis, which represents the estimate of each stock’s beta (for more details, see the discussion under “Beta of a Stock” later in the chapter). Additional results of the analysis can also be assessed, such as the strength of the relationship between the firm’s returns and market returns. (See Appendix B for more information on using regression analysis.)

**ILLUSTRATION** To illustrate how the CAPM can be used to estimate the required rate of return on a firm’s stock, consider a firm that has a beta of 1.2 (based on the application of regression analysis to determine the sensitivity of the firm’s return to the market return). Also, assume that the prevailing risk-free rate is 6 percent and that the market risk premium is 7 percent (based on historical data that show that the annual market return has exhibited a premium of 7 percent above the annual risk-free rate). Using this information, the risk premium (above the risk-free rate) is 8.4 percent (computed as the market risk premium of 7 percent times the beta of 1.2). Thus, the required rate of return on the firm is

\[
R_j = 6\% + 1.2(7\%) \\
= 14.4\%
\]

The firm’s required rate of return is 14.4 percent, so its estimated future cash flows would be discounted using a discount rate of 14.4 percent to derive the firm’s present value. At this same point in time, the required rates of return for other firms could also be determined. Although the risk-free rate and the market risk premium are the same regardless of the firm being assessed, the beta varies across firms. Therefore, at a given point in time, the required rates of return estimated by the CAPM will vary across firms because of differences in their risk premiums, which are attributed to differences in their systematic risk (as measured by beta).
Limitations of the CAPM The CAPM suggests that the return of a particular stock is positively related to its beta. However, a study by Fama and French\(^1\) found that beta was unrelated to the return on stocks over the period 1963–1990.

Subsequently, Chan and Lakonishok\(^2\) reassessed the relation between stock returns and beta. They found that the relation varied with the time period used, which implies that it is difficult to make projections about the future based on the findings in any specific period. Thus, they concluded that although it is appropriate to question whether beta is the driving force behind stock returns, it may be premature to pronounce beta dead.

Furthermore, if beta is a stable measure of the firm’s sensitivity to market movements, it would still be useful for determining which stocks are more feasible investments when the stock market is expected to perform well. Thus, investors should still monitor a firm’s beta.

Chan and Lakonishok assessed the 10 worst months for the U.S. stock market in order to compare the returns of firms with relatively high betas versus firms with relatively low betas. They found that firms with the highest betas performed much worse than firms with low betas in those periods. They also found that high-beta firms outperformed low-beta firms during market upswings. These results support the measurement of beta as an indicator of the firm’s response to market upswings or downswings.

Arbitrage Pricing Model

An alternative pricing model is based on the arbitrage pricing theory (APT). The APT differs from the CAPM in that it suggests that a stock’s price can be influenced by a set of factors in addition to the market. The factors may possibly reflect economic growth, inflation, and other variables that could systematically influence asset prices. The following model is based on the APT:

\[
E(R) = B_0 + \sum_{i=1}^{m} B_i F_i
\]

where

- \(E(R)\) = expected return of asset
- \(B_0\) = a constant
- \(F_i\ldots F_m\) = values of factors 1 to \(m\)
- \(B_i\) = sensitivity of the asset return to particular force

The model suggests that in equilibrium, expected returns on assets are linearly related to the covariance between asset returns and the factors. This is distinctly different from the CAPM, where expected returns are linearly related to the covariance between asset returns and the market. The appeal of the APT is that it allows for factors (such as industry effects) other than the market to influence the expected returns of assets. Thus, the required rate of return may be based not only on the firm’s sensitivity to market conditions but also on its sensitivity to industry conditions. A possible disadvantage of the APT is that it is not as well defined as the CAPM. This characteristic could be perceived as an advantage, however, since it allows investors to include whatever factors they believe are relevant in deriving the required rate of return for a particular firm.

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Factors That Affect Stock Prices

Stock prices are driven by three types of factors: (1) economic factors, (2) market-related factors, and (3) firm-specific factors.

Economic Factors

A firm’s value should reflect the present value of its future cash flows. Investors consider various economic factors that affect a firm’s cash flows when valuing a firm to determine whether its stock is over- or undervalued.

Impact of Economic Growth An increase in economic growth is expected to increase the demand for products and services produced by firms and therefore increase a firm’s cash flows and valuation. Participants in the stock markets monitor economic indicators such as employment, gross domestic product, retail sales, and personal income because these indicators may signal information about economic growth and therefore affect cash flows. In general, unexpected favorable information about the economy tends to cause a favorable revision of a firm’s expected cash flows and therefore places upward pressure on the firm’s value. Because the government’s fiscal and monetary policies affect economic growth, they are also continually monitored by investors.

Exhibit 11.1 shows the U.S. stock market performance, based on the S&P 500 index, an index of 500 large U.S. stocks. The stock market’s strong performance in the late 1990s was partially due to the strong economic conditions in the United States at that time. Conversely, the stock market’s weak performance in 2000 and in 2001 was primarily due to the weak economic conditions at that time. The rise in stock prices in the 2003–2007 period is partially attributed to the improvement in the economy.

Impact of Interest Rates One of the most prominent economic forces driving stock market prices is the risk-free interest rate. Investors should consider purchasing a risky asset only if they expect to be compensated with a risk premium for the risk incurred. Given a choice of risk-free Treasury securities or stocks, investors should purchase stocks only if they are appropriately priced to reflect a sufficiently high expected return above the risk-free rate. Although the relationship between interest rates and stock prices is not constant over time, most of the largest stock market declines have occurred in periods when interest rates increased substantially. Furthermore, the stock market’s rise in the late 1990s is partially attributed to the low interest rates during that period, which encouraged investors to shift from debt securities (with low rates) to equity securities.

Impact of the Dollar’s Exchange Rate Value The value of the dollar can affect U.S. stock prices for a variety of reasons. First, foreign investors prefer to purchase U.S. stocks when the dollar is weak and sell them when it is near its peak. Thus, the foreign demand for any given U.S. stock may be higher when the dollar is expected to strengthen, other things being equal. Also, stock prices are affected by the impact of the dollar’s changing value on cash flows. Stock prices of U.S. firms primarily involved in exporting could be favorably affected by a weak dollar and adversely affected by a strong dollar. U.S. importing firms could be affected in the opposite manner.

Stock prices of U.S. companies may also be affected by exchange rates if stock market participants measure performance by reported earnings. A multinational corpora-
tion’s consolidated reported earnings will be affected by exchange rate fluctuations even if the company’s cash flows are not affected. A weaker dollar tends to inflate the reported earnings of a U.S.-based company’s foreign subsidiaries. Some analysts argue that any effect of exchange rate movements on financial statements is irrelevant unless cash flows are also affected.

The changing value of the dollar can also affect stock prices by affecting expectations of economic factors that influence the firm’s performance. For example, if a weak dollar stimulates the U.S. economy, it may enhance the value of a U.S. firm whose sales are dependent on the U.S. economy. A strong dollar could adversely affect such a firm if it dampens U.S. economic growth. Because inflation affects some firms, a weak dollar could indirectly affect a firm’s stock by putting upward pressure on inflation. A strong dollar would have the opposite indirect impact. Some companies attempt to insulate their stock price from the changing value of the dollar, but other companies purposely remain exposed with the intent to benefit from it.

Exhibit 11.1 Stock Market Trend Based on the S&P 500 Index

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Market-Related Factors

Market-related factors also drive stock prices. These factors include investor sentiment and the January effect.

Investor Sentiment  A key market-related factor is investor sentiment, which represents the general mood of investors in the stock market. Since stock valuations reflect expectations, in some periods the stock market performance is not highly correlated with existing economic conditions. For example, even though the economy is weak, stock prices may rise if most investors expect that the economy will improve in the near future. That is, there is a positive sentiment because of optimistic expectations.

BEHAVIORAL FINANCE  Stocks can exhibit excessive volatility because their prices are partially driven by fads and fashions, which may be unrelated to the present value of future dividends. During the late 1990s, stock prices increased beyond what might be attributed to strong economic conditions. At that time, investor sentiment was unusually optimistic about Internet firms. In 2000 and 2001, investor sentiment shifted, causing a substantial decline in stock prices.

Movements in stock prices may be partially attributed to investors’ reliance on other investors for stock market valuation. Rather than making their own assessment of a firm’s value, many investors appear to focus on the general investor sentiment. This can result in irrational exuberance, whereby stock prices increase without reason.

Given the potential changes in valuation caused by market sentiment, some investors attempt to anticipate future momentum of stock prices by using technical analysis. The rationale behind technical analysis is that if trends in stock prices are repetitive, investors can take positions in stocks when they recognize that a particular trend is occurring. Technical analysis is most commonly used to anticipate short-term movements in stock prices.

January Effect  Because many portfolio managers are evaluated over the calendar year, they tend to invest in riskier small stocks at the beginning of the year and shift to larger (more stable) companies near the end of the year to lock in their gains. This tendency places upward pressure on small stocks in January of every year, causing the so-called January effect. Some studies have found that most of the annual stock market gains occur in January. Once investors discovered the January effect, they attempted to take more positions in stocks in the prior month. This has placed upward pressure on stocks in mid-December, causing the January effect to begin in December.

Firm-Specific Factors

A firm’s stock price is affected not only by macroeconomic and market conditions but also by firm-specific conditions. Some firms are more exposed to conditions within their own industry than to general economic conditions, so participants monitor industry sales forecasts, entry into the industry by new competitors, and price movements of the industry’s products. Stock market participants may focus on announcements by specific firms that signal information about a firm’s sales growth, earnings, or other characteristics that may cause a revision in the expected cash flows to be generated by that firm.

Dividend Policy Changes  An increase in dividends may reflect the firm’s expectation that it can more easily afford to pay dividends. A decrease in dividends may reflect the firm’s expectation that it will not have sufficient cash flow.
Earnings Surprises Recent earnings are used to forecast future earnings and therefore to forecast a firm’s future cash flows. When a firm’s announced earnings are higher than expected, some investors raise their estimates of the firm’s future cash flows and therefore revalue its stock upward. Conversely, an announcement of lower than expected earnings can cause investors to reduce their valuation of a firm’s future cash flows and its stock.

Acquisitions and Divestitures The expected acquisition of a firm typically results in an increased demand for the target’s stock and therefore raises the stock price. Investors recognize that the target’s stock price will be bid up once the acquiring firm attempts to acquire the target’s stock. The effect on the acquiring firm’s stock is less clear, as it depends on the perceived synergies that could result from the acquisition. Divestitures tend to be regarded as a favorable signal about a firm if
the divested assets are unrelated to the firm’s core business. The typical interpretation by the market in this case is that the firm intends to focus on its core business.

**Expectations** Investors do not necessarily wait for a firm to announce a new policy before they revalue the firm’s stock. Instead, they attempt to anticipate new policies so that they can make their move in the market before other investors. In this way, they may be able to pay a lower price for a specific stock or sell the stock at a higher price. For example, they may use the firm’s financial reports or recent statements by the firm’s executives to speculate on whether the firm will adjust its dividend policy. The disadvantage of trading based on incomplete information is that the investors may not properly anticipate the firm’s future policies.

**Integration of Factors Affecting Stock Prices**

Exhibit 11.2 illustrates the underlying forces that cause a stock’s price to change over time. As with the pricing of debt securities, the required rate of return is relevant, as are the economic factors that affect the risk-free interest rate. Stock market participants also monitor indicators that can affect the risk-free interest rate, which affects

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**Exhibit 11.2** Framework for Explaining Changes in a Firm’s Stock Price over Time
the required return by investors who invest in stocks. Indicators of inflation (such as the consumer price index and producer price index) and of government borrowing (such as the budget deficit and the volume of funds borrowed at upcoming Treasury bond auctions) also affect the risk-free rate and therefore affect the required return of investors. In general, whenever these indicators signal the expectation of higher interest rates, there is upward pressure on the required rate of return by investors and downward pressure on a firm’s value.

