

**SELF-TEST PROBLEM** Solution Appears In Appendix A

(ST-1)  
Net Income, Cash  
Flow, and EVA

Last year Cole Furnaces had \$5 million in operating income (EBIT). The company had a net depreciation expense of \$1 million and an interest expense of \$1 million; its corporate tax rate was 40%. The company has \$14 million in operating current assets and \$4 million in operating current liabilities; it has \$15 million in net plant and equipment. It estimates that it has an after-tax cost of capital of 10%. Assume that Cole's only noncash item was depreciation.

- What was the company's net income for the year?
- What was the company's net cash flow?
- What was the company's net operating profit after taxes (NOPAT)?
- Calculate net operating working capital and total net operating capital for the current year.
- If total net operating capital in the previous year was \$24 million, what was the company's free cash flow (FCF) for the year?
- What was the return on invested capital?
- What was the company's Economic Value Added (EVA)?

**PROBLEMS** Answers Appear in Appendix B

Note: By the time this book is published, Congress may have changed rates and/or other provisions of current tax law as noted in the chapter, as such changes occur fairly often. Work all problems on the assumption that the information in the chapter is applicable.

Easy Problems 1-6

- (2-1) An investor recently purchased a corporate bond that yields 9%. The investor is in the 36% combined federal and state tax bracket. What is the bond's after-tax yield?
- (2-2) Corporate bonds issued by Johnson Corporation currently yield 8%. Municipal bonds of equal risk currently yield 6%. At what tax rate would an investor be indifferent between these two bonds?
- (2-3) Molteni Motors Inc. recently reported \$6 million of net income. Its EBIT was \$13 million, and its tax rate was 40%. What was its interest expense? (*Hint:* Write out the headings for an income statement, and then fill in the known values. Then divide \$6 million net income by  $1 - T = 0.6$  to find the pre-tax income. The difference between EBIT and taxable income must be the interest expense. Use this procedure to work some of the other problems.)
- (2-4) Talbot Enterprises recently reported an EBITDA of \$8 million and net income of \$2.4 million. It had \$2.0 million of interest expense, and its corporate tax rate was 40%. What was its charge for depreciation and amortization?
- (2-5) Kendall Corners Inc. recently reported net income of \$3.1 million and depreciation of \$500,000. What was its cash flow? (Assume no amortization expense.)
- (2-6) In its most recent year, the company reported net income of \$9 million. How much cash did the company have available for common shareholders during the year?

Chapter 2

problem 2-4

**PROBLEMS** Answers Appear in Appendix B

## Easy Problems 1-5

(3-1) Days Sales Outstanding Greene Sisters has a DSO of 20 days. The company's average daily sales are \$20,000. What is the level of its accounts receivable? Assume there are 365 days in a year.

(3-2) Debt Ratio Vigo Vacations has \$200 million in total assets, \$5 million in notes payable, and \$25 million in long-term debt. What is the debt ratio?

(3-3) Market/Book Ratio Winston Washers's stock price is \$75 per share. Winston has \$10 billion in total assets. Its balance sheet shows \$1 billion in current liabilities, \$3 billion in long-term debt, and \$6 billion in common equity. It has 800 million shares of common stock outstanding. What is Winston's market/book ratio?

(3-4) Price/Earnings Ratio Reno Revolvers has an EPS of \$1.50, a cash flow per share of \$3.00, and a price/cash flow ratio of 8.0. What is its P/E ratio?

(3-5) ROE Needham Pharmaceuticals has a profit margin of 3% and an equity multiplier of 2.0. Its sales are \$100 million and it has total assets of \$50 million. What is its ROE?

## Intermediate Problems 6-10

(3-6) Du Pont Analysis Gardial & Son has an ROA of 12%, a 5% profit margin, and a return on equity equal to 20%. What is the company's total assets turnover? What is the firm's equity multiplier?

(3-7) Current and Quick Ratios Ace Industries has current assets equal to \$3 million. The company's current ratio is 1.5, and its quick ratio is 1.0. What is the firm's level of current liabilities? What is the firm's level of inventories?

(3-8) Profit Margin and Debt Ratio Assume you are given the following relationships for the Haslam Corporation:

|                        |     |
|------------------------|-----|
| Sales/total assets     | 1.2 |
| Return on assets (ROA) | 4%  |
| Return on equity (ROE) | 7%  |

Calculate Haslam's profit margin and liabilities-to-assets ratio. Suppose half its liabilities are in the form of debt. Calculate the debt-to-assets ratio.

(3-9) Current and Quick Ratios The Nelson Company has \$1,312,500 in current assets and \$525,000 in current liabilities. Its initial inventory level is \$375,000, and it will raise funds as additional notes payable and use them to increase inventory. How much can Nelson's short-term debt (notes payable) increase without pushing its current ratio lower? What will be the firm's new current ratio?

(3-10) Times-Interest-Earned Ratio The Morris Corporation has \$8 million in debt and pays an interest rate of 40%, and its net E ratio of at least 5 to 1, result. What is Morris's TIE ratio?

## Challenging Problems 11-14

(3-11) Balance Sheet Analysis Complete the balance sheet and sales information in the table that follows for J. White Industries using the following financial data:

Continue on next page

3-11

Total assets turnover: 1.5  
 Gross profit margin on sales:  $(\text{Sales} - \text{Cost of goods sold})/\text{Sales} = 25\%$   
 Total liabilities-to-assets ratio: 40%  
 Quick ratio: 0.80  
 Days sales outstanding (based on 365-day year): 36.5 days  
 Inventory turnover ratio: 3.75

| Partial Income       | Statement Information |                                    |
|----------------------|-----------------------|------------------------------------|
| Sales                | _____                 |                                    |
| Cost of goods sold   | _____                 |                                    |
| <b>Balance Sheet</b> |                       |                                    |
| Cash                 | _____                 | Accounts payable _____             |
| Accounts receivable  | _____                 | Long-term debt 50,000              |
| Inventories          | _____                 | Common stock _____                 |
| Fixed assets         | _____                 | Retained earnings 100,000          |
| Total assets         | <u>\$400,000</u>      | Total liabilities and equity _____ |

(3-12)  
 Comprehensive Ratio  
 Calculations

The Kretovich Company had a quick ratio of 1.4, a current ratio of 3.0, a days sales outstanding of 36.5 days (based on a 365-day year), total current assets of \$810,000, and cash and marketable securities of \$120,000. What were Kretovich's annual sales?

