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10 percent and Standard Fixtures' stock price increased by 10 percent. Do these two stocks page 310 have the same price today? Explain.

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**Returns** Two years ago, the Lake Minerals and Small Town Furniture stock prices were the same. The average annual return for both stocks over the past two years was 10 percent. Lake Minerals's stock price increased 10 percent each year. Small Town Furniture's stock price increased 25 percent in the first year and lost 5 percent last year. Do these two stocks have the same price today?

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**Arithmetic versus Geometric Returns** What is the difference between arithmetic and geometric returns? Suppose you have invested in a stock for the last 10 years. Which number is more important to you, the arithmetic or geometric return?

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**Historical Returns** The historical asset class returns presented in the chapter are not adjusted for inflation. What would happen to the estimated risk premium if we did account for inflation? The returns are also not adjusted for taxes. What would happen to the returns if we accounted for taxes? What would happen to the volatility?

## QUESTIONS AND PROBLEMS



Basic (Questions 1–20)

1. **Calculating Returns** Suppose a stock had an initial price of \$84 per share, paid a dividend of \$1.65 per share during the year, and had an ending share price of \$93. Compute the total percentage return.
2. **Calculating Yields** In problem 1, what was the dividend yield? The capital gains yield?
3. **Calculating Returns** Rework problems 1 and 2 assuming the ending share price is \$72.
4. **Calculating Returns** Suppose you bought a bond with a coupon rate of 5.6 percent one year ago for \$985. The bond sells for \$1,015 today. The bond pays annual coupons.
  - a. Assuming a \$1,000 face value, what was your total dollar return on this investment over the past year?
  - b. What was your total nominal rate of return on this investment over the past year?
  - c. If the inflation rate last year was 3.2 percent, what was your total real rate of return on this investment?
5. **Nominal versus Real Returns** What was the arithmetic average annual return on large-company stocks from 1926 through 2015:

a. In nominal terms?

b. In real terms?

6. **Bond Returns** What is the historical real return on long-term government bonds? On long-term corporate bonds?



7. **Calculating Returns and Variability** Using the following returns, calculate the average returns, the variances, and the standard deviations for X and Y.



RETURNS		
YEAR	X	Y
1	23%	34%
2	6	12
3	14	17
4	-16	-23
5	19	17

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8. **Risk Premiums** Refer to Table 10.1 in the text and look at the period from 1973 through 1978.
  - a. Calculate the arithmetic average returns for large-company stocks and T-bills over this time period.
  - b. Calculate the standard deviation of the returns for large-company stocks and T-bills over this time period.
  - c. Calculate the observed risk premium in each year for the large-company stocks versus the T-bills. What was the arithmetic average risk premium over this period? What was the standard deviation of the risk premium over this period?
9. **Calculating Returns and Variability** You've observed the following returns on Yasmin Corporation's stock over the past five years: 19 percent, -13 percent, 7 percent, 25 percent, and 16 percent.
  - a. What was the arithmetic average return on the company's stock over this five-year period?
  - b. What was the variance of the company's stock returns over this period? The standard deviation?
10. **Calculating Real Returns and Risk Premiums** In Problem 9, suppose the average inflation rate over this period was 2.6 percent and the average T-bill rate over the period was 3.25 percent.
  - a. What was the average real return on the company's stock?
  - b. What was the average nominal risk premium on the company's stock?
11. **Calculating Real Rates** Given the information in problem 10, what was the average real risk-free rate over this time period? What was the average real risk premium?
12. **Holding Period Return** A stock has had returns of -16.43 percent, 15.81 percent, 26.34 percent, 5.98 percent, and 18.43 percent over the past five years, respectively. What was the holding period return for the stock?
13. **Calculating Returns** You purchased a zero coupon bond one year ago for \$385.27. The market interest rate is now 4.8 percent. If the bond had 20 years to maturity when you originally purchased it, what was your total return for the past year? Assume a par value of \$1,000 and semiannual compounding.
14. **Calculating Returns** You bought a share of 3.9 percent preferred stock for \$92.65 last year. The market price for your stock is now \$96.20. What is your total return for last year?
15. **Calculating Returns** You bought a stock three months ago for \$53.26 per share. The stock paid no dividends. The current share price is \$58.97. What is the APR of your investment? The EAR?
16. **Calculating Real Returns** Refer to Table 10.1. What was the average real return for Treasury bills from 1926 through 1932?