In addition, the firm’s expected future cash flows are commonly estimated to derive its value, and these cash flows are influenced by economic conditions, industry conditions, and firm-specific conditions. This exhibit provides an overview of what stock market participants monitor when attempting to anticipate future stock price movements.

**Role of Analysts in Valuing Stocks**

Most investors agree that the factors just identified affect stock prices. However, they tend to disagree on how any particular stock’s price will be affected by changes in those factors. Given the difficulty in valuing stocks, many investors rely on opinions of stock analysts who are employed by investment banks or other financial firms. Analysts are assigned by their employer to periodically review and rate specific stocks. Since analysts command very high salaries, they are usually hired to cover only relatively large publicly traded firms. About half of the publicly traded firms with a total market value of less than $250 million do not have any analyst coverage. In contrast, the most widely traded stocks are followed by many analysts.

Analysts play an important role in the market valuation of stocks. Through their recommendations, they influence the buying or selling decisions of some investors and therefore can influence the price of stocks. Many analysts are assigned to specific stocks and issue ratings that can indicate whether investors should buy the stock or sell the stock.

The ratings have historically been confusing, however, because they use terminology such as strong buy, buy, accumulate buy, hold, and sell. In 2001, research by Thomson Financial determined that analysts at the largest brokerage firms typically recommended “sell” for less than 1 percent of all the stocks for which they provided ratings. Some analysts respond (anonymously) that investors simply are misinterpreting the ratings. Ratings such as “accumulate buy” or “hold” may really mean sell. As a result of the media attention to this issue, some analysts have changed their ratings to make them clearer to investors.

Ratings for a particular stock are provided along with stock quotes and other information at [http://finance.yahoo.com/?u](http://finance.yahoo.com/?u). This website provides summaries of ratings by well-known analysts and recent changes in analyst ratings for any stock.

**Analyst Conflicts of Interest**

Many analysts are employed by investment banks that provide many services for publicly traded firms. A bank’s analyst division and the divisions that sell services to client firms are supposed to be separated by a so-called Chinese wall so that the analysts can rate those firms in an unbiased manner. In some periods, this Chinese wall did not exist at many investment banks. In fact, during the late 1990s and early 2000s, many analysts were rewarded with large bonuses if they generated other business (such as merger advice or secondary offerings) for the investment bank that employed them. Thus, these analysts had an incentive to rate firms more favorably than they deserved, because firms are more likely to select an investment bank whose analyst rates them highly.
Glenbard Company wanted to hire an investment bank to help it pursue another company for a merger. It knew that the fees to be paid for this service would probably be at least $1 million. Glenbard considered two large investment banks, Riverside Investment Bank and Los Angeles Investment Bank. The analyst at Riverside Investment Bank rated Glenbard’s stock as neutral for investors. His rating was honest and accurate, as Glenbard’s stock was already priced high given the firm’s financial condition. In contrast, the analyst at Los Angeles Investment Bank rated Glenbard’s stock a strong buy for investors.

The analyst at Los Angeles Investment Bank was well aware that Glenbard Company was financially weak. Nevertheless, he realized that if he rated the stock highly, Glenbard would be more likely to do business with his investment bank. Therefore, he assigned an overly optimistic rating to Glenbard’s stock. Glenbard’s managers believed that an investment bank that thought that Glenbard was financially strong and would perform well in the future would be likely to negotiate a better merger deal. Therefore, they selected Los Angeles to handle the merger. Thus, as a result of the analyst’s rating, his investment bank received more business and generated more fees.

Another widely publicized abuse occurs when an analyst at the security firm that underwrites an initial public offering (IPO) for a firm continuously issues a buy recommendation for the IPO firm, even after there are clear signals that the firm is experiencing financial problems. This behavior was especially obvious during the 2000–2001 period when many analysts maintained their “buy” recommendations on Internet stocks that their firm had underwritten, even after there was substantial evidence that these firms had financial problems. Considering the conflict of interest that analysts face when their employer serves as their client’s investment bank, such “buy” ratings are misleading to the investors who rely on the analyst’s opinions.

An SEC investigation in 2001 determined that many research analysts of securities firms took positions in stocks contrary to their recommendations. Some analysts would issue a “buy” recommendation for a firm whose IPO had recently been underwritten by their employer but then sell their personal holdings of that stock during this same period. In one case, an analyst even borrowed the stock and sold it, while issuing a buy recommendation, which confirmed that his personal view differed from the recommendation he gave to satisfy his employer.

In the year 2000, the conflicts of interest should have been very obvious. Many firms were going public, engaging in secondary offerings, or merging, and investment banks were competing for the advisory business. Some investment banks were paying large bonuses to analysts based on the amount of business that the analysts generated for the banks. Thus, the analysts were encouraged to rate any firms that might need investment banking business optimistically so that these firms might hire their respective investment banking divisions to provide services. The Securities and Exchange Commission (SEC) investigated and found clear evidence of conflicts of interest. For example, some analysts assigned a rating of “strong buy” to stocks that they described as a “piece of junk” or worse in e-mail within their investment bank. Some of the e-mail messages confirmed that the main reason the analysts rated a stock highly was to attract business from other firms and generate fee income.

**Stock Exchange Rules** In the 2002–2004 period, the U.S. stock exchanges imposed new rules to prevent some obvious conflicts of interest faced by analysts. First, analysts cannot be supervised by the investment banking division of their company, and their compensation cannot be driven by the amount of investment banking business that they generate. This rule was intended to encourage analysts to provide more unbiased ratings of stocks. Second, investment banks must dis-
close summaries of their analysts’ ratings, so that investors can determine whether the ratings are excessively optimistic.

**Inside Information**

Historically, analysts were able to obtain valuable information by communicating with executives of a firm. In many cases, this gave them an advantage over other investors because the analysts might be the first to learn that the firm was revising its revenue or earnings forecast downward. The analysts could use this information to revise their own estimates of the firm’s quarterly earnings or to revise their rating of the firm. Their actions affected investor demand for the firm’s shares or the amount of shares that investors wanted to sell and therefore affected the share price. Thus, the information provided to the analysts was ultimately accounted for in the market, but the analysts had the information before the other market participants.

**New Disclosure Regulations**

In the late 1990s, some firms began to announce significant changes in their expected revenue or earnings through the media, rather than provide the information to the analysts first. In October 2000, the SEC enacted Regulation FD (“Fair Disclosure”), which requires that firms disclose any significant information that could affect the share price simultaneously to all market participants. Consequently, analysts no longer have an information advantage over other market participants.

**Unbiased Analyst Rating Services**

Some analyst rating services are considered to be unbiased because they are not attempting to provide other services for the firms that they rate. Some of the more popular analyst rating services include Morningstar, *Value Line*, and *Investor’s Business Daily*. Morningstar relies on traditional valuation methods (such as revenue and cost estimates) to determine whether a firm is undervalued. *Value Line* rates each stock from 1 (highest) to 5 (lowest). *Investor’s Business Daily* rates a stock from 1 to 99, with scores over 80 representing recommended buys and scores under 70 recommended sells. Morningstar rates stocks from 5-star (highest) to 1-star. *Investor’s Business Daily* covers more than 10,000 stocks, *Value Line* covers 1,700, and Morningstar covers 500.

Analyst rating services typically charge their subscribers between $100 and $600 per year. There are also some online rating services. For example, the website [http://www.msn.com](http://www.msn.com) not only provides stock quotes but also has stock ratings (provided by StockScouter) for 6,500 stocks.

**Stock Risk**

A stock’s risk reflects the uncertainty about future returns, such that the actual return may be less than expected. The return from investing in stock over a particular period is measured as

\[
R = \frac{(SP - INV) + D}{INV}
\]

where

- **INV** = initial investment
- **D** = dividend
- **SP** = selling price of the stock
The main source of uncertainty is the price at which the stock will be sold. Dividends tend to be much more stable than stock prices. Dividends contribute to the immediate return received by investors, but reduce the amount of earnings reinvested by the firm, which limits its potential growth.

**Measures of Risk**

The risk of a stock can be measured by its price volatility, its beta, and by the value-at-risk method.

**Volatility of a Stock** A stock’s volatility serves as a measure of risk because it may indicate the degree of uncertainty surrounding the stock’s future returns. The volatility is often referred to as total risk because it reflects movements in stock prices for any reason, not just movements attributable to stock market movements. A stock’s returns over a historical period such as the last 12 quarters may be compiled to estimate future volatility. If the standard deviation of the stock’s returns over the last 12 quarters is 3 percent, and if there is no perceived change in volatility, there is a 68 percent probability that the stock’s returns will be within 3 percentage points (one standard deviation) of the expected outcome and a 95 percent probability that the stock’s returns will be within 6 percentage points (2 standard deviations) of the expected outcome.

**Volatility of a Stock Portfolio** A portfolio’s volatility is dependent on the volatility of the individual stocks in the portfolio, the correlations between returns of the stocks in the portfolio, and the proportion of total funds invested in each stock. The portfolio’s volatility can be measured by the standard deviation:

\[
\sigma_p = \sqrt{w_i^2 \sigma_i^2 + w_j^2 \sigma_j^2 + \sum_{i=1}^{n} \sum_{j=1}^{n} w_i w_j \sigma_i \sigma_j \text{CORR}_{ij}}
\]

where

- \( \sigma_i \) = standard deviation of returns of the \( i \)th stock
- \( \sigma_j \) = standard deviation of returns of the \( j \)th stock
- CORR\(_{ij} \) = correlation coefficient between the \( i \)th and \( j \)th stocks
- \( w_i \) = proportion of funds invested in the \( i \)th stock
- \( w_j \) = proportion of funds invested in the \( j \)th stock

For portfolios containing more securities, the formula for the standard deviation would contain the standard deviation of each stock and the correlation coefficients between all pairs of stocks in the portfolio, weighted by the proportion of funds invested in each stock. The equation for a two-stock portfolio is sufficient to demonstrate that a stock portfolio has more volatility when its individual stock volatilities are high, other factors held constant. In addition, a stock portfolio has more volatility when its individual stock returns are highly correlated, other factors held constant. As an extreme example, if the returns of the stocks are all perfectly positively correlated (correlation coefficients = 1.0), the portfolio will have a relatively high degree of volatility because all stocks will experience peaks or troughs simultaneously. Conversely, a stock portfolio containing some stocks with low or negative correlation will exhibit less volatility because the stocks will not experience peaks and troughs simultaneously. Some offsetting effects will occur, smoothing the returns of the portfolio over time.

**Beta of a Stock** As explained earlier, a stock’s beta measures the sensitivity of its returns to market returns. This measure of risk is used by many investors who have a diversified portfolio of stocks and believe that the unsystematic risk of the portfolio
is diversified away (because favorable firm-specific characteristics will offset unfavor-
able firm-specific characteristics). The beta of a stock can be estimated by obtaining
returns of the firm and the stock market over the last 12 quarters and applying regres-
sion analysis to derive the slope coefficient as in this model:

$$R_{jt} = B_0 + B_1 R_{mt} + \mu_t$$

where

- $R_{jt}$ = return of stock $j$ during period $t$
- $R_{mt}$ = market return during period $t$
- $B_0$ = intercept
- $B_1$ = regression coefficient that serves as an estimate of beta
- $\mu_t$ = error term

Some investors or analysts prefer to use monthly returns rather than quarterly re-
turns to estimate the beta. The choice is dependent on the holding period for which
one wants to assess sensitivity. If the goal is to assess sensitivity to monthly returns,
then monthly data would be more appropriate.