(3-13)  
 Comprehensive Ratio  
 Analysis

Data for Lozano Chip Company and its industry averages follow.

- Calculate the indicated ratios for Lozano.
- Construct the extended Du Pont equation for both Lozano and the industry.
- Outline Lozano's strengths and weaknesses as revealed by your analysis.

Lozano Chip Company: Balance Sheet as of December 31, 2013 (Thousands of Dollars)

|                      |                    |                              |                    |
|----------------------|--------------------|------------------------------|--------------------|
| Cash                 | \$ 225,000         | Accounts payable             | \$ 601,866         |
| Receivables          | 1,575,000          | Notes payable                | 326,634            |
| Inventories          | <u>1,125,000</u>   | Other current liabilities    | <u>525,000</u>     |
| Total current assets | \$2,950,000        | Total current liabilities    | \$1,453,500        |
| Net fixed assets     | 1,350,000          | Long-term debt               | 1,068,750          |
|                      |                    | Common equity                | <u>1,752,750</u>   |
| Total assets         | <u>\$4,275,000</u> | Total liabilities and equity | <u>\$4,275,000</u> |

Lozano Chip Company: Income Statement for Year Ended December 31, 2013 (Thousands of Dollars)

|                                               |                   |
|-----------------------------------------------|-------------------|
| Sales                                         | \$ 7,500,000      |
| Cost of goods sold                            | 6,375,000         |
| Selling, general, and administrative expenses | <u>825,000</u>    |
| Earnings before interest and taxes (EBIT)     | \$ 300,000        |
| Interest expense                              | <u>111,631</u>    |
| Earnings before taxes (EBT)                   | \$ 188,369        |
| Federal and state income taxes (40%)          | <u>75,348</u>     |
| Net income                                    | <u>\$ 113,022</u> |

Chapter 12

Chapter 12

problem  
12-2**PROBLEMS** Answers Appear in Appendix B

## Easy Problems 1-3

(12-1) Broussard Skateboard's sales are expected to increase from \$8 million in 2013 to \$9.2 million in 2014. Its assets totaled \$5 million at the end of 2013. Broussard is already at full capacity, so its assets must grow at the same rate as projected sales. At the end of 2013, current liabilities were \$1.4 million, consisting of \$450,000 of accounts payable, \$500,000 of notes payable, and \$450,000 of accruals. The after-tax profit margin is forecasted to be 6%, and the forecasted payout ratio is 40%. Use the AFN equation to forecast Broussard's additional funds needed for the coming year.

(12-2) Refer to Problem 12-1. What would be the additional funds needed if the company's year-end 2013 assets had been \$7 million? Assume that all other numbers, including sales, are the same as in Problem 12-1 and that the company is operating at full capacity. Why is this AFN different from the one you found in Problem 12-1? Is the company's "capital intensity" ratio the same or different?

(12-3) Refer to Problem 12-1. Return to the assumption that the company had \$5 million in assets at the end of 2013, but now assume that the company pays no dividends. Under these assumptions, what would be the additional funds needed for the coming year? Why is this AFN different from the one you found in Problem 12-1?

Intermediate  
Problems 4-6

(12-4) Maggie's Muffins, Inc., generated \$5,000,000 in sales during 2013, and its year-end total assets were \$2,500,000. Also, at year-end 2013, current liabilities were \$1,000,000, consisting of \$300,000 of notes payable, \$500,000 of accounts payable, and \$200,000 of accruals. Looking ahead to 2014, the company estimates that its assets must increase at the same rate as sales, its spontaneous liabilities will increase at the same rate as sales, its profit margin will be 7%, and its payout ratio will be 80%. How large a sales increase can the company achieve without having to raise funds externally—that is, what is its self-supporting growth rate?

(12-5) At year-end 2013, Wallace Landscaping's total assets were \$2.17 million and its accounts payable were \$560,000. Sales, which in 2013 were \$3.5 million, are expected to increase by 35% in 2014. Total assets and accounts payable are proportional to sales, and that relationship will be maintained. Wallace typically uses no current liabilities other than accounts payable. Common stock amounted to \$625,000 in 2013, and retained earnings were \$395,000. Wallace has arranged to sell \$195,000 of new common stock in 2014 to meet some of its financing needs. The remainder of its financing needs will be met by issuing new long-term debt at the end of 2014. (Because the debt is added at the end of the year, there will be no additional interest expense due to the new debt.) Its net profit margin on sales is 5%, and 45% of earnings will be paid out as dividends.

- What were Wallace's total long-term debt and total liabilities in 2013?
- How much new long-term debt financing will be needed in 2014? (Hint:  $AFN - \text{New stock} = \text{New long-term debt}$ .)

