

Chapter 11

Stock Valuation and Risk

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Key Concepts

1. Explain stock valuation models.
2. Explain how to assess the risk of stocks and stock portfolios.

POINT/COUNTER-POINT: Is The Stock Market Efficient?

POINT: Yes. Investors fully incorporate all available information when trading stocks. Thus, the prices of stocks fully reflect all information.

COUNTER-POINT: No. The high degree of stock price volatility offers evidence of how much disagreement there is among stock prices. The fact that many stocks declined by more than 40 percent during the end of 2008 and beginning of 2009 suggests that stock prices are not always properly valued to reflect available information.

WHO IS CORRECT? Use the Internet to learn more about this issue and then formulate your own opinion.

ANSWER: There is no perfect answer, and there are valid arguments for and against whether markets are efficient. However, an abrupt decline of stock prices does not refute market efficiency. If new information about stock market conditions (such as a weakening economy) occurs, prices could possibly fully reflect all information and yet adjust abruptly as the new information becomes available.

Questions

1. **Price-Earnings Model.** Explain the use of the price-earnings (PE) 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?

ANSWER: Investors can value a stock by applying the industry PE ratio to the firm's expected earnings for the next year. This method implicitly assumes that the growth in earnings in future years will be similar to that of the industry.

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 one-time events. A third reason is that investors may disagree on the firms that should 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, they may disagree on how to weight each firm.

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

ANSWER: The dividend discount valuation model measures the value of a firm as the present value of future expected dividends to be received by the investor. The model can account for uncertainty by allowing dividends to be revised in response to revised expectations about a firm's cash flows, or by allowing the required rate of return to be revised in response to changes in the required rate of return by investors.

The dividend discount model may result in an inaccurate valuation of a firm because of potential errors 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 distribute 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.

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

ANSWER: The firm's value should reflect the present value of its future cash flows. Because earnings are a primary component of corporate cash flows, many investors use forecasted earnings to determine whether a firm's stock is over- or undervalued.

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?

ANSWER: Given a choice of risk-free Treasury securities or stocks, stocks should be purchased only if they are appropriately priced to reflect a sufficiently high expected return above the risk-free rate.

The relation between interest rates and stock prices is not constant over time. However, 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.

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 the stocks be affected? Explain.

ANSWER: An increase in expected inflation can increase the risk-free interest rate, which is a key component of the required rate of return on stocks. Therefore, it should cause an increase in the required rate of return on stocks.

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

ANSWER: The value of the dollar can affect U.S. stock prices for a variety of reasons. First, foreign investors tend 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 corporation'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 value could indirectly affect a firm's stock by putting upward pressure on inflation. A strong dollar would have the opposite indirect impact.

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

ANSWER: Investor sentiment represents the general mood of investors in the stock market. Since the stock valuations reflect expectations, there are some periods in which the stock market performance is not highly correlated with existing economic conditions. For example, stock prices may rise when the economy is weak if most investors expect that the economy will improve in the near future.

8. January Effect. Describe the January effect.

ANSWER: 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.

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

ANSWER: Favorable earnings surprises increase the values of stocks. Negative earnings surprises decrease the values of stocks.

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

ANSWER: 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.

11. Emerging Markets. What are the risks of investing in stocks in emerging markets?

ANSWER: Stocks in emerging markets 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.

12. Stock Volatility During the Credit Crisis. Explain how stock volatility changed during the credit crisis.

ANSWER: Stock prices became much more volatile due to uncertainty about economic conditions. The prices of some stocks were frequently changing by more than 5 percent on a single day.

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

ANSWER: 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. 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.

- 14. Beta.** Explain how to estimate the beta of a stock. Explain why beta serves as a measure of the stock's risk.

ANSWER: 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 regression analysis to derive the slope coefficient as in this model:

$$R_{jt} = B_0 + B_1 R_{mt} + u_t$$

where R_{jt} = return of stock j in time t

R_{mt} = market return

B_0 = intercept

B_1 = regression coefficient that serves as an estimate of beta

u_t = error term

Some investors or analysts prefer to use monthly returns rather than quarterly returns 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.

Beta serves as a measure of the stock's risk because it measures sensitivity to the market. The higher the sensitivity, the more likely that the stock will perform poorly under adverse market conditions.

- 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?