The regression analysis estimates the intercept ($B_0$) and the slope coefficient ($B_1$),
which serves as the estimate of beta. If the slope coefficient of an individual stock
is estimated to be 1.4, this means that for a given return in the market, the stock’s
expected return is 1.4 times that amount. Such sensitivity is favorable when the
stock market is performing well, but unfavorable when the stock market is perform-
ing poorly. This implies that the probability distribution of returns is very dispersed,
reflecting a wide range of possible outcomes for the individual stock.

Beta serves as a measure of risk because it can be used to derive a probability dis-
tribution of returns based on a set of market returns. As explained earlier, beta is use-
ful for investors who are primarily concerned with systematic risk because it captures
the movement in a stock’s price that is attributable to movements in the stock market.
It ignores stock price movements attributable to firm-specific conditions because such
unsystematic risk can be avoided by maintaining a diversified portfolio.

**ILLUSTRATION** Exhibit 11.3 shows how the probability distribution of a stock’s re-
turns is dependent on its beta. At one extreme, Stock A with a very low
beta is less responsive to market movements in either direction, so its possible returns
range only from $-4.8\%$ under poor market conditions to $6\%$ under the
most favorable market conditions. Stock D with a very high beta has possible returns
that range from $-11.2\%$ under poor market conditions to $14\%$ under the
most favorable market conditions.

**Beta of a Stock Portfolio** Participants in the stock market tend to invest
in a portfolio of stocks rather than a single stock and therefore are more concerned
with the risk of a portfolio than with the risk of an individual stock. The risk of indi-
vidual stocks is necessary to derive portfolio risk. Portfolio risk is commonly mea-
sured by beta or volatility (standard deviation), just as the risk of individual stocks is.

The beta of a stock portfolio can be measured as

$$B_p = \sum w_i B_i$$

That is, the portfolio beta is a weighted average of the betas of stocks that com-
prise the portfolio, where the weights reflect the proportion of funds invested in
each stock. The equation is intuitive as it simply suggests that a portfolio consisting
of high-beta stocks will have a relatively high beta. This type of portfolio normally
performs poorly relative to other stock portfolios in a period when the market return
Part 4: Equity Markets

is negative. The risk of such a portfolio could be reduced by replacing some of the high-beta stocks with low-beta stocks. Of course, the expected return for the portfolio would be lower as a result.

The beta of a stock and its volatility are typically related. High-beta stocks are expected to be very volatile because they are more sensitive to market returns over time.
Conversely, low-beta stocks are expected to be less volatile because they are less responsive to market returns.

**Value at Risk** Value at risk is a risk measurement that estimates the largest expected loss to a particular investment position for a specified confidence level. This method became very popular in the late 1990s after some mutual funds and pension funds experienced abrupt large losses. The value-at-risk method is intended to warn investors about the potential maximum loss that could occur. If the investors are uncomfortable with the potential loss that could occur in a day or a week, they can revise their investment portfolio to make it less risky.

The value-at-risk measurement focuses on the pessimistic portion of the probability distribution of returns from the investment of concern. For example, a portfolio manager might use a confidence level of 90 percent, which estimates the maximum daily expected loss for a stock in 90 percent of the trading days over an upcoming period. The higher the level of confidence desired, the larger the maximum expected loss that could occur for a given type of investment. That is, one may expect that the daily loss from holding a particular stock will be no worse than $-5\%$ when using a 90 percent confidence level, but no worse than $-8\%$ when using a 99 percent confidence level. In essence, the more confidence investors have that the actual loss will be no greater than the expected maximum loss, the further they move into the left tail of the probability distribution.

The value at risk is also commonly used to measure the risk of a portfolio. Some stocks may be perceived to have high risk when assessed individually, but low risk when assessed as part of a portfolio. This is because the likelihood of a large loss in the portfolio is influenced by the probabilities of simultaneous losses in all of the component stocks for the period of concern.

**Applying Value at Risk**

Value at risk can be applied to measure the maximum loss for a specific stock based on a specified confidence level.

**Methods of Determining the Maximum Expected Loss**

Numerous methods can be used when applying value at risk. Three basic methods are discussed next.

**Use of Historical Returns to Derive the Maximum Expected Loss** An obvious way to use value at risk is to assess historical data. For example, an investor may determine that out of the last 100 trading days, a stock experienced a decline of greater than 7 percent on 5 different days, or 5 percent of the days assessed. This information could be used to infer a maximum daily loss of no more than 7 percent for that stock, based on a 95 percent confidence level for an upcoming period.

**Use of Standard Deviation to Derive the Maximum Expected Loss** An alternative approach is to measure the standard deviation of daily returns over the previous period and apply it to derive boundaries for a specific confidence level.

**ILLUSTRATION** Assume that the standard deviation of daily returns for a particular stock in a recent historical period is 2 percent. Also assume that the
95 percent confidence level is desired for the maximum loss. If the daily returns are normally distributed, the lower boundary (the left tail of the probability distribution) is about 1.65 standard deviations away from the expected outcome. Assuming an expected daily return of .1 percent, the lower boundary is

\[ .1\% - [1.65 \times (2\%)] = -3.2\% \]

The expected daily return of .1 percent may have been derived from the use of subjective information, or it could be the average daily return from the recent historical period assessed. The lower boundary for a given confidence level can be easily derived for any expected daily return. For example, if the expected daily return is .14 percent, the lower boundary is

\[ .14\% - [1.65 \times (2\%)] = -3.16\% \]

**Use of Beta to Derive the Maximum Expected Loss** A third method of estimating the maximum expected loss for a given confidence level is to apply the stock’s beta.

**Illustration** Assume that the stock’s beta over the last 100 days is 1.2. Also assume that the stock market is expected to perform no worse than −2.5 percent on a daily basis based on a 95 percent confidence level. Given the stock’s beta of 1.2 and a maximum market loss of −2.5 percent, the maximum loss to the stock over a given day is estimated to be

\[ 1.2 \times (-2.5\%) = -3.0\% \]

The maximum expected market loss for the 95 percent confidence level can be derived subjectively or by assessing the last 100 days or so (in the same manner described for the two previous methods that can be used to derive a maximum expected loss for an individual stock).

**Deriving the Maximum Dollar Loss** Once the maximum percentage loss for a given confidence level is determined, it can be applied to derive the maximum dollar loss of a particular investment.

**Illustration** Assume that an investor has a $20 million investment in a stock. The maximum dollar loss is determined by applying the maximum percentage loss to the value of the investment. If the investor used beta to measure the maximum expected loss as explained above, the maximum percentage loss over one day would be −3 percent, so the maximum daily loss in dollars is

\[ (-3\%) \times \$20,000,000 = \$600,000 \]

Since many institutional and individual investors manage stock portfolios, value at risk is commonly applied to assess the maximum possible loss of the entire portfolio. The same three methods used to derive the maximum expected loss of one stock can be applied to derive the maximum expected loss of a stock portfolio for a given confidence level. For instance, the returns of the stock portfolio over the last 100 days or so can be assessed to derive the maximum expected loss. Alternatively, the standard deviation of the portfolio’s returns can be estimated over the last 100 days to derive a lower boundary at a specified confidence level. As another alternative, the beta of the portfolio’s returns can be estimated over the last 100 days and then applied to a maximum expected daily loss in the stock market to derive a maximum expected loss in the stock portfolio over a given day.
### Common Adjustments to the Value-at-Risk Applications

The basic methods of applying value at risk can be adjusted to improve the assessment of risk in particular situations, as explained next.

#### Investment Horizon Desired
An investor who wants to assess the maximum loss over a week or a month can apply the same methods, but should use a historical series that matches the investment horizon. For example, to assess the maximum loss over a given week in the near future, a historical series of weekly returns of that stock (or stock portfolio) can be used.

#### Length of Historical Period Used
The previous examples used a historical series of 100 trading days, but if, for example, conditions have changed such that only the most recent 70 days reflect the general state of market conditions, then those 70 days could be used. However, a subperiod of weak market performance should not be discarded because it could occur again.

#### Time-Varying Risk
The risk of a stock can vary over time for the following reasons. First, market conditions can change, such that the particular line of business reflected by the stock is subject to more competition or other industry conditions. For example, an abrupt increase in competition will increase the probability that the firm will fail and will normally result in a higher response to poor market conditions and a higher degree of volatility. Second, the firm's operations may change, causing a change in the response of its stock price to market returns and a change in the volatility of the stock's returns. Consequently, the assessment of a maximum expected loss based on historical risk characteristics may not be accurate. It is important for investors to recognize how the stock’s risk varies over time so that they can properly assess its risk in the future.

#### Restructuring the Investment Portfolio
Portfolio managers may apply value at risk to potential investments. For example, if they are considering the sale of Stock X and the purchase of Stock Y, they should apply value at risk to their potential new portfolio. Then, they can compare the risk of this portfolio to their existing portfolio to decide whether they should make these changes. Even if they plan to increase their investment in some stocks without selling others, they should reapply value at risk to reflect the new proportions of their stock portfolio allocated to each security that result from the restructured portfolio.

### Forecasting Stock Price Volatility and Beta

Since the operations of a particular firm and its competitive environment can change over time, its risk can change as well. Investors are most concerned with the risk of their investments over the future horizon in which they hold those investments so that they can anticipate the range of possible returns that may result.

#### Methods of Forecasting Stock Price Volatility
Some of the more common methods of forecasting stock price volatility are the historical method, the time-series method, and the implied standard deviation method, which are described next.
**Historical Method**  With the historical method, a historical period is used to derive a stock’s standard deviation of returns, and then that estimate is used as the forecast over the future. Although the stock price volatility level may change over time, this method can be useful if there is no obvious trend in volatility, so the best forecast may be the volatility in the most recent period.

**Time-Series Method**  A second method for forecasting stock price volatility is to use a time series of volatility patterns in previous periods.

The standard deviation of daily stock returns is determined for each of the last several months. Then, a time-series trend of these standard deviation levels is used to form an estimate for the standard deviation of daily stock returns over the next month. This method differs from the first in that it uses information beyond that contained in the previous month. The forecast may be based on a weighting scheme such as 50 percent times the standard deviation in the last month (month 4), plus 25 percent times the standard deviation in the month before that (month 3), plus 15 percent times the standard deviation in month 2, plus 10 percent times the standard deviation in month 1.

This scheme places more weight on the most recent data, but allows data from the last four months to influence the forecast. Normally, the weights and the number of previous periods (lags) that were most accurate (lowest forecast error) in previous periods are used. Various economic and political factors can cause stock price volatility to change abruptly, however, so even sophisticated time-series models do not necessarily generate accurate forecasts of stock price volatility.

**Implied Standard Deviation**  A third method for forecasting stock price volatility is to derive the stock’s implied standard deviation (ISD) from the stock option pricing model (options are discussed in detail in Chapter 14). The premium on a call option for a stock is dependent on factors such as the relationship between the current stock price and the exercise (strike) price of the option, the number of days until the expiration date of the option, and the anticipated volatility of the stock price movements. There is a formula for estimating the call option premium based on various factors. The actual values of these factors are known, except for the anticipated volatility. However, by plugging in the actual option premium paid by investors for that specific stock, it is possible to derive the anticipated volatility level. Market participants who wish to forecast volatility over a 30-day period will consider a call option on the stock that has 30 days to expiration. This measurement represents the anticipated volatility of the stock over a 30-day period by investors who are trading stocks. Participants may use this measurement as their own forecast of that specific stock’s volatility.