- Poorly performing managers can be removed either by a takeover or by the company's own board of directors. Provisions in the corporate charter affect the difficulty of a successful takeover, and the composition of the board of directors affects the likelihood of a manager being removed by the board.
- Managerial entrenchment is most likely when a company has a weak board of directors coupled with strong anti-takeover provisions in its corporate charter. In this situation, the likelihood that badly performing senior managers will be fired is low.
- Nonpecuniary benefits are noncash perks such as lavish offices, memberships at country clubs, corporate jets, foreign junkets, and the like. Some of these expenditures may be cost effective, but others are wasteful and simply reduce profits. Such fat is almost always cut after a hostile takeover.
- Targeted share repurchases, also known as greenmail, occur when a company buys back stock from a potential acquirer at a price higher than the market price. In return, the potential acquirer agrees not to attempt to take over the company.
- Shareholder rights provisions, also known as poison pills, allow existing shareholders to purchase additional shares of stock at a price lower than the market value if a potential acquirer purchases a controlling stake in the company.
- A restricted voting rights provision automatically deprives a shareholder of voting rights if he or she owns more than a specified amount of stock.

Chapter 13  
Questions 13-4  
13-5

Directors occur when the CEO of Company A sits on the B's CEO sits on A's board.  
or the purchase of a share of stock at a fixed price, called  
er what the actual price of the stock is. Stock options have  
which they cannot be exercised.  
rship Plan (ESOP) is a plan that facilitates employees'  
company for which they work.

## QUESTIONS

(13-1) Define each of the following terms:

- Agent; principal; agency relationship
- Agency cost
- Basic types of agency conflicts
- Managerial entrenchment; nonpecuniary benefits
- Greenmail; poison pills; restricted voting rights
- Stock option; ESOP

(13-2) What is the possible agency conflict between inside owner/managers and outside shareholders?

(13-3) What are some possible agency conflicts between borrowers and lenders?

(13-4) What are some actions an entrenched management might take that would harm shareholders?

(13-5) How is it possible for an employee stock option to be valuable even if the firm's stock price fails to meet shareholders' expectations?

- (4-4) Number of Periods of a Single Payment If you deposit money today in an account that pays 6.5% annual interest, how long will it take to double your money?
- (4-5) Number of Periods for an Annuity You have \$42,180.53 in a brokerage account, and you plan to deposit an additional \$5,000 at the end of every future year until your account totals \$250,000. You expect to earn 12% annually on the account. How many years will it take to reach your goal?
- (4-6) Future Value: Ordinary Annuity versus Annuity Due What is the future value of a 7%, 5-year ordinary annuity that pays \$300 each year? If this were an annuity due, what would its future value be?
- (4-7) Present and Future Value of an Uneven Cash Flow Stream An investment will pay \$100 at the end of each of the next 3 years, \$200 at the end of Year 4, \$300 at the end of Year 5, and \$500 at the end of Year 6. If other investments of equal risk earn 8% annually, what is this investment's present value? Its future value?
- (4-8) Annuity Payment and EAR You want to buy a car, and a local bank will lend you \$20,000. The loan would be fully amortized over 5 years (60 months), and the nominal interest rate would be 12%, with interest paid monthly. What is the monthly loan payment? What is the loan's EFF%?
- Intermediate Problems 9-29
- (4-9) Present and Future Values of Single Cash Flows for Different Periods Find the following values, *using the equations*, and then work the problems using a financial calculator to check your answers. Disregard rounding differences. (*Hint: If you are using a financial calculator, you can enter the known values and then press the appropriate key to find the unknown variable. Then you can "override" the variable that changes by simply then pressing the key for the unknown variable to the procedure can be used in parts b and d, and in many input variables affect the output variable.*)
- Chapter 4  
Problems  
4-8  
4-13  
4-21
- An initial \$500 compounded for 1 year at 6%
  - An initial \$500 compounded for 2 years at 6%
  - The present value of \$500 due in 1 year at a discount rate of 6%
  - The present value of \$500 due in 2 years at a discount rate of 6%
- (4-10) Present and Future Values of Single Cash Flows for Different Interest Rates Use both the TVM equations and a financial calculator to find the following values. See the Hint for Problem 4-9.
- An initial \$500 compounded for 10 years at 6%
  - An initial \$500 compounded for 10 years at 12%
  - The present value of \$500 due in 10 years at a 6% discount rate
  - The present value of \$500 due in 10 years at a 12% discount rate
- (4-11) Time for a Lump Sum to Double To the closest year, how long will it take \$200 to double if it is deposited and earns the following rates? [Notes: (1) See the Hint for Problem 4-9. (2) This problem cannot be solved exactly with some financial calculators. For example, if you enter  $PV = -200$ ,  $PMT = 0$ ,  $FV = 400$ , and  $I = 7$  in an HP-12C and then press the N key, you will get 11 years for part a. The correct answer is 10.2448 years, which rounds to 10, but the calculator rounds up. However, the HP10BII gives the exact answer.]
- 7%
  - 10%
  - 18%
  - 100%

(4-12)  
Future Value of an Annuity

Find the *future value* of the following annuities. The first payment in these annuities is made at the *end* of Year 1, so they are *ordinary annuities*. (Notes: See the Hint to Problem 4-9. Also, note that you can leave values in the TVM register, switch to Begin Mode, press FV, and find the FV of the annuity due.)

- \$400 per year for 10 years at 10%
- \$200 per year for 5 years at 5%
- \$400 per year for 5 years at 0%
- Now rework parts a, b, and c assuming that payments are made at the *beginning* of each year; that is, they are *annuities due*.

(4-13)  
Present Value of an Annuity

Find the *present value* of the following *ordinary annuities* (see the Notes to Problem 4-12).

- \$400 per year for 10 years at 10%
- \$200 per year for 5 years at 5%
- \$400 per year for 5 years at 0%
- Now rework parts a, b, and c assuming that payments are made at the *beginning* of each year; that is, they are *annuities due*.

