CHAPTER 13
CAPITAL STRUCTURE AND LEVERAGE

(Difficulty: E = Easy, M = Medium, and T = Tough)

Multiple Choice: Conceptual

Easy:

Business risk **Answer: c Diff: E**

1. A decrease in the debt ratio will generally have no effect on _____.

   a. Financial risk.
   b. Total risk.
   c. Business risk.
   d. Market risk.
   e. None of the above is correct. (It will affect each type of risk above.)

Business risk **Answer: d Diff: E**

2. Business risk is concerned with the operations of the firm. Which of the following is not associated with (or not a part of) business risk?

   a. Demand variability.
   b. Sales price variability.
   c. The extent to which operating costs are fixed.
   d. Changes in required returns due to financing decisions.
   e. The ability to change prices as costs change.

Business risk **Answer: d Diff: E N**

3. Which of the following factors would affect a company's business risk?

   a. The level of uncertainty regarding the demand for its product.
   b. The degree of operating leverage.
   c. The amount of debt in its capital structure.
   d. Statements a and b are correct.
   e. All of the statements above are correct.

Business and financial risk **Answer: d Diff: E**

4. Which of the following statements is most correct?

   a. A firm's business risk is solely determined by the financial characteristics of its industry.
   b. The factors that affect a firm's business risk are determined partly by industry characteristics and partly by economic conditions. Unfortunately, these and other factors that affect a firm's business risk are not subject to any degree of managerial control.
   c. One of the benefits to a firm of being at or near its target capital structure is that financial flexibility becomes much less important.
   d. The firm's financial risk may have both market risk and diversifiable risk components.
   e. None of the statements above is correct.

Optimal capital structure **Answer: e Diff: E**

5. Which of the following statements is most correct?

   a. As a rule, the optimal capital structure is found by determining the debt-equity mix that maximizes expected EPS.
   b. The optimal capital structure simultaneously maximizes EPS and minimizes the WACC.
   c. The optimal capital structure minimizes the cost of equity, which is a necessary condition for maximizing the stock price.
   d. The optimal capital structure simultaneously minimizes the cost of debt, the cost of equity, and the WACC.
   e. None of the statements above is correct.

Optimal capital structure **Answer: c Diff: E**

6. From the information below, select the optimal capital structure for Minnow Entertainment Company.

   a. Debt = 40%; Equity = 60%; EPS = $2.95; Stock price = $26.50.
   b. Debt = 50%; Equity = 50%; EPS = $3.05; Stock price = $28.90.
   c. Debt = 60%; Equity = 40%; EPS = $3.18; Stock price = $31.20.
   d. Debt = 80%; Equity = 20%; EPS = $3.42; Stock price = $30.40.
   e. Debt = 70%; Equity = 30%; EPS = $3.31; Stock price = $30.00.

Optimal capital structure **Answer: e Diff: E**

7. Which of the following statements best describes the optimal capital structure?

   a. The optimal capital structure is the mix of debt, equity, and preferred stock that maximizes the company's earnings per share (EPS).
   b. The optimal capital structure is the mix of debt, equity, and preferred stock that maximizes the company's stock price.
   c. The optimal capital structure is the mix of debt, equity, and preferred stock that minimizes the company's weighted average cost of capital (WACC).
   d. Statements a and b are correct.
   e. Statements b and c are correct.

Target capital structure **Answer: e Diff: E**

8. The firm's target capital structure is consistent with which of the following?

   a. Maximum earnings per share (EPS).
   b. Minimum cost of debt (k_d).
   c. Minimum risk.
   d. Minimum cost of equity (k_s).
   e. Minimum weighted average cost of capital (WACC).

Leverage and capital structure **Answer: d Diff: E**

9. Which of the following is likely to encourage a company to use more debt in its capital structure?

   a. An increase in the corporate tax rate.
   b. An increase in the personal tax rate.
   c. A decrease in the company's degree of operating leverage.
   d. Statements a and c are correct.
   e. All of the statements above are correct.