**Forecasting a Stock Portfolio’s Volatility**  Portfolio managers who monitor total risk rather than systematic risk are more concerned about stock volatility than about beta. Recall that a stock portfolio’s volatility is dependent on the volatility of the individual stocks in the portfolio, as well as their correlations. Since the volatilities and correlations of the individual stocks can change over time, so can the volatility of the portfolio. One method of forecasting portfolio volatility is to first derive forecasts of individual volatility levels as described earlier. Then, the correlation coefficient for each pair of stocks in the portfolio is forecasted by estimating the correlation in recent periods and determining whether there was a trend in the change in correlations. The forecasted volatilities of individual stocks and the correlation coefficients are then used to estimate the future portfolio volatility. This approach explicitly captures the recent trends in individual volatilities and correlations.
Forecasting a Stock Portfolio’s Beta

Given that the beta of any stock can change over time and that a stock portfolio’s beta is dependent on the betas of its individual stocks, the portfolio’s beta is subject to change. One way to forecast a portfolio’s beta is to first forecast the betas of the individual stocks in the portfolio and then sum the individual forecasted betas, weighted by the proportion of investment in each stock.

The beta of each individual stock may be forecasted in a subjective manner; for example, a portfolio manager may forecast a stock’s beta to increase from its existing level of .8 to .9 because the firm has initiated a more aggressive growth strategy. Alternatively, the manager can assess a set of historical periods to determine whether there is a trend in the beta over those periods and then apply the trend. For example, a portfolio manager who is attempting to forecast the beta of stocks based on a daily horizon may estimate the betas in each of the previous four 100-day periods. Assume that the beta was estimated to be .6 four periods ago, .62 three periods ago, .7 two periods ago, and .8 last period. This firm’s beta appears to have an upward trend, which may support a forecast of a slightly higher beta in the next period. However, the stock’s beta will not continually change in one direction.

The same procedure can be used to forecast betas based on a different horizon. For example, a portfolio manager who wants to forecast the beta based on monthly stock returns can attempt to determine the trend by assessing recent 12-month periods.

Stock Performance Measurement

The performance of a stock or a stock portfolio over a particular period can be measured by its excess return (return above the risk-free rate) over that period divided by its risk. Two common methods of measuring performance are the Sharpe index and the Treynor index.

Sharpe Index

If total variability is thought to be the appropriate measure of risk, a stock’s risk-adjusted returns can be determined by the reward-to-variability ratio (also called the Sharpe index), computed as

$$\text{Sharpe index} = \frac{\bar{R} - \bar{R}_f}{\sigma}$$

where

- $\bar{R}$ = average return on the stock
- $\bar{R}_f$ = average risk-free rate
- $\sigma$ = standard deviation of the stock’s returns

The higher the stock’s mean return relative to the mean risk-free rate and the lower the standard deviation, the higher the Sharpe index. This index measures the excess return above the risk-free rate per unit of risk.

**ILLUSTRATION**

Assume the following information for two stocks:

- Average return for Sooner stock = 16%
- Average return for Longhorn stock = 14%
- Average risk-free rate = 10%
- Standard deviation of Sooner stock returns = 15%
- Standard deviation of Longhorn stock returns = 8%
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Sharpe index for Sooner stock

\[
\text{Sharpe index for Sooner stock} = \frac{16\% - 10\%}{15\%}
\]

\[
= .40
\]

Sharpe index for Longhorn stock

\[
\text{Sharpe index for Longhorn stock} = \frac{14\% - 10\%}{8\%}
\]

\[
= .50
\]

Even though Sooner stock had a higher average percentage return, Longhorn stock had a higher performance because of its lower risk. If a stock's average return is less than the average risk-free rate, the Sharpe index for that stock will be negative.

\[\text{Treynor Index}\]

If beta is thought to be the most appropriate type of risk, a stock’s risk-adjusted returns can be determined by the Treynor index, computed as

\[
\text{Treynor index} = \frac{\bar{R} - \bar{R}_f}{B}
\]

where \(B\) is the stock’s beta. The Treynor index is similar to the Sharpe index, except that it uses beta rather than standard deviation to measure the stock’s risk. The higher the Treynor index, the higher the return relative to the risk-free rate, per unit of risk.

Using the information provided earlier on Sooner and Longhorn stock and assuming that Sooner’s stock beta is 1.2 and Longhorn’s beta is 1.0, the Treynor index is computed for each stock as follows:

Treynor index for Sooner stock

\[
\text{Treynor index for Sooner stock} = \frac{16\% - 10\%}{1.2}
\]

\[
= .05
\]

Treynor index for Longhorn stock

\[
\text{Treynor index for Longhorn stock} = \frac{14\% - 10\%}{1.0}
\]

\[
= .04
\]

Based on the Treynor index, Sooner stock had the higher performance.

A comparison of this and the previous illustration shows that the stock determined to have the higher performance is dependent on the measure of risk and therefore on the index used. In some cases, the indexes will lead to the same results. Like the Sharpe index, the Treynor index is negative for a stock whose average return is less than the average risk-free rate.

\[\text{Stock Market Efficiency}\]

If stock markets are efficient, the prices of stocks at any point in time should fully reflect all available information. As investors attempt to capitalize on new information that is not already accounted for, stock prices should adjust immediately. Investors commonly over- or underreact to information. This does not mean markets are inefficient unless the reaction is biased (consistently over- or underreacting). In
this case, investors who recognize the bias will be able to earn abnormally high risk-adjusted returns.

**Forms of Efficiency**

Efficient markets can be classified into three forms: weak, semistrong, and strong.

**Weak-Form Efficiency**  
Weak-form efficiency suggests that security prices reflect all trade-related information, such as historical security price movements and volume of securities trades. Thus, investors will not be able to earn abnormal returns on a trading strategy that is based solely on past price movements.

**Semistrong-Form Efficiency**  
Semistrong-form efficiency suggests that security prices fully reflect all public information. The difference between public information and market-related information is that public information also includes announcements by firms, economic news or events, and political news or events. Market-related information is a subset of public information. Thus, if semistrong-form efficiency holds, weak-form efficiency must hold as well. It is possible, however, for weak-form efficiency to hold, while semistrong-form efficiency does not. In this case, investors could earn abnormal returns by using the relevant information that was not immediately accounted for by the market.

**Strong-Form Efficiency**  
Strong-form efficiency suggests that security prices fully reflect all information, including private or insider information. If strong-form efficiency holds, semistrong-form efficiency must hold as well. If insider information leads to abnormal returns, however, semistrong-form efficiency could hold, while strong-form efficiency does not.

Inside information allows insiders (such as some employees or board members) an unfair advantage over other investors. For example, if employees of a firm are aware of favorable news about the firm that is not yet disclosed to the public, they may consider purchasing shares or advising their friends to purchase the firm’s shares. Though such actions are illegal, they still happen and can create market inefficiencies.

Even if insiders do not act on inside information, a particular group of investors may receive information before others and therefore have an unfair advantage.

**ILLUSTRATION**  
Consider the Bank of New York’s announcement that it was experiencing loan defaults on its credit card business. The bank first announced this information through a conference call to about 90 securities analysts and institutional investors at about 2:00 P.M. on June 19, 1996. After the announcement, its stock price declined by about 2.6 percent that afternoon. The bank then issued a news release to the public at about 4:30 P.M. on the same afternoon—30 minutes after the stock market closed. Small investors were upset that they received the information later than many institutional investors and therefore could not respond as quickly to the news. They argued that this allowed institutional investors a head start on selling the stock in response to negative information. Regulation FD has been enacted to ensure that firms fully disclose their information at the same time to all investors, which should prevent some market inefficiencies.

**Tests of the Efficient Market Hypothesis**

Tests of market efficiency are segmented into three categories, as discussed next.
Test of Weak-Form Efficiency  Weak-form efficiency has been tested by searching for a nonrandom pattern in security prices. If the future change in price is related to recent changes, historical price movements could be used to earn abnormal returns. In general, studies have found that historical price changes are independent over time. Therefore, historical information is already reflected by today’s price and cannot be used to earn abnormal profits. Even when some dependence was detected, the transaction costs would offset any excess return earned.

There is some evidence that stocks have performed better in specific time periods. For example, as mentioned earlier, small stocks have performed unusually well in the month of January (“January effect”). Second, stocks have historically performed better on Fridays than on Mondays (“weekend effect”). Third, stocks have historically performed well on the trading days just before holidays (“holiday effect”). To the extent that a given pattern continues and can be used by investors to earn abnormal returns, market inefficiencies exist. In most cases, there is no clear evidence that such patterns persist once they are recognized by the investment community.

One could argue that the stock market is inefficient based on the number of so-called corrections that occur. During the twentieth century, there were more than 100 specific days when the market (as measured by the Dow Jones Industrial Average) declined by 10 percent or more. On more than 300 specific days during the century, the market declined by more than 5 percent. These abrupt declines frequently followed a market runup, which implies that the runup may have been excessive. Thus, a market correction was necessary to remove the excessive runup.

Test of Semistrong-Form Efficiency  Semistrong-form efficiency has been tested by assessing how security returns adjust to particular announcements. Some announcements are specific to a firm, such as an announced dividend increase, an acquisition, or a stock split. Other announcements are economy related, such as an announced decline in the federal funds rate. In general, security prices immediately reflected the information from the announcements. That is, the securities were not consistently over- or undervalued. Consequently, abnormal returns could not consistently be achieved. This is especially true when considering transaction costs.

There is evidence of unusual profits when investing in IPOs. In particular, the return over the first day following the IPO tends to be abnormally high. One reason for this underpricing is that the investment banking firms underwriting an IPO intentionally underprice to ensure that the entire issue can be placed. In addition, underwriters are required to exercise due diligence in ensuring the accuracy of the information that they provide to investors about the corporation. Thus, underwriters are encouraged to err on the low side when setting a price for IPOs.

Some analysts might contend that given imperfect information about IPOs, investors will participate only if prices are low. Thus, the potential return must be high enough to compensate for the lack of information about these corporations and the risk incurred. Using this argument, the underpricing does not imply market inefficiencies but rather reflects the high degree of uncertainty.

Test of Strong-Form Efficiency  Tests of strong-form efficiency are difficult, because the inside information used is not publicly available and cannot be properly tested. Nevertheless, many forms of insider trading could easily result in abnormally high returns. For example, there is clear evidence that share prices of target firms rise substantially when the acquisition is announced. If insiders purchased stock of targets prior to others, they would normally achieve abnormally high returns. Insiders are discouraged from using this information because it is illegal, not because markets are strong-form efficient.
Foreign Stock Valuation, Performance, and Efficiency

Some of the key concepts in this chapter can be adjusted so that they apply on a global basis, as explained next.

Valuation of Foreign Stocks
Foreign stocks can be valued by using the price-earnings method or the dividend discount model with an adjustment to reflect international conditions.

Price-Earnings (PE) Method
The expected earnings per share of the foreign firm are multiplied by the appropriate PE ratio (based on the firm’s risk and local industry) to determine the appropriate price of the firm’s stock. Though easy to use, this method is subject to some limitations when valuing foreign stocks. The PE ratio for a given industry may change continuously in some foreign markets, especially when the industry is composed of just a few firms. Thus, it is difficult to determine the proper ratio that should be applied to a specific foreign firm. In addition, the PE ratio for any particular industry may need to be adjusted for the firm’s country because reported earnings can be influenced by the country’s accounting guidelines and tax laws.

Furthermore, even if U.S. investors are comfortable with their estimate of the proper PE ratio, the value derived by this method is denominated in the local foreign currency (since the estimated earnings are denominated in that currency). Therefore, U.S. investors still need to consider exchange rate effects. Even if the stock is under-valued in the foreign country, it may not necessarily generate a reasonable return for U.S. investors if the foreign currency depreciates against the dollar.