(4-14)  
Uneven Cash Flow Stream

- Find the present values of the following cash flow streams. The appropriate interest rate is 8%. (Hint: It is fairly easy to work this problem dealing with the individual cash flows. However, if you have a financial calculator, read the section of the manual that describes how to enter cash flows such as the ones in this problem. This will take a little time, but the investment will pay huge dividends throughout the course. Note that, when working with the calculator's cash flow register, you must enter  $CF_0 = 0$ . Note also that it is quite easy to work the problem with *Excel*, using procedures described in the Chapter 4 *Tool Kit*.)

| Year | Cash Stream A | Cash Stream B |
|------|---------------|---------------|
| 1    | \$100         | \$300         |
| 2    | 400           | 400           |
| 3    | 400           | 400           |
| 4    | 400           | 400           |
| 5    | 300           | 100           |

- What is the value of each cash flow stream at a 0% interest rate?

(4-15)  
Effective Rate of Interest

Find the interest rate (or rates of return) in each of the following situations.

- You *borrow* \$700 and promise to pay back \$749 at the end of 1 year.
- You *lend* \$700 and receive a promise to be paid \$749 at the end of 1 year.
- You borrow \$85,000 and promise to pay back \$201,229 at the end of 10 years.
- You borrow \$9,000 and promise to make payments of \$2,684.80 at the end of each of the next 5 years.

(4-16)  
Future Value for Various Compounding Periods

Find the amount to which \$500 will grow under each of the following conditions.

- 12% compounded annually for 5 years
- 12% compounded semiannually for 5 years
- 12% compounded quarterly for 5 years
- 12% compounded monthly for 5 years

- (4-17) Find the present value of \$500 due in the future under each of the following conditions.
- Present Value for Various Compounding Periods
- 12% nominal rate, semiannual compounding, discounted back 5 years
  - 12% nominal rate, quarterly compounding, discounted back 5 years
  - 12% nominal rate, monthly compounding, discounted back 1 year
- (4-18) Find the future values of the following ordinary annuities.
- Future Value of an Annuity for Various Compounding Periods
- FV of \$400 each 6 months for 5 years at a nominal rate of 12%, compounded semiannually
  - FV of \$200 each 3 months for 5 years at a nominal rate of 12%, compounded quarterly
  - The annuities described in parts a and b have the same total amount of money paid into them during the 5-year period, and both earn interest at the same nominal rate, yet the annuity in part b earns \$101.75 more than the one in part a over the 5 years. Why does this occur?
- (4-19) Universal Bank pays 7% interest, compounded annually, on time deposits. Regional Bank pays 6% interest, compounded quarterly.
- Effective versus Nominal Interest Rates
- Based on effective interest rates, in which bank would you prefer to deposit your money?
  - Could your choice of banks be influenced by the fact that you might want to withdraw your funds during the year as opposed to at the end of the year? In answering this question, assume that funds must be left on deposit during an entire compounding period in order for you to receive any interest.
- (4-20) Set up an amortization schedule for a \$25,000 loan to be repaid in equal installments at the end of each of the next 5 years. The interest rate is 10%.
- Amortization Schedule
- How large must each annual payment be if the loan is for \$50,000? Assume that the interest rate remains at 10% and that the loan is still paid off over 5 years.
  - How large must each payment be if the loan is for \$50,000, the interest rate is 10%, and the loan is paid off in equal installments at the end of each of the next 10 years? This loan is for the same amount as the loan in part b, but the payments are spread out over twice as many periods. Why are these payments not half as large as the payments on the loan in part b?
- (4-21) Sales for Hanebury Corporation's just-ended year were \$12 million. Sales were \$6 million 5 years earlier.
- Growth Rates
- At what rate did sales grow?
  - Suppose someone calculated the sales growth for Hanebury in part a as follows: "Sales doubled in 5 years. This represents a growth of 100% in 5 years; dividing 100% by 5 results in an estimated growth rate of 20% per year." Explain what is wrong with this calculation.
- (4-22) Washington-Pacific invested \$4 million to buy a tract of land and plant some young pine trees. The trees can be harvested in 10 years, at which time W-P plans to sell the forest at an expected price of \$8 million. What is W-P's expected rate of return?
- Expected Rate of Return
- (4-23) A mortgage company offers to lend you \$85,000; the loan calls for payments of \$8,273.59 at the end of each year for 30 years. What interest rate is the mortgage company charging you?
- Effective Rate of Interest
- (4-24) To complete your last year in business school and then go through law school, you will need \$10,000 per year for 4 years, starting next year (that is, you will need to withdraw the first \$10,000 one year from today). Your uncle offers to put you through school, and he will deposit in a bank paying 7% interest a sum of money that is sufficient to provide the 4 payments of \$10,000 each. His deposit will be made today.
- Required Lump-Sum Payment