-  **17. Return Distributions** Refer back to Table 10.2. What range of returns would you expect to see 68 percent of the time for long-term corporate bonds? What about 95 percent of the time?
- 18. Return Distributions** Refer back to Table 10.2. What range of returns would you expect to see 68 percent of the time for large-company stocks? What about 95 percent of the time?
-  **19. Blume's Formula** Over a 30-year period an asset had an arithmetic return of 11.2 percent and a geometric return of 9.7 percent. Using Blume's formula, what is your best estimate of the future annual returns over 5 years? 10 years? 20 years?
- 20. Blume's Formula** Assume that the historical return on large-company stocks is a predictor of the future returns. What return would you estimate for large-company stocks over the next year? The next 5 years? 20 years? 30 years?

Intermediate (Questions 21–26)

- 21. Calculating Returns and Variability** You find a certain stock that had returns of 15 percent, 9 percent, -18 percent, and 11 percent for four of the last five years. If the average return of the stock over this period was 10.35 percent, what was the stock's return for the missing year? What is the standard deviation of the stock's returns?
-  **22. Arithmetic and Geometric Returns** A stock has had returns of -23 percent, 37 percent, 19 percent, -4 percent, 21 percent, and 11 percent over the last six years. What are the arithmetic and geometric average returns for the stock?

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## QUESTIONS AND PROBLEMS



Basic (Questions 1–19)

- Determining Portfolio Weights** What are the portfolio weights for a portfolio that has 125 shares of Stock A that sell for \$38 per share and 175 shares of Stock B that sell for \$26 per share?
- Portfolio Expected Return** You own a portfolio that has \$3,850 invested in Stock A and \$6,100 invested in Stock B. If the expected returns on these stocks are 7.2 percent and 13.1 percent, respectively, what is the expected return on the portfolio?
- Portfolio Expected Return** You own a portfolio that is 20 percent invested in Stock X, 35 percent invested in Stock Y, and 45 percent invested in Stock Z. The expected returns on these three stocks are 9.2 percent, 11.8 percent, and 14.3 percent, respectively. What is the expected return on the portfolio?
- Portfolio Expected Return** You have \$10,000 to invest in a stock portfolio. Your choices are Stock X with an expected return of 12.4 percent and Stock Y with an expected return of 10.2 percent. If your goal is to create a portfolio with an expected return of 10.9 percent, how much money will you invest in Stock X? In Stock Y?
- Calculating Expected Return** Based on the following information, calculate the expected return.

STATE OF ECONOMY	PROBABILITY OF STATE OF ECONOMY	RATE OF RETURN IF STATE OCCURS
Recession	.35	-.09
Normal	.50	.15
Boom	.15	.34

- Calculating Returns and Standard Deviations** Based on the following information, calculate the expected return and standard deviation for the two stocks.

STATE OF ECONOMY	PROBABILITY OF STATE OF ECONOMY	RATE OF RETURN IF STATE OCCURS	
		STOCK A	STOCK B
Recession	.15	.01	-.19
Normal	.50	.09	.11

Boom	.35		.13		.37
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7. **Calculating Returns and Standard Deviations** Based on the following information, calculate the expected return and standard deviation of the following stock.