Dividend Discount Model
The dividend discount model can be applied to value foreign stocks by discounting the stream of expected dividends, but with an adjustment to account for expected exchange rate movements. Foreign stocks pay dividends in the currency in which they are denominated. Thus, the cash flow per period to U.S. investors is the dividend (denominated in the foreign currency) multiplied by the value of that foreign currency in dollars. An expected appreciation of the currency denominated the foreign stocks will result in higher expected dollar cash flows and a higher present value. The dividend can normally be forecasted with more accuracy than the value of the foreign currency. Because of exchange rate uncertainty, the value of the foreign stock from a U.S. investor’s perspective is subject to more uncertainty than the value of the stock from a local investor’s perspective.

Measuring Performance from Investing in Foreign Stocks
An investor’s performance from investing in foreign stocks is most properly measured by considering the objective of the investor. For example, if portfolio managers are assigned to select stocks in Europe, their performance should be compared to the performance of a European index, measured in U.S. dollars. In this way, the performance measurement controls for general market movements and exchange rate movements in the region where the portfolio manager has been assigned to invest funds. Thus, if the entire European market experiences poor performance over a particular quarter, or if the main European currency (the euro) depreciates against the dollar over the period, the portfolio managers assigned to Europe are not automatically penalized. Conversely, if the entire European market experiences strong performance over a...
particular quarter, or the euro appreciates against the dollar, the managers are not automatically rewarded. Instead, the performance of portfolio managers will be measured relative to the general market conditions of the region to which they are assigned.

Performance from Global Diversification

A substantial amount of research has demonstrated that investors in stocks can benefit by diversifying internationally. Most stocks are highly influenced by the country where their firms are located (although some firms are more vulnerable to economic conditions than others).

Since a given stock market partially reflects the current and/or forecasted state of its country’s economy, and economics do not move in tandem, particular stocks of the various markets are not expected to be highly correlated. This contrasts with
a purely domestic portfolio (such as all U.S. stocks), in which most stocks are often moving in the same direction and by a somewhat similar magnitude.

Nevertheless, stock price movements among international stock markets are integrated to a degree because some underlying economic factors reflecting the world’s general financial condition may systematically affect all markets. Since one country’s economy can influence the economies of other countries, expectations about economies across countries may be somewhat similar. Thus, stock markets across countries may respond to some of the same expectations. Integration is an important concept because of its implications about benefits from international diversification. A high degree of integration implies that stock returns of different countries would be affected by common factors. Therefore, the returns of stocks from various countries would move in tandem, allowing only modest benefits from international diversification.

In general, correlations between stock indexes have been higher in recent years than they were several years ago. One reason for the increased correlations is the increased integration of business between countries, which results in more intercountry trade flows and capital flows, causing each country to have more influence on other countries. In particular, many European countries have become more integrated because of a movement to standardize regulations throughout Europe and the use of a single currency (the euro) to facilitate trade between countries.

**Integration of Markets during the 1987 Crash** Exhibit 11.4 compares the U.S. stock market to three foreign stock markets during October 1987. Not only did the U.S. market suffer a major decline, but the other three markets were severely affected as well. The high correlation among country stock markets during the crash suggests that the underlying cause of the crash systematically affected all markets. Many institutional investors buy and sell stocks on numerous stock exchanges. Because they anticipated a worldwide decline in stock prices, they liquidated some stocks from all markets, not just from the U.S. market.

**Integration of Markets during Mini-Crashes** Although there has not been another world stock market crash since 1987, there have been several mini-crashes. For example, on August 27, 1998 (referred to as “Bloody Thursday”), Russian stock and currency values declined abruptly in response to severe financial problems in Russia, and most stock markets around the world experienced losses on that day. U.S. stocks declined by more than 4 percent. Such mini-crashes that adversely affect most stock markets illustrate that even a well-diversified international stock portfolio is not insulated from some events that have adverse consequences for stocks in every country. In the case of Bloody Thursday, the adverse effects extended beyond stocks that would be directly affected by financial problems in Russia, as paranoia caused investors to sell stocks across all markets due to fears that stocks might be overvalued.

**Diversification among Emerging Stock Markets** Emerging markets provide an alternative outlet for investors from the United States and other countries to invest their funds. The potential economic growth rate is relatively high. In addition, investors may achieve extra diversification benefits from investing in emerging markets because their respective economies may not necessarily move in tandem with those of the more developed countries. Thus, the correlation between these stocks and those of other countries is low, and investors can reduce risk by including some stocks from these markets within their portfolio. However, emerging market stocks tend to exhibit a high degree of volatility, which partially offsets the advantage of their low correlations with stocks of other countries.
International Market Efficiency

Some foreign markets are likely to be inefficient because of the relatively small number of analysts and portfolio managers who monitor stocks in those markets. It is easier to find undervalued stocks when a smaller number of market participants monitor the market. Research has documented that some foreign markets are inefficient, based on slow price responses to new information about specific firms (such as earnings announcements). The inefficiencies are more common in smaller foreign stock markets. Some emerging stock markets are relatively new and small and may not be as efficient as the U.S. stock market. Thus, some stocks may be undervalued, a possibility that has attracted investors to these markets. Because some of these markets are small, however, they may be susceptible to manipulation by large traders. Furthermore, insider trading is more prevalent in many foreign markets because rules against it are not enforced. In general, large institutional investors and insiders based in the foreign markets may have some advantages.


Exhibit 11.4 Impact of the Crash on Four Stock Markets
Although these markets may appeal to investors seeking abnormal returns, they also tend to have more volatile price movements than the larger markets. They are more exposed to major government turnover and other forms of political risk. They also expose U.S. investors to a high degree of exchange rate risk because their local currencies are typically very volatile. From 1990 to 1996 (before the Asian crisis), emerging stock markets such as Argentina, Brazil, Indonesia, and the Philippines experienced at least one year when stocks declined in value by at least 40 percent (after accounting for exchange rate effects on U.S. investors). During the Asian crisis of 1997–1998, these markets and other Asian markets experienced major declines. Thus, stock market inefficiencies in emerging markets may sometimes result in excessive optimism and overvalued stocks, resulting in periodic corrections.

Stocks are commonly valued using the price-earnings (PE) method, the dividend discount model, or the free cash flow model. The PE method applies the industry PE ratio to the firm’s earnings to derive its value. The dividend discount model estimates the value as the present value of expected future dividends. The free cash flow model is based on the present value of future cash flows.

Stock prices are affected by those factors that affect future cash flows or the required rate of return by investors. Economic conditions, market conditions, and firm-specific conditions can affect a firm’s cash flows or the required rate of return.

Many investors rely on analyst recommendations when making investment decisions. Analysts can have a major impact on the value of a stock because of their influence on the demand for a stock by investors. Recently, analysts have come under scrutiny, as their recommendations tend to be overly optimistic.

The risk of a stock is measured by its volatility, its beta, or its value-at-risk estimate. Investors are giving more attention to risk measurement in light of abrupt downturns in the prices of some stocks in recent years.

Stock market efficiency implies that stock prices reflect all available information. Weak-form efficiency suggests that security prices reflect all trade-related information, such as historical security price movements and volume of securities trades. Semistrong-form efficiency suggests that security prices fully reflect all public information. Strong-form efficiency suggests that security prices fully reflect all information, including private or insider information. Evidence supports weak-form efficiency to a degree, but there is less support for semistrong or strong-form efficiency.

### Point Counter-Point

**Should the Market Rely on Analysts’ Opinions?**

**Point** Yes. Analysts specialize in recognizing when a stock is under- or overvalued. They are more skilled than most investors. They also have better access to information than investors.

**Counter-Point** No. Even if analysts have better skills and information, they tend to offer overly optimistic projections. They are subject to major conflicts of interest and are unwilling to provide negative reports of stocks.

**Who Is Correct?** Use the Internet to learn more about this issue. Offer your own opinion on this issue.

Summary

- Stocks are commonly valued using the price-earnings (PE) method, the dividend discount model, or the free cash flow model. The PE method applies the industry PE ratio to the firm’s earnings to derive its value. The dividend discount model estimates the value as the present value of expected future dividends. The free cash flow model is based on the present value of future cash flows.

- Stock prices are affected by those factors that affect future cash flows or the required rate of return by investors. Economic conditions, market conditions, and firm-specific conditions can affect a firm’s cash flows or the required rate of return.

- Many investors rely on analyst recommendations when making investment decisions. Analysts can have a major impact on the value of a stock because of their influence on the demand for a stock by investors. Recently, analysts have come under scrutiny, as their recommendations tend to be overly optimistic.

- The risk of a stock is measured by its volatility, its beta, or its value-at-risk estimate. Investors are giving more attention to risk measurement in light of abrupt downturns in the prices of some stocks in recent years.

- Stock market efficiency implies that stock prices reflect all available information. Weak-form efficiency suggests that security prices reflect all trade-related information, such as historical security price movements and volume of securities trades. Semistrong-form efficiency suggests that security prices fully reflect all public information. Strong-form efficiency suggests that security prices fully reflect all information, including private or insider information. Evidence supports weak-form efficiency to a degree, but there is less support for semistrong or strong-form efficiency.
Questions and Applications

1. **Price-Earnings Model** Explain the use of the price-earnings ratio for valuing a stock. Why might investors derive different valuations for a stock when using the price-earnings method? Why might investors derive an inaccurate valuation of a firm when using the price-earnings method?

2. **Dividend Discount Model** Describe the dividend discount valuation model. What are some limitations of the dividend discount model?

3. **Impact of Economic Growth** Explain how economic growth affects the valuation of a stock.

4. **Impact of Interest Rates** How are the interest rate, the required rate of return on a stock, and the valuation of a stock related?

5. **Impact of Inflation** Assume that the expected inflation rate has just been revised upward by the market. Would the required return by investors who invest in stocks be affected? Explain.

6. **Impact of Exchange Rates** Explain how the value of the dollar affects stock valuations.

7. **Investor Sentiment** Explain why investor sentiment can affect stock prices.

8. **January Effect** Describe the January effect.

9. **Earnings Surprises** How do earnings surprises affect valuations of stocks?

10. **Impact of Takeover Rumors** Why can expectations of an acquisition affect the value of the target’s stock?

11. **Analyst Recommendations** How do analyst recommendations affect stock valuations?

12. **Analyst Conflicts of Interest** What conflicts of interest are faced by many analysts who rate stocks?

13. **Stock Portfolio Volatility** Identify the factors that affect a stock portfolio’s volatility and explain their effects.

14. **Beta** Explain how to estimate the beta of a stock. Explain the logic regarding how beta serves as a measure of the stock’s risk.

15. **Wall Street** In the movie *Wall Street*, Bud Fox is a broker who conducts trades for Gordon Gekko’s firm. Gekko purchases shares of firms he believes are undervalued. Various scenes in the movie offer excellent examples of concepts discussed in this chapter.

a. Bud Fox makes the comment to Gordon Gekko that a firm’s breakup value is twice its market price. What is Bud suggesting in this statement? How would employees of the firm respond to Bud’s statement?

b. Once Bud informs Gekko that another investor, Mr. Wildman, is secretly planning to acquire a target firm in Pennsylvania, Gekko tells Bud to buy a large amount of this stock. Why?

c. Gekko states “Wonder why fund managers can’t beat the S&P 500? Because they are sheep.” What is Gekko’s point? How does it relate to market efficiency?