Chapter 5  
Problems  
5-9  
5-13

Intermediate  
Problems 7-20

- (5-7) Renfro Rentals has issued bonds that have a face value of \$1,000, a coupon rate of 8 percent, and a maturity of 8 years. The bonds mature in 8 years, have a face value of \$1,000, and a coupon rate of 8 percent. What is the price of the bonds?
- (5-8) Thatcher Corporation's bonds will mature in 10 years. The bonds have a face value of \$1,000 and an 8% coupon rate, paid semiannually. The price of the bonds is \$1,100. The bonds are callable in 5 years at a call price of \$1,050. What is their yield to maturity? What is their yield to call?
- (5-9) The Garraty Company has two bond issues outstanding. Both bonds pay \$100 annual interest plus \$1,000 at maturity. Bond L has a maturity of 15 years, and Bond S has a maturity of 1 year.
- What will be the value of each of these bonds when the going rate of interest is (1) 5%, (2) 8%, and (3) 12%? Assume that there is only one more interest payment to be made on Bond S.
  - Why does the longer-term (15-year) bond fluctuate more when interest rates change than does the shorter-term bond (1 year)?
- (5-10) The Brownstone Corporation's bonds have 5 years remaining to maturity. Interest is paid annually, the bonds have a \$1,000 par value, and the coupon interest rate is 9%.
- What is the yield to maturity at a current market price of (1) \$829 or (2) \$1,104?
  - Would you pay \$829 for one of these bonds if you thought that the appropriate rate of interest was 12%—that is, if  $r_d = 12\%$ ? Explain your answer.
- (5-11) Seven years ago, Goodwynn & Wolf Incorporated sold a 20-year bond issue with a 14% annual coupon rate and a 9% call premium. Today, G&W called the bonds. The bonds originally were sold at their face value of \$1,000. Compute the realized rate of return for investors who purchased the bonds when they were issued and who surrender them today in exchange for the call price.
- (5-12) A 10-year, 12% semiannual coupon bond with a par value of \$1,000 may be called in 4 years at a call price of \$1,060. The bond sells for \$1,100. (Assume that the bond has just been issued.)
- What is the bond's yield to maturity?
  - What is the bond's current yield?
  - What is the bond's capital gain or loss yield?
  - What is the bond's yield to call?
- (5-13) You just purchased a bond that matures in 5 years. The bond has a face value of \$1,000 and has an 8% annual coupon. The bond has a current yield of 8.21%. What is the bond's yield to maturity?
- (5-14) A bond that matures in 7 years sells for \$1,020. The bond has a face value of \$1,000 and a yield to maturity of 10.5883%. The bond pays coupons semiannually. What is the bond's current yield?

- What is the holding company's beta?
- Assume that the risk-free rate is 6% and that the market risk premium is 5%. What is the holding company's required rate of return?
- ECRI is considering a change in its strategic focus: It will reduce its reliance on the electric utility subsidiary so that the percentage of its business from this subsidiary will be 50%. At the same time, ECRI will increase its reliance on the international/special projects division, and the percentage of its business from that subsidiary will rise to 15%. What will be the shareholders' required rate of return if management adopts these changes?

## PROBLEMS Answers Appear in Appendix B

### Easy Problems 1-4

- (6-1) **Portfolio Beta** Your investment club has only two stocks in its portfolio. \$20,000 is invested in a stock with a beta of 0.7, and \$35,000 is invested in a stock with a beta of 1.3. What is the portfolio's beta?
- (6-2) **Required Rate of Return** AA Industries's stock has a beta of 0.8. The risk-free rate is 4% and the expected return on the market is 12%. What is the required rate of return on AA's stock?
- (6-3) **Required Rates of Return** Suppose that the risk-free rate is 5% and that the market risk premium is 7%. What is the required return on (1) the market, (2) a stock with a beta of 1.0, and (3) a stock with a beta of 1.7? Assume that the risk-free rate is 5% and that the market risk premium is 7%.
- (6-4) **Fama-French Three-Factor Model** An analyst has modeled the stock of a company using the Fama-French three-factor model. The risk-free rate is 5%, the market return is 10%, the return on the SMB portfolio ( $r_{SMB}$ ) is 3.2%, and the return on the HML portfolio ( $r_{HML}$ ) is 4.8%. If  $a_i = 0$ ,  $b_i = 1.2$ ,  $c_i = -0.4$ , and  $d_i = 1.3$ , what is the stock's predicted return?

### Intermediate Problems 5-10

- (6-5) **Expected Return: Discrete Distribution**

A stock's return has the follow

#### Demand for the Company's Products

| Demand for the Company's Products |            | Rate of Return If This Demand Occurs (%) |
|-----------------------------------|------------|------------------------------------------|
| Weak                              |            | -50%                                     |
| Below average                     |            | -5                                       |
| Average                           | 0.4        | 16                                       |
| Above average                     | 0.2        | 25                                       |
| Strong                            | 0.1        | 60                                       |
|                                   | <u>1.0</u> |                                          |

Chapter 6  
Problems  
6-6  
6-8

- (6-6) **Expected Returns: Discrete Distribution**

Calculate the stock's expected return and standard deviation. The market and Stock J have the following probability distributions:

| Probability | $r_M$ | $r_J$ |
|-------------|-------|-------|
| 0.3         | 15%   | 20%   |
| 0.4         | 9     | 5     |
| 0.3         | 18    | 12    |

- Calculate the expected rates of return for the market and Stock J.
- Calculate the standard deviations for the market and Stock J.

(6-7) Suppose  $r_{RF} = 5\%$ ,  $r_M = 10\%$ , and  $r_A = 12\%$ .

Required Rate of Return

- Calculate Stock A's beta.
- If Stock A's beta were 2.0, then what would be A's new required rate of return?

(6-8) As an equity analyst you are concerned with what will happen to the required return to Universal Toddler Industries's stock as market conditions change. Suppose  $r_{RF} = 5\%$ ,  $r_M = 12\%$ , and  $b_{UTI} = 1.4$ .

Required Rate of Return

- Under current conditions, what is  $r_{UTI}$ , the required rate of return on UTI stock?
- Now suppose  $r_{RF}$  (1) increases to 6% or (2) decreases to 4%. The slope of the SML remains constant. How would this affect  $r_M$  and  $r_{UTI}$ ?
- Now assume  $r_{RF}$  remains at 5% but  $r_M$  (1) increases to 14% or (2) falls to 11%. The slope of the SML does not remain constant. How would these changes affect  $r_{UTI}$ ?

(6-9) Your retirement fund consists of a \$5,000 investment in each of 15 different common stocks. The portfolio's beta is 1.20. Suppose you sell one of the stocks with a beta of 0.8 for \$5,000 and use the proceeds to buy another stock whose beta is 1.6. Calculate your portfolio's new beta.

Portfolio Beta

(6-10) Suppose you manage a \$4 million fund that consists of four stocks with the following investments:

Portfolio Required Return

| Stock | Investment | Beta  |
|-------|------------|-------|
| A     | \$ 400,000 | 1.50  |
| B     | 600,000    | -0.50 |
| C     | 1,000,000  | 1.25  |
| D     | 2,000,000  | 0.75  |

If the market's required rate of return is 14% and the risk-free rate is 6%, what is the fund's required rate of return?