ANSWER: Bud is suggesting that the firm could be acquired and separated into divisions and sold to various firms. The combined value of the individual divisions (when sold) would be worth more than the firm's prevailing market value. Employees of a firm are concerned about comments like this because it means that they may be subject to reorganization (although some employees might benefit from this).

- b. When 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?

ANSWER: Gekko wants to accumulate much of the stock before Mr. Wildman attempts to acquire the target. In this way, Wildman will need to purchase stock from Gekko at a premium to obtain those shares held by Gekko. This strategy is known as greenmail.

- c. Gekko says "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?

ANSWER: Gekko is implying that all fund managers use the same type of information, which is already known by the market. The market prices should already reflect that information. Gekko focuses on obtaining information that is not known by the market to outperform other investors in the market.

- 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.

ANSWER: The weak form suggests that security prices reflect recent price movements and trading information. The semistrong form suggests that security prices reflect all publicly traded information. The strong form suggests that security prices reflect public and private information.

Weak-form efficiency can be tested by searching for a nonrandom pattern in stock prices. If future price movements can be predicted by assessing the past movements, a market inefficiency is detected.

- 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.

ANSWER: Students have their own opinions, but a test of one strategy does not allow for a definite conclusion that weak-form efficiency exists. Some other strategy may still achieve abnormal returns.

Advanced Questions

- 18. Value at Risk.** Describe the value-at-risk method for measuring risk.

ANSWER: Value at risk is a risk measurement that estimates the largest expected loss to a particular investment position for a specified confidence level. It 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 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.

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

ANSWER: Investors can derive the stock's implied standard deviation (ISD) from the stock option pricing model. 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. Participants may use this measurement as their own forecast of that specific stock's 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?

ANSWER: The stock price may have been appropriate under the conditions of unchanged management. However, when management is changed in a manner that will reduce the waste and improve cash flows, the firm's value increases, and investors revalue the stock higher. Thus, the market could still be efficient even though there was a discrepancy in price.

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, and the Fed's monetary policy, political conditions, and the general mood of investors. Based on prevailing 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?

ANSWER: This question is open-ended. It requires students to apply the concepts that were presented in this chapter in order to develop their own view. This question can be useful for class discussion because it will likely lead to a variety of answers, which reflects the dispersed opinions of market participants.

22. Application of CAPM to Stock Pricing. Explain (using intuition instead of math) why stock prices may decrease in response to a higher risk-free rate according to the CAPM. In some periods, the risk-free rate rises in response to higher economic growth. Explain (using intuition instead of math) why stock prices may increase in this situation even though the risk-free rate increases.

ANSWER: When the risk-free rate rises, the required rate of return rises, and therefore expected cash flows generated by the stock are discounted at a higher discount rate, which results in a lower value.

If the economic growth increases, there may be an increase in expected cash flows. This favorable effect can overwhelm the unfavorable effect of a rise in the discount rate used to discount cash flows.

- 23. Impact of SOX on Stock Valuations.** Use a stock valuation framework to explain why the Sarbanes-Oxley Act (SOX) could improve the valuation of a stock. Why might SOX cause a reduction in the valuation of a stock?

ANSWER: The Sarbanes-Oxley Act of 2002 was intended to improve the reporting of financial statements. It may allow firms to detect problems that they would not have recognized otherwise, so that they can increase their cash inflows. However, the costs of complying with SOX result in higher cash outflows.

- 24. Interpretation of the VIX Index.** Explain why participants in the stock market monitor the VIX index. What does a decline in the VIX index imply about a change in expected volatility by market participants?

ANSWER: At a given point in time, the VIX index measures investor's expectation of the stock market volatility over the next 30 days. Some investors refer to VIX as an indicator of stock market fear. As the VIX index decreases, it indicates a lower expected level of stock market volatility. Since the VIX index simply measures the expectations of investors in general, it will not necessarily provide a perfectly accurate forecast of the stock market volatility over the next 30 days. Nevertheless, many investors may believe that it is a useful indicator of expected stock market volatility.

Interpreting Financial News

Interpret the following comments made by Wall Street analysts and portfolio managers.

- a. "The stock market's recent climb has been driven by falling interest rates."

The value of a stock may be measured as the present value of future cash flows provided to investors. The present value is increased when using a lower discount rate. If interest rates decline, the required rate of return by investors declines, and so does the discount rate used to value stocks.

- b. "Future stock prices are dependent on the Fed's policy meeting next week."