16. **Market Efficiency** Explain the difference between weak-form, semistrong-form, and strong-form efficiency. Which of these forms of efficiency is most difficult to test? Which is most likely to be refuted? Explain how to test weak-form efficiency in the stock market.

17. **Market Efficiency** A consulting firm was hired to determine whether a particular trading strategy could generate abnormal returns. The strategy involved taking positions based on recent historical movements in stock prices. The strategy did not achieve abnormal returns. Consequently, the consulting firm concluded that the stock market is weak-form efficient. Do you agree? Explain.

Advanced Questions


19. **Implied Volatility** Explain the meaning and use of implied volatility.

20. **Leveraged Buyout** At the time a management group of RJR Nabisco initially considered engaging in a leveraged buyout, RJR’s stock price was less than $70 per share. Ultimately, RJR was acquired by the firm Kohlberg, Kravis, and Roberts (KKR) for about $108 per share. Does the large discrepancy between the stock price before an acquisition was considered versus after the acquisition mean that RJR’s price was initially undervalued? If so, does this imply that the market was inefficient?

21. **How Stock Prices May Respond to Prevailing Conditions** Consider the prevailing conditions that could affect the demand for stocks, including inflation, the economy, the budget deficit, the
Fed’s monetary policy, political conditions, and the general mood of investors. Based on these conditions, do you think stock prices will increase or decrease during this semester? Offer some logic to support your answer. Which factor do you think will have the biggest impact on stock prices?

22. Reducing Analyst Conflicts of Interest Explain why analysts at investment banks sometimes face conflicts of interest when rating a firm. Explain how stock exchange rules were adjusted to reduce the conflicts of interest.

Interpreting Financial News

Interpret the following statements made by Wall Street analysts and portfolio managers:

a. “The stock market’s recent climb has been driven by falling interest rates.”

b. “Future stock prices are dependent on the Fed’s policy meeting next week.”

c. “Given a recent climb in stocks that cannot be explained by fundamentals, a correction is inevitable.”

Managing in Financial Markets

Stock Portfolio Dilemma As an investment manager, you frequently make decisions about investing in stocks versus other types of investments and about types of stocks to purchase.

a. You have noticed that investors tend to invest more heavily in stocks after interest rates have declined. You are considering this strategy as well. Is it rational to invest more heavily in stocks once interest rates have declined?

b. Assume that you are about to select a specific stock that will perform well in response to an expected runup in the stock market. You are very confident that the stock market will perform well in the near future. Recently, a friend recommended that you consider purchasing stock of a specific firm because it had decent earnings over the last few years, it has a low beta (reflecting a low degree of systematic risk), and its beta is expected to remain low. You normally rely on beta as a measurement of a firm’s systematic risk. Should you seriously consider buying that stock? Explain.

c. You are considering an investment in an initial public offering (IPO) by Marx Company, which has performed very well recently, according to its financial statements. The firm will use some of the proceeds from selling stock to pay off some of its bank loans. How can you apply stock valuation models to estimate this firm’s value, when its stock was not publicly traded? Once you estimate the value of the firm, how can you use this information to determine whether to invest in it? What are some limitations in estimating the value of this firm?

d. In the past, your boss assessed your performance based on the actual return on the portfolio of U.S. stocks that you manage. For each quarter in which your portfolio generated an annualized return of at least 20 percent, you received a bonus. Now your boss wants you to develop a method for measuring your performance from managing the portfolio. Offer a method that accurately measures your performance.

e. Assume that you were also asked to manage a portfolio of European stocks. How would your method for measuring your performance in managing this portfolio differ from the method you devised for the U.S. stock portfolio in the previous question?

Problems

1. Risk-Adjusted Return Measurements Assume the following information over a five-year period:

   - Average risk-free rate = 6%
   - Average return for Crane stock = 11%
   - Average return for Load stock = 14%
   - Standard deviation of Crane stock returns = 2%
   - Standard deviation of Load stock returns = 4%
   - Beta of Crane stock = 0.8
   - Beta of Load stock = 1.1

   Determine which stock has higher risk-adjusted returns when using the Sharpe index. Which stock has higher risk-adjusted returns when using the Treynor index? Show your work.

2. Measuring Expected Return Assume Mess stock has a beta of 1.2. If the risk-free rate is 7 percent and the market return is 10 percent, what is the expected return of Mess stock?
3. **Using the PE Method** You found that IBM is expected to generate earnings of $4.38 per share this year and that the mean PE ratio for its industry is 27.195. Using the PE valuation method, what should be the value of IBM shares?

4. **Using the Dividend Discount Model** Suppose that you are interested in buying the stock of a company that has a policy of paying a $6 per share dividend every year. Assuming no changes in the firm’s policies, what is the value of a share of stock if the required rate of return is 11 percent?

5. **Using the Dividend Discount Model** Micro, Inc. will pay a dividend of $2.30 per share next year. If the company plans to increase its dividend by 9 percent per year indefinitely, and you require a 12 percent return on your investment, what should you pay for the company’s stock?

6. **Using the Dividend Discount Model** Suppose you know that a company just paid an annual dividend of $1.75 per share on its stock and that the dividend will continue to grow at a rate of 8 percent per year. If the required return on this stock is 10 percent, what is the current share price?

7. **Deriving the Required Rate of Return** The next expected annual dividend for Sun, Inc. will be $1.20 per share, and analysts expect the dividend to grow at an annual rate of 7 percent indefinitely. If Sun stock currently sells for $22 per share, what is the required rate of return?

8. **Deriving the Required Rate of Return** A share of common stock currently sells for $110. Current dividends are $8 per share annually and are expected to grow at 6 percent per year indefinitely. What is the rate of return required by investors in the stock?

9. **Deriving the Required Rate of Return** A stock has a beta of 2.2, the risk-free rate is 6 percent, and the expected return on the market is 12 percent. Using the CAPM, what would you expect the required rate of return on this stock to be? What is the market risk premium?

10. **Deriving the Stock’s Beta** You are considering investing in a stock that has an expected return of 13 percent. If the risk-free rate is 5 percent and the market risk premium is 7 percent, what must the beta of this stock be?

11. **Measuring Stock Returns** Suppose you bought a stock at the beginning of the year for $76.50. During the year, the stock paid a dividend of $0.70 per share and had an ending share price of $99.25. What is the total percentage return from investing in that stock over the year?

12. **Measuring the Portfolio Beta** Assume the following information:
   - Beta of IBM = 1.31
   - Beta of LUV = 0.85
   - Beta of ODP = 0.94
   If you invest 40 percent of your money in IBM, 30 percent in LUV, and 30 percent in ODP, what is your portfolio’s beta?

13. **Measuring the Portfolio Beta** Using the information from Problem 12, suppose that you instead decide to invest $20,000 in IBM, $30,000 in LUV, and $50,000 in ODP. What is the beta of your portfolio now?

14. **Value at Risk** IBM has a beta of 1.31.
   a. If you assume that the stock market has a maximum expected loss of −3.2 percent on a daily basis (based on a 95 percent confidence level), what is the maximum daily loss for the IBM stock?
   b. If you have $19,000 invested in IBM stock, what is your maximum daily dollar loss?

15. **Value at Risk** If your portfolio beta was calculated to be 0.89 and the stock market has a maximum expected loss of −2.5 percent on a daily basis, what is the maximum daily loss to your portfolio?

16. **Dividend Model Relationships**
   a. When computing the price of a stock with a dividend discount model, determine how the price of a stock would be affected if the required rate of return is increased. Explain the logic of this relationship.
   b. When computing the price of a stock using the constant-growth dividend discount model, determine how the price of a stock would be affected if the growth rate is reduced. Explain the logic of this relationship.

17. **CAPM Relationships**
   a. When using the CAPM, determine how the required rate of return on a stock would be affected if the risk-free rate is lower.
   b. When using the CAPM, determine how the required rate of return on a stock would be affected if the market return is lower.
   c. When using the CAPM, determine how the required rate of return on a stock would be affected if the beta is higher.
18. **Value at Risk**

a. How is the maximum expected loss of a stock affected by an increase in the volatility (standard deviation), based on a 95 percent confidence interval?

b. Determine how the maximum expected loss of a stock would be affected by an increase in the expected return of the stock, based on a 95 percent confidence interval.

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**Flow of Funds Exercise**

**Valuing Stocks**

Recall that if the economy continues to be strong, Carson Company may need to increase its production capacity by about 50 percent over the next few years to satisfy demand. It would need financing to expand and accommodate the increase in production. Recall that the yield curve is currently upward sloping. Also recall that Carson is concerned about a possible slowing of the economy because of potential Fed actions to reduce inflation. It is also considering issuing stock or bonds to raise funds in the next year. If Carson goes public, it might even consider using its stock as a means of acquiring some target firms. It would also consider engaging in a secondary offering at a future point in time if the IPO is successful and if its growth continues over time. It would also change its compensation system so that most of its managers would receive about 30 percent of their compensation in shares of Carson stock and the remainder as salary.

a. At the present time, the price-earnings (PE) ratio (stock price per share divided by earnings per share) of other firms in Carson’s industry is relatively low but should rise in the future. Why might this information affect the time at which Carson issues its stock?

b. Assume that Carson Company believes that issuing stock is an efficient means of circumventing the potential for high interest rates. Even if long-term interest rates have increased by the time it issues stock, Carson thinks that it would be insulated by issuing stock instead of bonds. Is this view correct?

c. Carson Company recognizes the importance of a high stock price at the time it engages in an IPO (if it goes public). But why would its stock price be important to Carson Company even after the IPO?

d. If Carson Company goes public, it may be able to motivate its managers by granting them stock as part of their compensation. Explain why the stock may motivate them to perform well. Then explain why the use of stock as compensation may motivate them to use a very short-term focus, even though they are supposed to focus on maximizing shareholder wealth over the long run. How can a firm provide stock as motivation but prevent the managers from using a very short-term focus?

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**Internet/Excel Exercises**

1. Go to [http://finance.yahoo.com/?u](http://finance.yahoo.com/?u). Compare the performance of the Dow, Nasdaq, and S&P 500 indexes. Click on each of these indexes and describe the trend for that index since January. Which index has had the best performance?

2. Go to [http://finance.yahoo.com/](http://finance.yahoo.com/), type in the symbol DELL (for Dell, Inc.) and click on “Get Quotes.” Then go to the bottom of the stock price chart and retrieve the end-of-month stock price of Dell over the last 12 months. Record this information on an Excel spreadsheet and estimate the standard deviation of the stock’s price movements. [See Appendix B for guidance on how to estimate the standard deviation of a stock’s price movements.] Repeat the process for Oracle Corporation (its symbol is ORCL). Which stock is riskier based on your analysis?

3. Assume that the expected return on Dell stock and Oracle stock is 0 percent for the next month. Use the value-at-risk method to determine the maximum expected loss of Dell and Oracle for the next month, based on a 95 percent confidence level.
Review Section C of a recent issue of *The Wall Street Journal*. Notice that the stocks with the largest one-day gains and losses are shown. Do an Internet search for news about the stock with the biggest gain. What is the reason for the gain? Repeat the exercise for the stock with the biggest loss.
In a publicly traded firm, the managers who run the firm are separate from the investors who own it. Managers are hired to serve as agents of the corporation and are expected to serve the interests of the firm's shareholders by making decisions that maximize the value of the firm. The firm's management is required to provide substantial information about the firm's financial condition and performance. Shareholders and other investors use this information to monitor management and to value the firm. For example, if investors use the price-earnings method to derive a valuation, they rely on the reported earnings. If they use the dividend discount model, they may derive an expected growth rate from recently reported earnings or revenue figures. If they use the adjusted dividend discount model, they may rely on financial statements to estimate future cash flows.