Challenging Problems 11-14

(6-11) You have a \$2 million portfolio consisting of a \$100,000 investment in each of 20 different stocks. The portfolio has a beta of 1.1. You are considering selling \$100,000 worth of one stock with a beta of 0.9 and using the proceeds to purchase another stock with a beta of 1.4. What will the portfolio's new beta be after these transactions?

Portfolio Beta

(6-12) Stock R has a beta of 1.5, Stock S has a beta of 0.75, the expected rate of return on an average stock is 13%, and the risk-free rate is 7%. By how much does the required return on the riskier stock exceed that on the less risky stock?

Required Rate of Return

(6-13) You are considering an investment in either individual stocks or a portfolio of stocks. The two stocks you are researching, stocks A and B, have the following historical returns:

Historical Realized Rates of Return

| Year | $\bar{r}_A$ | $\bar{r}_B$ |
|------|-------------|-------------|
| 2009 | -20.00%     | -5.00%      |
| 2010 | 42.00       | 15.00       |
| 2011 | 20.00       | -13.00      |
| 2012 | -8.00       | 50.00       |
| 2013 | 25.00       | 12.00       |

- (7-10) Preferred Stock Rate of Return What is the required rate of return on a preferred stock with a \$50 par value, a stated annual dividend of 7% of par, and a current market price of (a) \$30, (b) \$40, (c) \$50, and (d) \$70 (assume the market is in equilibrium with the required return equal to the expected return)?
- (7-11) Declining Growth Stock Valuation Brushy Mountain Mining Company's coal reserves are being depleted, so its sales are falling. Also, environmental costs increase each year, so its costs are rising. As a result, the company's earnings and dividends are declining at the constant rate of 4% per year. If  $D_0 = \$6$  and  $r_s = 14\%$ , what is the estimated value of Brushy Mountain's stock?
- (7-12) Nonconstant Growth Stock Valuation Assume that the average firm in your company's industry is expected to grow at a constant rate of 6% and that its dividend yield is 7%. Your company is about as risky as the average firm in the industry, but it has just successfully completed some R&D work that leads you to expect that its earnings and dividends will grow at a rate of 50% [ $D_1 = D_0(1 + g) = D_0(1.50)$ ] this year and 25% the following year, after which growth should return to the 6% industry average. If the last dividend paid ( $D_0$ ) was \$1, what is the estimated value per share of your firm's stock?
- (7-13) Nonconstant Growth Stock Valuation Simpkins Corporation does not pay any dividends because it is expanding rapidly and needs to retain all of its earnings. However, investors expect Simpkins to begin paying dividends, with the first dividend of \$0.50 coming 3 years from today. The dividend should grow rapidly—at a rate of 80% per year—during Years 4 and 5. After Year 5, the company should grow at a constant rate of 7% per year. If the required return on the stock is 16%, what is the value of the stock today (assume the market is in equilibrium with the required return equal to the expected return)?
- (7-14) Preferred Stock Valuation Several years ago, Rolen Riders issued preferred stock with a stated annual dividend of 10% of its \$100 par value. Preferred stock of this type currently yields 8%. Assume dividends are paid annually.
- What is the estimated value of Rolen's preferred stock?
  - Suppose interest rate levels have risen to the point that the new yield is 12%. What would be the new estimate of the value of the stock?
- (7-15) Return on Common Stock You buy a share of The Ludwig Corporation stock that has annual dividends of \$1.07, \$1.1449, and \$1.2250 in Years 1, 2, and 3, respectively. You expect to sell it at a price of \$26.22 at the end of 3 years.
- Calculate the growth rate in dividends.
  - Calculate the expected dividend yield.
  - Assuming that the calculated growth rate is equal to the dividend yield, what is the expected total rate of return? What is this stock's expected total rate of return (assume the market is in equilibrium with the required return equal to the expected return)?
- (7-16) Constant Growth Stock Valuation Investors require a 13% rate of return on Brooks Sisters's stock ( $r_s = 13\%$ ).
- What would the estimated value of Brooks's stock be if the previous dividend were  $D_0 = \$3.00$  and if investors expect dividends to grow at a constant annual rate of (1) -5%, (2) 0%, (3) 5%, and (4) 10%?
  - Using data from part a, what is the constant growth model's estimated value for Brooks Sisters's stock if the required rate of return is 13% and the expected growth rate is (1) 13% or (2) 15%? Are these reasonable results? Explain.
  - Is it reasonable to expect that a constant growth stock would have  $g > r_s$ ?
- (7-17) Value of Operations Kendra Enterprises has never paid a dividend. Free cash flow is projected to be \$80,000 and \$100,000 for the next 2 years, respectively; after the second year, FCF is expected to grow at a constant rate of 8%. The company's weighted average cost of capital is 12%.

Chapter 7

problem

7-17

low  
?

expect

7-11  
(7-18)  
Free Cash Flow  
Valuation

- a. What is the terminal, or horizon, value of operations? (*Hint: Find the value of all free cash flows beyond Year 2 discounted back to Year 2.*)  
b. Calculate the value of Kendra's operations.

Dozier Corporation is a fast-growing supplier of office products. Analysts project the following free cash flows (FCFs) during the next 3 years, after which FCF is expected to grow at a constant 7% rate. Dozier's weighted average cost of capital is  $WACC = 13\%$ .

|                              | Year  |      |      |
|------------------------------|-------|------|------|
|                              | 1     | 2    | 3    |
| Free cash flow (\$ millions) | -\$20 | \$30 | \$40 |

Challenging  
Problems 19-21

(7-19)  
Constant Growth  
Stock Valuation

- a. What is Dozier's terminal, or horizon, value? (*Hint: Find the value of all free cash flows beyond Year 3 discounted back to Year 3.*)  
b. What is the current value of operations for Dozier?  
c. Suppose Dozier has \$10 million in marketable securities, \$100 million in debt, and 10 million shares of stock. What is the intrinsic price per share?