Leverage and capital structure **Answer: e Diff: E**

10. Which of the following statements is most correct?

   a. A reduction in the corporate tax rate is likely to increase the debt ratio of the average corporation.
   b. An increase in the personal tax rate is likely to increase the debt ratio of the average corporation.
   c. If changes in the bankruptcy code make bankruptcy less costly to corporations, then this would likely reduce the debt ratio of the average corporation.
   d. All of the statements above are correct.
   e. None of the statements above is correct.

Leverage and capital structure **Answer: e Diff: E**

11. Which of the following statements is likely to encourage a firm to increase its debt ratio in its capital structure?

   a. Its sales become less stable over time.
   b. Its corporate tax rate declines.
   c. Management believes that the firm's stock is overvalued.
   d. Statements a and b are correct.
   e. None of the statements above is correct.

Leverage and capital structure **Answer: a Diff: E**

12. Which of the following factors is likely to encourage a corporation to increase the proportion of debt in its capital structure?

   a. An increase in the corporate tax rate.
   b. An increase in the personal tax rate.
   c. An increase in the company's degree of operating leverage.
   d. The company's assets become less liquid.
   e. An increase in expected bankruptcy costs.

Leverage and capital structure **Answer: e Diff: E**

13. Which of the following would increase the likelihood that a company would increase its debt ratio in its capital structure?

    a. An increase in costs incurred when filing for bankruptcy.
    b. An increase in the corporate tax rate.
    c. An increase in the personal tax rate.
    d. A decrease in the firm's business risk.
    e. Statements b and d are correct.

Leverage and capital structure **Answer: a Diff: E N**

14. Which of the following factors is likely to encourage a company to increase its debt ratio?

    a. An increase in the corporate tax rate.
    b. An increase in the personal tax rate.
    c. Its assets become less liquid.
    d. Both statements a and c are correct.
    e. All of the statements above are correct.

Leverage and capital structure **Answer: c Diff: E N**

15. Jones Co. currently is 100 percent equity financed. The company is considering changing its capital structure. More specifically, Jones' CFO is considering a recapitalization plan in which the firm would issue long-term debt with a yield of 9 percent and use the proceeds to repurchase common stock. The recapitalization would not change the company's total assets nor would it affect the company's basic earning power, which is currently 15 percent. The CFO estimates that the recapitalization will reduce the company's WACC and increase its stock price. Which of the following is also likely to occur if the company goes ahead with the planned recapitalization?

    a. The company's net income will increase.
    b. The company's earnings per share will decrease.
    c. The company's cost of equity will increase.
    d. The company's ROA will increase.
    e. The company's ROE will decrease.

Leverage and capital structure **Answer: e Diff: E N**

16. Which of the following statements is most correct?

    a. When a company increases its debt ratio, the costs of both equity and debt capital increase. Therefore, the weighted average cost of capital (WACC) must also increase.
    b. The capital structure that maximizes stock price is generally the capital structure that also maximizes earnings per share.
    c. Since debt financing is cheaper than equity financing, increasing a company's debt ratio will always reduce the company's WACC.
    d. The capital structure that maximizes stock price is generally the capital structure that also maximizes the company's WACC.
    e. None of the statements above is correct.

Leverage and capital structure **Answer: c Diff: E**

17. Which of the following statements is most correct?

a. When a company increases its debt ratio, the costs of equity and debt capital both increase. Therefore, the weighted average cost of capital (WACC) must also increase.
b. The capital structure that maximizes stock price is generally the capital structure that also maximizes earnings per share.
c. All else equal, an increase in the corporate tax rate would tend to encourage a company to increase its debt ratio.
d. Statements a and b are correct.
e. Statements a and c are correct.

Capital structure and WACC **Answer: e Diff: E**

18. Which of the following statements is most correct?

a. Since debt financing raises the firm's financial risk, increasing a company's debt ratio will always increase the company's WACC.
b. Since debt financing is cheaper than equity financing, increasing a company's debt ratio will always reduce the company's WACC.
c. Increasing a company's debt ratio will typically reduce the marginal costs of both debt and equity financing; however, it still may raise the company's WACC.
d. Statements a and c are correct.
e. None of the statements above is correct.