STATE OF ECONOMY	PROBABILITY OF STATE OF ECONOMY	RATE OF RETURN IF STATE OCCURS
Depression	.10	-.279
Recession	.20	-.128
Normal	.45	.141
Boom	.25	.365

8. **Calculating Expected Returns** A portfolio is invested 25 percent in Stock G, 60 percent in Stock J, and 15 percent in Stock K. The expected returns on these stocks are 8.6 percent, 10.8 percent, and 13.4 percent, respectively. What is the portfolio's expected return? How do you interpret your answer?




9. **Returns and Standard Deviations** Consider the following information:

STATE OF ECONOMY	PROBABILITY OF STATE OF ECONOMY	RATE OF RETURN IF STATE OCCURS		
		STOCK A	STOCK B	STOCK C
Boom	.15	.26	.40	.38
Good	.45	.10	.18	.15
Poor	.35	.02	-.19	-.03
Bust	.05	-.08	-.32	-.06


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- a. Your portfolio is invested 35 percent each in A and C, and 30 percent in B. What is the expected return of the portfolio?
- b. What is the variance of this portfolio? The standard deviation?
10. **Calculating Portfolio Betas** You own a stock portfolio invested 15 percent in Stock Q, 20 percent in Stock R, 30 percent in Stock S, and 35 percent in Stock T. The betas for these four stocks are .74, 1.27, 1.09, and 1.38, respectively. What is the portfolio beta?
11. **Calculating Portfolio Betas** You own a portfolio equally invested in a risk-free asset and two stocks. If one of the stocks has a beta of 1.17 and the total portfolio is equally as risky as the market, what must the beta be for the other stock in your portfolio?
12. **Using CAPM** A stock has a beta of .93, the expected return on the market is 10.9 percent, and the risk-free rate is 2.7 percent. What must the expected return on this stock be?
13. **Using CAPM** A stock has an expected return of 11.3 percent, the risk-free rate is 2.8 percent, and the market risk premium is 6.9 percent. What must the beta of this stock be?
14. **Using CAPM** A stock has an expected return of 11.8 percent, its beta is 1.13, and the risk-free rate is 3.1 percent. What must the expected return on the market be?
15. **Using CAPM** A stock has an expected return of 11.5 percent, a beta of 1.09, and the expected return on the market is 10.8 percent. What must the risk-free rate be?
16. **Portfolio Returns** Using information from the previous chapter on capital market history, determine the return on a portfolio that is equally invested in large-company stocks and long-term government bonds. What is the return on a portfolio that is equally invested in small-company stocks and Treasury bills?
-  17. **Using the SML** Asset W has an expected return of 10.9 percent and a beta of 1.20. If the risk-free rate is 2.4 percent, complete the following table for portfolios of Asset W and a risk-free asset. Illustrate the relationship between portfolio expected return and portfolio beta by plotting the expected returns against the betas. What is the slope of the line that results?

PERCENTAGE OF PORTFOLIO IN ASSET W	PORTFOLIO EXPECTED RETURN	PORTFOLIO BETA
0%		
25		
50		
75		
100		
125		
150		

-  **18. Reward-to-Risk Ratios** Stock Y has a beta of 1.20 and an expected return of 14.1 percent. Stock Z has a beta of .78 and an expected return of 9.5 percent. If the risk-free rate is 4.3 percent and the market risk premium is 7.6 percent, are these stocks correctly priced?
- 19. Reward-to-Risk Ratios** In the previous problem, what would the risk-free rate have to be for the two stocks to be correctly priced?

Intermediate (Questions 20–32)

- 20. Using CAPM** A stock has a beta of 1.17 and an expected return of 12 percent. A risk-free asset currently earns 2.3 percent.
- What is the expected return on a portfolio that is equally invested in the two assets?
  - If a portfolio of the two assets has a beta of .5, what are the portfolio weights?
  - If a portfolio of the two assets has an expected return of 10 percent, what is its beta?
  - If a portfolio of the two assets has a beta of 2.34, what are the portfolio weights? How do you interpret the weights for the two assets in this case? Explain.