If firms provide inaccurate financial information, investors will derive inaccurate valuations, and money will flow to the wrong sources in the stock markets. In addition, inaccurate financial information creates more risk for stocks because investors must worry about the uncertainty surrounding the reported financial statement numbers. If financial statement data are questionable, stock values may decline whenever investors recognize that the earnings or some other proxy used to estimate cash flows is overstated. Investors will require a higher rate of return to hold stocks subject to downside risk because of distorted accounting. Thus, deceptive accounting practices disrupt the stock market and increase the cost of capital raised by issuing of stock.

To ensure that managers serve shareholder interests, firms commonly tie managerial compensation to the stock price. For example, managers may be granted stock options that allow them to buy the firm's stock at a specified price over a specified time period (such as the next five years). In this way, the managers benefit directly from a high stock price just like other shareholders and thus should make decisions that result in a high stock price for the shareholders.

Unfortunately, some managers recognize that it may be easier to increase their stock's price by manipulating the financial statements than by improving the firm's operations. When the firm's reported earnings are inflated, investors will likely overestimate the value of its stock, regardless of the method they use to value stocks.

Managers may be tempted to temporarily inflate reported earnings because doing so may temporarily inflate the stock's price. If no limits are imposed on the stock options granted, managers may be able to exercise their options (buying the stock at the price specified in the option contracts) during this period of a temporarily inflated price and immediately sell the stock in the secondary market. They can capitalize on the inflated stock price before other investors realize that the earnings and stock price are inflated.
Problems with Creative Accounting

Managers would not be able to manipulate a firm’s financial information if accounting rules did not allow them to be creative. The accounting for a firm’s financial statement items is guided by generally accepted accounting principles (GAAP) set by the Financial Accounting Standards Board (FASB). However, these guidelines allow for substantial flexibility in accounting, which means that there is no standard formula for converting accounting numbers into cash flows. The accounting confusion is compounded by the desire of some managers to inflate their firm’s earnings in particular periods when they wish to sell their holdings of the firm’s stock. Specifically, the accounting can inflate revenue in a particular period without inflating expenses or defer the reporting of some expenses until a future quarter. Investors who do not recognize that some of the accounting numbers are distorted may overestimate the value of the firm.

Creative Classification of Expenses

When a firm discontinues one of its business projects, it commonly records this as a writeoff, or a onetime charge against earnings. Investors tend to ignore writeoffs when estimating future expenses because they do not expect them to occur again. Some firms, however, shift a portion of their normal operating expenses into the writeoff, even though those expenses will occur again in the future. Investors who do not recognize this accounting gimmick will underestimate the future expenses.

As a classic example of shifting expenses, WorldCom attempted to write off more than $7 billion following the acquisition of MCI in 1998. When the Securities and Exchange Commission (SEC) questioned this accounting, WorldCom changed the amount to about $3 billion. If it had succeeded in including the extra $4 billion in the writeoff, it could have reduced its reported operating expenses by $4 billion. Thus, investors who trusted WorldCom’s income statement would have underestimated its future expenses by about $4 billion per year and therefore would have grossly overestimated the value of the stock.

Earnings Restatements: After the Damage Is Done

When firms go beyond the loose accounting guidelines, the SEC may require them to restate their earnings and provide a corrected set of financial statements. In recent years, the SEC has forced hundreds of firms to restate their earnings, but the investors who lost money because they trusted a firm’s distorted accounting were not reimbursed.

Governance Applied to Prevent Distorted Accounting

Several types of governance can be used to attempt to prevent firms from using distorted accounting, as explained next.

Auditing

Firms are required to hire auditors to audit their financial statements and verify that the statements are within the accounting guidelines. The auditors, however, rely on these firms for their future business. Many large firms pay auditors more than
$1 million per year for their auditing services and also for nonauditing services. Thus, the auditors may be tempted to sign off on distorted accounting so that they will be rehired by their clients in the future. If the auditors uphold proper standards that force their clients to revise their reported earnings, they may not be hired again. The temptation to sign off on creative accounting used by client firms is especially strong given the subjectivity allowed by the accounting rules. Auditors may be more willing to sign off on financial statements that are somewhat confusing but do not directly violate accounting rules.

**Board of Directors**

A firm’s board of directors is expected to represent the firm’s shareholders. The directors oversee the firm’s financial reporting process and should attempt to ensure that the financial information provided by the firm is accurate. However, some boards have not forced managers to accurately disclose their financial condition. A board can be ineffective if it is run by insiders who are the same managers that the board is supposed to monitor. Board members who are managers of the firm (insiders) are less likely to scrutinize the firm’s management. In recent years, many firms have increased the proportion of independent board members (outsiders), who are not subject to pressure from the firm’s executives. Even some independent board members, however, have strong ties to the firm’s employees or receive substantial consulting income beyond their compensation for serving on the board. Thus, they may be willing to overlook distorted accounting or other unethical behavior in order to maintain their existing income stream from the firm.

Recently, several proposals have been made to try to increase the independence of board members. For example, on January 9, 2003, the Commission on Public Trust and Private Enterprise released its recommendations to improve corporate governance. The Commission is a panel of the Conference Board, and its purpose is to address the widespread abuses that led to corporate scandals and declining public trust in companies, their leaders, and U.S. capital markets. The Commission issues best-practices guidelines.

Among its recommendations was that each corporation should consider separating the offices of chair of the board and CEO. Furthermore, the board chair should be an independent director. The Commission also recommended that a Lead Independent Director position should be established in cases where the chair is not an independent director. In addition, the Commission recommended that a Presiding Director position be established in cases where a corporation does not separate the functions of chair of the board and CEO.

**Compensation of Board Members**

Some boards are ineffective because of the way the board members are compensated. If board members receive stock options from the firm as compensation, the options’ value is tied to the firm’s stock price. Consequently, some board members may be tempted to ignore their oversight duties, as they may benefit from selling their shares of the stock (received as compensation) while the price is temporarily inflated. Meanwhile, shareholders who hold their stock for a longer time period will be adversely affected once the market recognizes that the financial statements are distorted.

Board members are more likely to serve the long-term interests of shareholders if they are compensated in a manner that encourages them to maximize the long-term value of the firm. If they are provided stock that they cannot sell for a long-term period, they are more likely to focus on maximizing the long-term value of the firm.
Recent regulations address the issue of potential abuses resulting from granting stock options to managers and board members. On July 1, 2003, the SEC ruled that corporations listed on the New York Stock Exchange (NYSE) or the Nasdaq market must have shareholder approval before giving executives company stock or options. The rules were drafted and approved by the NYSE and Nasdaq. In addition, the FASB recently required that corporations expense their executive stock options on their income statements. This increases transparency in financial reporting and might improve corporate governance.

**Board’s Independent Audit Committee** Some board members may serve on an independent audit committee, which is responsible for monitoring the firm’s auditor. The committee is expected to ensure that the audit is completed without conflicts of interest so that the auditors will provide an unbiased audit. Some boards have not prevented distorted audits, however, either because they did not recognize the conflicts of interest or because they were unwilling to acknowledge them.

**Role of Credit Rating Agencies** Investors may also rely on credit rating agencies such as Standard & Poor’s or Moody’s to assess a firm’s risk level. However, these agencies do not always detect a firm’s financial problems in advance. They normally focus on assessing a firm’s risk level based on the financial statements provided, rather than on determining whether the financial statements are accurate. The agencies may assume that the financial statements are accurate because they were verified by an auditor.

**Role of the Market for Corporate Control** In the market for corporate control, firms that perform poorly should be acquired and reorganized by other more efficient firms (called raiders). The raiders have an incentive to seek out inefficient firms because they can buy them at a low price (reflecting their poor performance) and remove their inefficient management. Nevertheless, the market for corporate control does not necessarily prevent faulty accounting. First, raiders may not be able to identify firms that inflated their earnings. Second, firms that have inflated their earnings are probably overvalued, and raiders will not want to acquire them at their inflated price. Third, an acquisition involves substantial costs of integrating businesses, and there is the risk that these costs will offset any potential benefits.

**The Enron Scandal** The most famous recent example of the use of creative accounting occurred at Enron Corporation. Enron was formed in 1985 from the merger of two natural gas pipeline companies. It grew relatively slowly until the 1990s when the deregulation of the utilities industry presented new opportunities. Enron began to expand in several directions. It acquired power plants in the United States and also expanded internationally, acquiring a power distributor in Brazil, a power plant in India, and a water company in the United Kingdom, among others. Perhaps most importantly, it took advantage of the new deregulated environment to pioneer the trading of natural gas and electricity. Soon it had branched out beyond simple energy trading to trade such instruments as weather derivatives. In 1999, it introduced Enron Online, an Internet-based trading platform that gave the company the appeal of an “Internet stock” at a time when such stocks were highly desired. The company introduced online trading of metals, wood products, and even broadband capacity, as well as energy. All of this enabled Enron to grow to become the seventh largest firm in the United States in terms of gross revenues by 2000.
Most investors were caught by surprise when Enron began to experience financial problems in October 2001 and then filed for bankruptcy on December 2, 2001. At the time, it was the largest U.S. firm to go bankrupt. In retrospect, Enron’s stock may have been overvalued for many years, but some investors and creditors were fooled by its financial statements. The Enron fiasco received much publicity because it demonstrated how a firm could manipulate its financial statements, and therefore manipulate its valuation, in spite of various controls designed to prevent that type of behavior. This section offers some insight into why investor valuations and risk assessments of Enron were so poor.

**Enron’s Letter to Its Shareholders**

If investors trusted the claims made by Enron in its annual report, it is understandable that they would value the stock highly. The letter to shareholders in Enron’s 2000 annual report included the following statements:

- “Enron’s performance in 2000 was a success by any measure, as we continued to outdistance the competition and solidify our leadership in each of our businesses.
- Enron has built unique and strong businesses that have limitless opportunities for growth.
- At a minimum, we see our market opportunities company-wide tripling over the next five years.
- Enron is laser-focused on earnings per share, and we expect to continue strong performance.
- Enron is increasing earnings per share and continuing our strong return to shareholders.
- The company’s total return to shareholders was 89% in 2000, compared with a –9% returned by the S&P 500.
- The 10-year return to Enron shareholders was 1,415%, compared with 383% for the S&P 500.
- We plan to . . . create significant shareholder value for our shareholders.”

**Enron’s Stock Valuation**

Normally, the valuation of a firm is obtained by using the firm’s financial statements to derive cash flows and to derive a required rate of return that is used to discount the cash flows. Enron’s valuation was excessive because of various irregularities in its financial statements.

**Estimating Cash Flows** Since Enron’s earnings were distorted, the estimates of its cash flows derived from those earnings were also distorted. Moreover, Enron’s earnings were manipulated to create the perception of consistent earnings growth, which tempted investors to apply a high growth rate when estimating future cash flows.

**Estimating the Required Rate of Return** Investors can derive a required rate of return as the prevailing long-term risk-free interest rate plus the firm’s risk premium. The risk premium can be measured by the firm’s existing degree of financial leverage, its ability to cover interest payments with operating earnings, and its sensitivity to market movements.

Until the accounting distortions were publicized, Enron’s risk was underestimated. The company concealed much of its debt by keeping it off its consolidated
financial statements, as will be explained shortly. Consequently, investors who estimated Enron’s sensitivity to market movements using historical data were unable to detect Enron’s potential for failure. As a result, they used a lower risk premium than was appropriate. Thus, the financial statements caused investors both to overestimate Enron’s future cash flows and to underestimate its risk. Both effects led to a superficially high stock price.