You are analyzing Jillian's Jewlery (JJ) stock for a possible purchase. JJ just paid a dividend of \$1.50 *yesterday*. You expect the dividend to grow at the rate of 6% per year for the next 3 years; if you buy the stock, you plan to hold it for 3 years and then sell it.

- a. What dividends do you expect for JJ stock over the next 3 years? In other words, calculate  $D_1$ ,  $D_2$ , and  $D_3$ . Note that  $D_0 = \$1.50$ .  
b. JJ's stock has a required return of 13% and so this is the rate you'll use to discount dividends. Find the present value of the dividend stream; that is, calculate the PV of  $D_1$ ,  $D_2$ , and  $D_3$ , and then sum these PVs.  
c. JJ stock should trade for \$27.05 3 years from now (i.e., you expect  $\hat{P}_3 = \$27.05$ ). Discounted at a 13% rate, what is the present value of this expected future stock price? In other words, calculate the PV of \$27.05.  
d. If you plan to buy the stock, hold it for 3 years, and then sell it for \$27.05, what is the most you should pay for it?  
e. Use the constant growth model to calculate the present value of this stock. Assume that  $g = 6\%$  and is constant.  
f. Is the value of this stock dependent on how long you plan to hold it? In other words, if your planned holding period were 2 years or 5 years rather than 3 years, would this affect the value of the stock today,  $\hat{P}_0$ ? Explain your answer.

(7-20)  
Nonconstant Growth  
Stock Valuation

Reizenstein Technologies (RT) has just developed a solar panel capable of generating 200% more electricity than any solar panel currently on the market. As a result, RT is expected to experience a 15% annual growth rate for the next 5 years. By the end of 5 years, other firms will have developed comparable technology, and RT's growth rate will slow to 5% per year indefinitely. Stockholders require a return of 12% on RT's stock. The most recent annual dividend ( $D_0$ ), which was paid yesterday, was \$1.75 per share.

- a. Calculate RT's expected dividends for  $t = 1$ ,  $t = 2$ ,  $t = 3$ ,  $t = 4$ , and  $t = 5$ .  
b. Calculate the estimated intrinsic value of the stock today,  $\hat{P}_0$ . Proceed by finding the present value of the dividends expected at  $t = 1$ ,  $t = 2$ ,  $t = 3$ ,  $t = 4$ , and  $t = 5$  plus the present value of the stock price that should exist at  $t = 5$ ,  $\hat{P}_5$ . The  $\hat{P}_5$  stock price can

Intermediate  
Problems 3-4

(8-3)

## Black-Scholes Model

Assume that you have been given the following information on Purcell Industries:

Current stock price = \$15

Strike price of option = \$15

Time to maturity of option = 6 months

Risk-free rate = 6%

Variance of stock return = 0.12

 $d_1 = 0.24495$  $N(d_1) = 0.59675$  $d_2 = 0.00000$  $N(d_2) = 0.50000$ 

According to

Chapter 8  
problem 8-3

model, what is the option's value?

(8-4)

## Put-Call Parity

The current  
strike price  
the value c  
date as theual risk-free rate is 6%. A call option with a  
ation has a current value of \$6.56. What is  
with the same exercise price and expirationChallenging  
Problems 5-7

(8-5)

## Black-Scholes Model

Use the Black-Scholes Model to find the price for a call option with the following inputs:  
(1) current stock price is \$30, (2) strike price is \$35, (3) time to expiration is 4 months,  
(4) annualized risk-free rate is 5%, and (5) variance of stock return is 0.25.

(8-6)

## Binomial Model

The current price of a stock is \$20. In 1 year, the price will be either \$26 or \$16. The  
annual risk-free rate is 5%. Find the price of a call option on the stock that has a strike  
price of \$21 and that expires in 1 year. (Hint: Use daily compounding.)

(8-7)

## Binomial Model

The current price of a stock is \$15. In 6 months, the price will be either \$18 or \$13. The  
annual risk-free rate is 6%. Find the price of a call option on the stock that has a strike  
price of \$14 and that expires in 6 months. (Hint: Use daily compounding.)

## SPREADSHEET PROBLEM

(8-8)

Build a Model: Black-  
Scholes ModelStart with the partial model in the file *Ch08 P08 Build a Model.xls* on the textbook's  
Web site. You have been given the following information for a call option on the stock of  
Puckett Industries:  $P = \$65.00$ ,  $X = \$70.00$ ,  $t = 0.50$ ,  $r_{RF} = 5.00\%$  and  $\sigma = 50.00\%$ .

## RESOURCE

- Use the Black-Scholes option pricing model to determine the value of the call option.
- Suppose there is a put option on Puckett's stock with exactly the same inputs as the call option. What is the value of the put?

## MINI CASE

Assume that you have just been hired as a financial analyst by Triple Play Inc., a mid-sized California company that specializes in creating high-fashion clothing. Because no one at Triple Play is familiar with the basics of financial options, you have been asked to prepare a brief report that the firm's executives can use to gain a cursory understanding of the topic.