The Fed's monetary policy affects the values of stocks in various ways. First, it can affect economic conditions, which affect the cash flow generated by a firm. Second, the Fed's monetary policy can affect the interest rates, which affect the discount rate used as the required rate of return when valuing stocks.

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

The recent climb in stocks occurred without any fundamental change in the performance of firms. Stock prices will revert because there is no reason for their climb, and once investors recognize this, they will sell stocks (which causes the reversal).

Managing in Financial Markets

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?

One argument is that investors are unwilling to accept a very low interest rate on debt securities, and are more willing to invest in stocks simply because their opportunity cost (what they forgo) on debt securities is low. The value of stocks may rise in response to lower interest rates, simply because the present value of dividends should rise with a lower interest used as the discount rate. However, it is risky for investors to heavily invest in the stock market simply because they have no other type of investment that is acceptable. This type of behavior can force stock prices to exceed their fundamental values, and create a speculative bubble that will break in the future.

- 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.

No. Given that you expect the stock market to perform well, you would not be so interested in a low-beta stock. You would consider stocks that would be more sensitive to market conditions so that you can benefit from the expected market run-up.

- c. You are considering an investment in an initial public offering by Marx Co., 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 is not yet 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 involved in estimating the value of this firm?

There are numerous possible solutions, but most solutions would involve the estimation of the firm's future cash flows, and deriving a present value of those cash flows. You can apply the dividend discount model by assessing past earnings to generate forecasts of future earnings. Then, the amount of earnings to be retained can be estimated so dividends can be estimated. Next, the dividend discount model can be used to estimate the present value of all future dividends that are to be paid. Once you estimate the value of the firm, estimate the value of stock by dividing the firm value by the number of shares outstanding. This provides an estimated value per share. Compare this value to the prevailing price per share of stock in the IPO. There are limitations in using past earnings as a forecast of future earnings, and in selecting the proper required rate of return to discount future cash flows. Consequently, the estimate of the firm's value is subject to error.

- 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.

There are many possible solutions. The method should include some control for the stock market movements over the period of concern. For example, your performance may be measured as an excess return beyond the return of some stock index representing U.S. stocks. If your portfolio is supposed to be focused on one particular industry, your performance should be measured relative to that industry norm (perhaps compared to the return on an industry index). You may also wish to account for risk by measuring a risk-adjusted return of your portfolio and the comparable index.

- 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 U.S. stock portfolio in the previous question?

The European portfolio return should be compared to a European stock index. The reason is that you have no control over the general stock market conditions in Europe. You only have control over the European stocks to include in your portfolio. Your performance should be measured relative to the group of stocks that were available. You may also wish to account for risk by deriving a risk-adjusted return of your portfolio and comparing that to a risk-adjusted return of the index. A Sharpe index might be applied to derive risk-adjusted returns.

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 according to the Sharpe Index. Which stock has higher risk-adjusted returns according to the Treynor Index? Show your work.

ANSWER:

Sharpe Index of Crane stock:

$$\begin{aligned}\text{Sharpe index} &= \frac{\bar{R} - \bar{R}_f}{\sigma} \\ &= \frac{11\% - 6\%}{2\%} \\ &= 2.5\end{aligned}$$

Sharpe Index of Load stock:

$$\begin{aligned}
 \text{Sharpe index} &= \frac{\bar{R} - \bar{R}_f}{\sigma} \\
 &= \frac{11\% - 6\%}{0.8} \\
 &= .0625
 \end{aligned}$$

Treynor Index of Crane stock:

$$\begin{aligned}
 \text{Treynor index} &= \frac{\bar{R} - \bar{R}_f}{B} \\
 &= \frac{11\% - 6\%}{0.8} \\
 &= .0625
 \end{aligned}$$

Treynor Index of Load stock:

$$\begin{aligned}
 \text{Treynor index} &= \frac{\bar{R} - \bar{R}_f}{B} \\
 &= \frac{14\% - 6\%}{1.1} \\
 &= .0727
 \end{aligned}$$

Crane stock has a higher Sharpe Index while Load stock has a higher Treynor Index.

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 on Mess stock?

ANSWER:

$$\begin{aligned}
 \text{Expected return} &= 7\% + 1.2(10\% - 7\%) \\
 &= 10.6\%
 \end{aligned}$$

3. **Using the PE Method.** You found that Verto Stock is expected to generate earnings of \$4.38 per share this year, and that the mean PE ratio for its industry is 27.195. Use the PE valuation method to determine the value of Verto shares.