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Based on his own analysis, Tom is recommending that the company increase its use of equity financing because, “debt costs 12.5 percent, but equity only costs 10 percent; thus equity is cheaper.” Ignoring all the other issues, what do you think about the conclusion that the cost of equity is less than the cost of debt?

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**Company Risk versus Project Risk** Both Dow Chemical Company, a large natural gas user, and Superior Oil, a major natural gas producer, are thinking of investing in natural gas wells near Houston. Both are all equity financed companies. Dow and Superior are looking at identical projects. They’ve analyzed their respective investments, which would involve a negative cash flow now and positive expected cash flows in the future. These cash flows would be the same for both firms. No debt would be used to finance the projects. Both companies estimate that their projects would have a net present value of \$1 million at an 18 percent discount rate and a -\$1.1 million NPV at a 22 percent discount rate. Dow has a beta of 1.25, whereas Superior has a beta of .75. The expected risk premium on the market is 8 percent, and risk-free bonds are yielding 12 percent. Should either company proceed? Should both? Explain.

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**Divisional Cost of Capital** Under what circumstances would it be appropriate for a firm to use different costs of capital for its different operating divisions? If the overall firm WACC was used as the hurdle rate for all divisions, would the riskier divisions or the more conservative divisions tend to get most of the investment projects? Why? If you were to try to estimate the appropriate cost of capital for different divisions, what problems might you encounter? What are two techniques you could use to develop a rough estimate for each division’s cost of capital?

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**Leverage** Consider a levered firm’s projects that have similar risks to the firm as a whole. Is the discount rate for the projects higher or lower than the rate computed using the security market line? Why?

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**Beta** What factors determine the beta of a stock? Define and describe each.

## QUESTIONS AND PROBLEMS



Basic (Questions 1–15)

- Calculating Cost of Equity** The Hudson Corporation’s common stock has a beta of 1.13. If the risk-free rate is 4.1 percent and the expected return on the market is 11 percent, what is the company’s cost of equity capital?

2. **Calculating Cost of Debt** J&R Renovation, Inc., is trying to determine its cost of debt. The firm has a debt issue outstanding with 14 years to maturity that is quoted at 95 percent of face value. The issue makes semiannual payments and has a coupon rate of 6.4 percent annually. What is the company's pretax cost of debt? If the tax rate is 35 percent, what is the aftertax cost of debt?
3. **Calculating Cost of Debt** Suspect Corp. issued a 30-year, 5.8 percent semiannual bond seven years ago. The bond currently sells for 104 percent of its face value. The company's tax rate is 35 percent.
  - a. What is the pretax cost of debt?
  - b. What is the aftertax cost of debt?
  - c. Which is more relevant, the pretax or the aftertax cost of debt? Why?
4. **Calculating Cost of Debt** For the firm in the previous problem, suppose the book value of the debt issue is \$55 million. In addition, the company has a second debt issue on the market, a zero coupon bond with 12 years left to maturity; the book value of this issue is \$75 million and the bonds sell for 63 percent of par. What is the company's total book value of debt? The total market value? What is your best estimate of the aftertax cost of debt now?
5. **Calculating WACC** Johansen Corporation has a target capital structure of 75 percent common stock and 25 percent debt. Its cost of equity is 12.1 percent, and the cost of debt is 6.3 percent. The relevant tax rate is 35 percent. What is the company's WACC?
6. **Taxes and WACC** Appraisal, Inc., has a target debt–equity ratio of .45. Its cost of equity is 13 percent, and its cost of debt is 7 percent. If the tax rate is 35 percent, what is the company's WACC?
-  7. **Finding the Capital Structure** Fama's Llamas has a weighted average cost of capital of 8.6 percent. The company's cost of equity is 11.2 percent, and its cost of debt is 6.4 percent. The tax rate is 35 percent. What is the company's debt–equity ratio?