Chapter 9  
 problem 8  
 9-7  
 9-11

**PROBLEMS** Answers Appear in Appendix B

## Easy Problems 1-8

- (9-1) Calculate the after-tax cost of debt unde  
 After-Tax Cost of Debt  
 a.  $r_d$  of 13%, tax rate of 0%  
 b.  $r_d$  of 13%, tax rate of 20%  
 c.  $r_d$  of 13%, tax rate of 35%
- (9-2) LL Incorporated's currently outstanding 11% coupon bonds have a yield to maturity of 8%. LL believes it could issue new bonds at par that would provide a similar yield to maturity. If its marginal tax rate is 35%, what is LL's after-tax cost of debt?
- (9-3) Duggins Veterinary Supplies can issue perpetual preferred stock at a price of \$50 a share with an annual dividend of \$4.50 a share. Ignoring flotation costs, what is the company's cost of preferred stock,  $r_{ps}$ ?
- (9-4) Burnwood Tech plans to issue some \$60 par preferred stock with a 6% dividend. A similar stock is selling on the market for \$70. Burnwood must pay flotation costs of 5% of the issue price. What is the cost of the preferred stock?
- (9-5) Summerdahl Resort's common stock is currently trading at \$36 a share. The stock is expected to pay a dividend of \$3.00 a share at the end of the year ( $D_1 = \$3.00$ ), and the dividend is expected to grow at a constant rate of 5% a year. What is its cost of common equity?
- (9-6) Booher Book Stores has a beta of 0.8. The yield on a 3-month T-bill is 4%, and the yield on a 10-year T-bond is 6%. The market risk premium is 5.5%, and the return on an average stock in the market last year was 15%. What is the estimated cost of common equity using the CAPM?

(9-7) Shi Importers's balance sheet shows \$300 million in debt, \$50 million in preferred stock, and \$250 million in total common equity. Shi's tax rate is 40%,  $r_d = 6\%$ ,  $r_{ps} = 5.8\%$ , and  $r_s = 12\%$ . If Shi has a target capital structure of 30% debt, 5% preferred stock, and 65% common stock, what is its WACC?

(9-8) David Ortiz Motors has a target capital structure of 40% debt and 60% equity. The yield to maturity on the company's outstanding bonds is 9%, and the company's tax rate is 40%. Ortiz's CFO has calculated the company's WACC as 9.96%. What is the company's cost of equity capital?

## Intermediate Problems 9-14

- (9-9) A company's 6% coupon rate, semiannual payment, \$1,000 par value bond that matures in 30 years sells at a price of \$515.16. The company's federal-plus-state tax rate is 40%. What is the firm's after-tax component cost of debt for purposes of calculating the WACC? (Hint: Base your answer on the nominal rate.)
- (9-10) The earnings, dividends, and stock price of Shelby Inc. are expected to grow at 7% per year in the future. Shelby's common stock sells for \$23 per share, its last dividend was \$2.00, and the company will pay a dividend of \$2.14 at the end of the current year.
- Using the discounted cash flow approach, what is its cost of equity?
  - If the firm's beta is 1.6, the risk-free rate is 9%, and the expected return on the market is 13%, then what would be the firm's cost of equity based on the CAPM approach?

- c. If the firm's bonds earn a return of 12%, then what would be your estimate of  $r_s$  using the own-bond-yield-plus-judgmental-risk-premium approach? (Hint: Use the midpoint of the risk premium range.)
- d. On the basis of the results of parts a through c, what would be your estimate of Shelby's cost of equity?

(9-11)

Cost of Equity

Radon Homes's current EPS is \$6.50. It was \$4.42 5 years ago. The company pays out 40% of its earnings as dividends, and the stock sells for \$36.

- a. Calculate the historical growth rate in earnings. (Hint: This is a 5-year growth period.)
- b. Calculate the next expected dividend per share,  $D_1$ . (Hint:  $D_0 = 0.4(\$6.50) = \$2.60$ .) Assume that the past growth rate will continue.
- c. What is Radon's cost of equity,  $r_s$ ?

(9-12)

Calculation of  $g$  and  
EPS

Spencer Supplies's stock is currently selling for \$60 a share. The firm is expected to earn \$5.40 per share this year and to pay a year-end dividend of \$3.60.

- a. If investors require a 9% return, what rate of growth must be expected for Spencer?
- b. If Spencer reinvests earnings in projects with average returns equal to the stock's expected rate of return, then what will be next year's EPS? (Hint:  $g = \text{ROE} \times \text{Retention ratio}$ .)

(9-13)

The Cost of Equity  
and Flotation Costs

Messman Manufacturing will issue common stock to the public for \$30. The expected dividend and the growth in dividends are \$3.00 per share and 5%, respectively. If the flotation cost is 10% of the issue's gross proceeds, what is the cost of external equity,  $r_e$ ?

(9-14)

The Cost of Debt and  
Flotation Costs

Suppose a company will issue new 20-year debt with a par value of \$1,000 and a coupon rate of 9%, paid annually. The tax rate is 40%. If the flotation cost is 2% of the issue proceeds, then what is the after-tax cost of debt? Disregard the tax shield from the amortization of flotation costs.

Challenging  
Problems 15-17

(9-15)

WACC Estimation

On January 1, the total market value of the Tyseland Company was \$60 million. During the year, the company plans to raise and invest \$30 million in new projects. The firm's present market value capital structure, shown below, is considered to be optimal. There is no short-term debt.

|               |                     |
|---------------|---------------------|
| Debt          | \$30,000,000        |
| Common equity | 30,000,000          |
| Total capital | <u>\$60,000,000</u> |

New bonds will have an 8% coupon rate, and they will be sold at par. Common stock is currently selling at \$30 a share. The stockholders' required rate of return is estimated to be 12%, consisting of a dividend yield of 4% and an expected constant growth rate of 8%. (The next expected dividend is \$1.20, so the dividend yield is  $\$1.20/\$30 = 4\%$ .) The marginal tax rate is 40%.

- a. In order to maintain the present capital structure, how much of the new investment must be financed by common equity?
- b. Assuming there is sufficient cash flow for Tyseland to maintain its target capital structure without issuing additional shares of equity, what is its WACC?