ANSWER:

$$\begin{aligned}
 \text{Value} &= (\text{Expected earnings of IBM per share}) \times (\text{Mean industry P/E ratio}) \\
 \text{Value} &= \$4.38 \times 27.195 \\
 \text{Value} &= \$119.114
 \end{aligned}$$

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?

ANSWER:

$$\begin{aligned} PV_{\text{of stock}} &= D/k \\ &= 6/0.11 \\ &= \$54.5 \text{ per share} \end{aligned}$$

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?

ANSWER:

$$\begin{aligned} PV_{\text{of stock}} &= D_1/(k - g) \\ PV_{\text{of stock}} &= 2.3/(0.12 - 0.09) \\ &= \$76.67 \text{ per share} \end{aligned}$$

6. **Using the Dividend Discount Model.** Suppose you know that a company just paid a 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?

ANSWER:

$$\begin{aligned} D_1 &= D_0(1 + g) \\ D_1 &= 1.75(1 + 0.08) = 1.89 \\ PV_{\text{of stock}} &= D_1/(k - g) \\ PV_{\text{of stock}} &= 1.89/(0.10 - 0.08) \\ &= \$94.5 \text{ per share} \end{aligned}$$

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

ANSWER:

$$\begin{aligned} PV_{\text{of stock}} &= D_1/(k - g) \\ k &= (D_1/PV_{\text{of stock}}) + g \\ k &= (1.20/22) + 0.07 = 0.1245 = 12.45\% \end{aligned}$$

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

ANSWER:

$$\begin{aligned} D_1 &= D_0(1 + g) \\ D_1 &= \$8.00(1 + 0.06) = \$8.48 \end{aligned}$$

$$k = (D_1/PV \text{ of stock}) + g$$

$$k = (8.48/110) + 0.06 = 0.137 = 13.7\%$$

- 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?

ANSWER:

$$R_j = R_f + B_j(R_m - R_f)$$

$$R_j = 6\% + 2.2(12\% - 6\%)$$

$$R_j = 19.2\%$$

The market risk premium is 6 percent.

- 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?

ANSWER:

$$R_j = R_f + B_j(R_m - R_f)$$

$$0.13 = 0.05 + B_j(0.07)$$

$$B_j = 1.142$$

- 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?

ANSWER:

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

$$= \frac{(99.25 - 76.5) + 0.70}{76.5}$$

$$= 30.6\%$$

- 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?

ANSWER:

$$\begin{aligned}\text{Portfolio beta} &= 0.4(1.31) + 0.3(0.85) + 0.3(0.94) \\ &= 0.524 + 0.255 + 0.282 = 1.061\end{aligned}$$

- 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?

ANSWER:

$$\begin{aligned}\text{Portfolio beta} &= [(20 \times 1.31) + (30 \times 0.85) + (50 \times 0.94)]/100 \\ &= (26.2 + 25.5 + 47)/100 \\ &= 0.987\end{aligned}$$

- 14. Value at Risk.** Assume that Quitar Co. 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 Quitar Co. stock?

ANSWER:

$$1.31(-3.2\%) = -4.192\%$$

- b. If you have \$19,000 invested in Quitar Co. stock, what is your maximum daily dollar loss?

ANSWER:

$$(-4.192\%)(19,000) = -\$796.48$$

- 15. Value at Risk.** If your portfolio beta is 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?

ANSWER:

$$0.89(-2.5\%) = -2.225\%$$

- 16. Dividend Model Relationships.**

- a. When computing the price of the stock with the dividend discount model, how would the price of a stock be affected if the required rate of return is increased. Explain the logic of this relationship.

ANSWER: The price of the stock is reduced, because the cash flows would be discounted at a higher rate.

- 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.

ANSWER: The price of the stock is reduced, because the expected future cash flows in distant periods are reduced if the growth rate is revised downward.

- 17. CAPM Relationships.**

- a. When using the CAPM, how would the required rate of return on a stock be affected if the risk-free rate were lower.

ANSWER: The required rate of return would be lower, because it should reflect a premium above the risk-free rate (which is now lower).

- b. When using the CAPM, how would the required rate of return on a stock be affected if the market return were lower.

ANSWER: The required rate of return would be lower, because the premium that is added to the risk-free rate would now be lower.

- c. When using the CAPM, how would the required rate of return on a stock be affected if the beta were higher.