**Applying Market Multiples** Given the difficulty of estimating cash flows and the required rate of return, some investors may have tried to value Enron’s stock by using market multiples. Determining the appropriate PE multiple for Enron was also difficult, however, because its reported earnings did not represent its real earnings.

Another problem with applying the industry PE method to Enron was the difficulty of identifying the proper industry. One of the company’s main businesses was trading various types of energy derivative contracts. Enron did not want to be known as a trading company, however, because the valuations of companies such as investment banks that engage in trading are generally lower for a given level of earnings per share.

**Enron’s Managerial Motives**

One of the main reasons for Enron’s problems was its management. Managers are expected to maximize the value of the firm’s stock. Like many firms, Enron granted stock options to some of its managers as a means of motivating them to make decisions that would maximize the value of its stock. However, Enron’s management seemed to focus more on manipulating the financial statements to create a perception of strong business performance than on improving the actual performance. By manipulating the financial statements, Enron consistently met its earnings forecasts and increased its earnings over 20 consecutive quarters leading up to 2001. In this way, it created a false sense of security about its performance, thereby increasing the demand for its stock. This resulted in a superficially high stock price over a period in which some managers sold their stock holdings. Twenty-nine Enron executives or board members sold their holdings of Enron stock for more than $1 billion in total before the stock price plummeted.

**Internal Monitoring** Some firms use internal monitoring to ensure some degree of control over managers and encourage them to make decisions that benefit shareholders. Unfortunately, Enron’s internal monitoring was also susceptible to manipulation. For example, managers were periodically required to measure the market value of various energy contracts that the company held. Since there was not an active market for some of these contracts, the prevailing valuations of the contracts were arbitrary. Managers used estimates that resulted in very favorable valuations, which in turn led to a higher level of reported performance and higher managerial compensation.

**Monitoring by the Board of Directors** The board members serve as representatives of the firm’s shareholders and are responsible for ensuring that the managers serve shareholder interests. In fact, board members are commonly compensated with stock so that they have an incentive to ensure that the stock price is maximized. In the case of Enron, some board members followed executives in selling their shares while the stock price was superficially high.

**Enron’s Financial Statement Manipulation**

Some of the methods Enron used to report its financial conditions were inconsistent with accounting guidelines. Other methods were within the rules, but were mislead-
ing. Consequently, many investors invested in Enron without recognizing financial problems that were hidden from the financial statements. Some of these investors lost most or all of their investment.

**Accounting for Partnerships** One of the most common methods used by Enron to manipulate its financial statements involved the transfer of assets to partnerships that it owned called special-purpose entities (SPEs). It found outside investors to invest at least 3 percent of each partnership’s capital. Under accounting guidelines, a partnership with this minimum level of investment from an outside investor does not have to be classified as a subsidiary. Since Enron did not have to classify its SPEs as subsidiaries, it did not have to include the financial information for them in its consolidated financial statements. Thus, the debt related to the SPEs was removed from Enron’s consolidated financial statements. Since most investors focused on the consolidated financial statements, they did not detect Enron’s financial problems.

In addition, whenever Enron created a partnership that would buy one of its business segments, it would book a gain on its consolidated financial statements from the sale of the asset to the partnership. Losses from a partnership would be booked on the partnership’s financial statements. Thus, Enron was booking gains from its partnerships on its consolidated financial statements while hiding their losses. On November 8, 2001, Enron announced that it was restating its earnings for the previous five years because three of its partnerships should have been included in the consolidated financial statements. This announcement confirmed the suspicion of some investors that previous earnings figures were exaggerated. Enron’s previously reported earnings were reduced by about $600 million over the previous five years, but the correction came too late for many investors who had purchased Enron stock when the reported earnings (and share price) were much higher.

**Financing of Partnerships** Enron’s partnerships were financed by various creditors such as banks. The loans were to be paid off either from the cash flow generated by the assets transferred to the partnership or from the ultimate sale of the assets. When the partnerships performed poorly, they could not cover their debt payments. In some cases, Enron backed the debt with its stock, but as its stock price plummeted, this collateral no longer covered the debt, setting in motion the downward spiral that ultimately led to the company’s bankruptcy.

**Arthur Andersen’s Audit** Investors and creditors commonly presume that financial statements used to value a firm are accurate when they have been audited by an independent accounting firm. In reality, however, the auditor and the firm do not always have an arm’s length relationship. The accounting firm that conducts an audit is paid for the audit and recognizes the potential annuity from repeating this audit every year. In addition, accounting firms that provide auditing services also provide consulting services. Enron hired Arthur Andersen both to serve as its auditor and to provide substantial consulting services. In 2000, Arthur Andersen received $25 million in auditing fees from Enron and an additional $27 million in consulting fees.

Although Arthur Andersen was supposed to be completely independent, it recognized that if it did not sign off on the audit, it would lose this lucrative audit and consulting business. Furthermore, the annual bonus an accounting firm pays to its employees assigned to audit a client may be partially based on their billable hours, which would have been reduced if the firm’s relationship with such a large client was severed.
Oversight by Investment Analysts

Even if financial statements are contrived, some investors may presume that investment analysts will detect discrepancies. If analysts simply accept the financial statements, however, rather than questioning their accuracy, the analysts will not necessarily serve as a control mechanism. The difficulties analysts faced in interpreting Enron’s financial statements are highlighted by a humorous list created by some Enron employees of why the company restructured its operations so frequently. Reason number 7 was “Because the basic business model is to keep the outside investment analysts so confused that they will not be able to figure out that we do not know what we are doing.” The humor now escapes some analysts, as well as some creditors and investors.

Another problem, though, is that like the supposedly independent auditors who hope to generate more business for their accounting firm, investment analysts may encounter a conflict of interest when they attempt to rate firms. As explained earlier, analysts employed by securities firms have been criticized for assigning very high ratings to firms they cover so that their employer may someday receive some consulting business from those firms.

As an example of what can happen to analysts who are “too critical,” consider the experience of an analyst at BNP Paribus who downgraded Enron in August 2001, a few months before the company’s financial problems became public. At the time, BNP Paribus was providing some consulting services for Enron. The analyst was demoted and then fired shortly after his downgrade of Enron. To the extent that many other analysts were subjected to a similar conflict of interest, it may explain why they did not downgrade Enron until after its financial problems were publicized. Even if analysts had detected financial problems at Enron, they might have been reluctant to lower their rating.

Market for Corporate Control

As explained earlier, if a firm’s managers are running a firm into the ground, a raider has an incentive to purchase that firm at a low price and improve it so that it can be sold someday for a much higher price. However, this theory presumes that the stock price of the firm properly reflects its actual business performance. If the firm’s financial statements reflect strong performance, a raider will not necessarily realize that the firm is experiencing financial problems. Moreover, even if the raider is able to detect the problems, it will not be willing to pursue a firm whose value is overpriced by the market because of its contrived financial statements.

When Enron’s stock price was high, few raiders could have afforded to acquire it. Once the stock price plummeted, Dynegy considered an acquisition of Enron. Dynegy quickly backed off, however, even though the stock price had fallen 90 percent from its high. Dynegy said it was concerned about problems it found when trying to reconcile Enron’s cash position with what its financial statements suggested (among other reasons).

Monitoring by Creditors

Enron relied heavily on creditors for its financing. Since Enron’s consolidated financial statements showed a superficially high level of earnings and a low level of debt, it had easy access to credit from a wide variety of creditors. Enron maintained a low cost of capital by using contrived statements that concealed its risk. Its balance sheet showed debt of $13 billion, but by some accounts, the actual amount of its debt was $20 billion. The hidden debt concealed Enron’s true degree of financial leverage.

Bank of America and J.P. Morgan Chase each had exposure estimated at $500 million. Many other banks had exposure estimated at more than $100 million. They
would not have provided so much credit if they had fully understood Enron’s financial situation.

Even the debt rating agencies had difficulty understanding Enron’s financial situation. On October 16, 2001, Enron announced $2 billion in writeoffs that would reduce its earnings. At this time, Standard & Poor’s, the debt rating agency, affirmed Enron’s rating at BBB+, along with its opinion that Enron’s balance sheet should improve in the future. Over the next 45 days, S&P became more aware of Enron’s financial condition and lowered its rating to junk status.

Many of Enron’s creditors attempted to sue Enron once it became clear that the financial statements were misrepresented. By this time, however, Enron’s value was depleted, as its price had already fallen to less than $1 per share.

Oversight by Regulators

The Enron fiasco prompted questions about whether additional regulations should be implemented to ensure proper disclosure of financial information. In particular, the accounting guidelines for the SPE partnerships and the potential conflict of interest between the audit and consulting segments of accounting firms are currently receiving much attention.

SPE Partnerships

The FASB had discussed possible changes in reporting standards for SPE partnerships over the 20 years prior to the Enron fiasco. Nevertheless, it never took any action to correct this obvious means of hiding debt from consolidated financial statements. Perhaps this event will prompt the FASB to take some initiative.

Conflict between Audit and Consulting Duties

In 2000, the SEC proposed a rule to prevent the potential conflict of interest for accounting firms that provide auditing and consulting services to a given client. It proposed that an accounting firm should provide either auditing or consulting services, but not both types of services. This proposal met strong resistance. Several accounting firms and the American Institute of Certified Public Accountants (AICPA) lobbied members of Congress to discourage the SEC from pushing this proposal. At least 50 members of Congress wrote to the SEC, objecting to the proposal. Most of the letters came from members who had received donations from the accounting lobby. Of the 14 senators who wrote to the SEC, 11 were on the Banking Committee, which could influence the future funding for the SEC. The chairman of that committee received about $200,000 in contributions from the accounting lobby over the 1995–2000 period. His wife was on the board of directors at Enron. Twenty of the House members who wrote to the SEC were on the Energy and Commerce Committee. The chairman of this committee received about $143,000 in donations from the accounting lobby. Overall, the members of Congress who wrote letters to the SEC objecting to the accounting proposal received more than $3.5 million from the accounting lobby.

Prevention of Accounting Fraud

In response to the accounting fraud at Enron and other firms, regulators are attempting to ensure more accurate financial disclosure by firms. Stock exchanges have instituted new regulations for listed firms. The SEC has been given more resources and power to monitor financial reporting. Perhaps the most important regulatory changes have occurred as a result of the Sarbanes-Oxley Act of 2002. Some of the act’s more important provisions were summarized in Chapter 10.
Discussion Questions

The following discussion questions focus on the use of financial statements in the valuation of firms. They should generate much discussion, especially when accounting and finance students are present. These questions can be used in several ways. They may serve as an assignment on a day that the professor is unable to attend class. They are also useful for small group exercises. For each issue, one group could be randomly selected and asked to present their solution. Then, other students not in that group may suggest alternative answers if they feel that the solution can be improved. Each issue does not necessarily have a perfect solution, so students should be able to present different points of view.

1. Should an accounting firm be required to provide only auditing services or consulting services? Explain your answer. If an accounting firm is allowed to offer only one service, might there be any conflicts of interest due to referrals (and finder’s fees)?

2. Should members of Congress be allowed to set regulations on accounting and financial matters while receiving donations from related lobbying groups?

3. What alternative sources of information about a firm should investors rely on if they cannot rely on financial statements?

4. Should investors have confidence in ratings by analysts who are affiliated with securities firms that provide consulting services to firms? Explain.

5. Does an analyst who is employed by a securities firm and is assigned to rate firms face a conflict of interest? What is a solution to this potential conflict?

6. How might a firm’s board of directors discourage its managers from attempting to manipulate financial statements to create a temporarily high stock price?

7. How can the compensation of a firm’s board of directors be structured so that the board members will not be tempted to allow accounting or other managerial decisions that could cause a superficially high price over a short period?