ANSWER: The required rate of return would be higher, because a given premium above the risk-free rate would now be higher.

18. Value at Risk.

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

ANSWER: The maximum expected loss would now be more pronounced (worse) than before, because the larger standard deviation creates a greater deviation from (below) the expected outcome.

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

ANSWER: The maximum expected loss would now be less pronounced than before, because the expected outcome is higher and the deviation from that will result in a maximum loss that is not as bad.

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 to compensate most of its managers with shares of its stock that would represent about 30 percent of their compensation and would pay the remainder of the compensation 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?

Carson would like to attempt to issue the shares when the valuation of its stock is favorable. Investors who buy shares may apply the industry PE ratio to Carson's earnings ratio to value the shares. Under these conditions, it receives a higher level of proceeds for a given amount of shares issued.

- b. Assume that Carson Company believes that issuing of 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?

No. If interest rates increase, the risk-free interest rate that can be earned by investors has increased. The required rate of return by investors when investing in a new stock contains a risk premium. As the risk-free rate rises, the required rate of return should increase. Thus, the amount that investors would be willing to pay for a stock should decline when the required rate of return increases. An alternative argument is that the higher interest rates will increase the cost of Carson's debt, which may reduce cash flows and therefore reduce the value of the firm.

- 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?

First, Carson Company may do a secondary offering someday, and the stock price at the time of the secondary offering would affect the amount of proceeds it would receive from selling a specific number of shares. Second, Carson could use its shares instead of cash to acquire companies, and a higher stock price allows it to make an acquisition with fewer shares. Third, a high stock price means more compensation for its managers, and may motivate them to perform well.

- 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 focus on short-term goals, 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 its managers from using a very short-term focus?

Stock compensation can motivate managers to make decisions that maximize the stock price, because the managers benefit directly when they hold shares of the firm's stock. Yet, some managers may be tempted to use accounting gimmicks so that the stock price is overvalued, so that they can sell their shares and capitalize on the overvalued stock. To prevent this strategy, firms that provide options as compensation could make managers hold the stock for a specified number of years.

Answers to Appendix Discussion Questions

1. Should an accounting firm be prohibited from offering both auditing services and consulting services to the same client? Explain your answer. If an accounting firm offered only one service, could there still be conflicts of interest due to referrals (and finder's fees)?

ANSWER: The goal is to allow students to present advantages and disadvantages of the SEC's

proposal for accounting firms to provide only auditing or consulting services. Even if the accounting firms are only allowed to offer one service, there could be a conflict of interest if they have an agreement with other firms. For example, they may serve as auditors but refer consulting firms for a fee. In this case, their audit is not really independent because the firm may be pressured to sign off if it received a finder's fee for referring a consultant that influenced the firm's financial statements.

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

ANSWER: This answer has no clear solution and will likely result in some animated discussion. Students should at least recognize the potential conflicts of interest here.

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

ANSWER: The alternative sources of information about a firm come from securities firms and other research firms, but most of that information is derived from the financial statements created by the firm. Therefore, if they do not trust the financial statements, they probably should not trust these reports by other sources.

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

ANSWER: If analysts are unwilling to assign a true rating to a firm, then investors cannot rely on them for information. To the extent that analysts must appease firms that they rate so that their employer may possibly receive some consulting business from the firms, analysts are unable to serve investors.

5. Does an analyst employed by a securities firm to rate firms face a conflict of interest? If so, can the conflict be resolved?

ANSWER: There is a conflict of interests if analysts must appease firms that they rate so that their employer may possibly receive some consulting business from the firms. One possible solution is for investors to rely only on analysts who are not affiliated with an employer that pursues consulting business with the firms that are rated.

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?

ANSWER: The firm could implement a compensation system that prevents managers from selling any of their holdings of the firm's stock in a short period of time. That is, managers would only be allowed to sell the stock holdings in small increments over time. With this system, there would be limited benefits from creating a superficially high price for a firm over a short period, because the managers would not be able to sell much of their stock over that period.

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

ANSWER: The firm could implement a compensation system that prevents board members from selling any of their holdings of the firm's stock in a short period of time. That is, board members would only be allowed to sell the stock holdings in small increments over time. There would be

limited benefits from creating a superficially high price for a firm over a short period, because the board members would not be able to sell much of their stock over that period. Thus, they would not be tempted to allow a short-term manipulation of the stock price if they are not able to benefit directly from that manipulation.