Capital structure, ROA, and ROE **Answer: d Diff: E**

19. Ridgefield Enterprises has total assets of $300 million. The company currently has no debt in its capital structure. The company's basic earning power is 15 percent. The company is contemplating a recapitalization where it will issue debt at 10 percent and use the proceeds to buy back shares of the company's common stock. If the company proceeds with the recapitalization its operating income, total assets, and tax rate will remain the same. Which of the following will occur as a result of the recapitalization?

a. The company's ROA will decline.
b. The company's ROE will increase.
c. The company's basic earning power will decline.
d. Statements a and b are correct.
e. All of the statements above are correct.

Capital structure, WACC, TIE, and EPS **Answer: a Diff: E**

20. Which of the following statements is most correct?

a. The capital structure that maximizes stock price is also the capital structure that minimizes the weighted average cost of capital (WACC).
b. The capital structure that maximizes stock price is also the capital structure that maximizes earnings per share.
c. The capital structure that maximizes stock price is also the capital structure that maximizes the firm's times interest earned (TIE) ratio.
d. Statements a and b are correct.
e. Statements b and c are correct.

Capital structure theory **Answer: d Diff: E**

21. Which of the following statements about capital structure theory is most correct?

    a. Signaling theory suggests firms should in normal times maintain reserve borrowing capacity that can be used if an especially good investment opportunity comes along.
    b. In general, an increase in the corporate tax rate would cause firms to use less debt in their capital structures.
    c. According to the "trade-off theory," an increase in the costs of bankruptcy would lead firms to reduce the amount of debt in their capital structures.
    d. Statements a and c are correct.
    e. All of the statements above are correct.

Miscellaneous capital structure concepts **Answer: c Diff: E N**

22. Which of the following statements is most correct?

    a. If Congress were to pass legislation that increases the personal tax rate, but decreases the corporate tax rate, this would encourage companies to increase their debt ratios.
    b. If a company were to issue debt and use the money to repurchase common stock, this action would have no impact on the company's return on assets. (Assume that the repurchase has no impact on the company's operating income.)
    c. If a company were to issue debt and use the money to increase assets, this action would increase the company's return on equity. (Assume that the company's return on assets remains unchanged.)
    d. Statements a and b are correct.
    e. Statements b and c are correct.

Financial leverage and EPS **Answer: a Diff: E**

23. Volga Publishing is considering a proposed increase in its debt ratio, which will also increase the company's interest expense. The plan would involve the company issuing new bonds and using the proceeds to buy back shares of its common stock. The company's CFO expects that the plan will not change the company's total assets or operating income. How-ever, the company's CFO does estimate that it will increase the company's earnings per share (EPS). Assuming the CFO's estimates are correct, which of the following statements is most correct?

    a. Since the proposed plan increases Volga's financial risk, the company's stock price still might fall even though its EPS is expected to increase.
    b. If the plan reduces the company's WACC, the company's stock price is also likely to decline.
    c. Since the plan is expected to increase EPS, this implies that net income is also expected to increase.
    d. Statements a and b are correct.
    e. Statements a and c are correct.

Financial leverage and EPS **Answer: c Diff: E**

24. Which of the following statements is most correct?

a. Increasing financial leverage is one way to increase a firm's basic earning power (BEP).
b. Firms with lower fixed costs tend to have greater operating leverage.
c. The debt ratio that maximizes EPS generally exceeds the debt ratio that maximizes share price.
d. Statements a and b are correct.
e. Statements a and c are correct.

Financial leverage and ratios **Answer: d Diff: E**

25. Company A and Company B have the same tax rate, the same total assets, and the same basic earning power. Both companies have a basic earning power that exceeds their before-tax costs of debt, k_d. However, Company A has a higher debt ratio and higher interest expense than Company B. Which of the following statements is most correct?

a. Company A has a lower net income than B.
b. Company A has a lower ROA than B.
c. Company A has a lower ROE than B.
d. Statements a and b are correct.
e. None of the statements above is correct.

Financial leverage and ratios **Answer: b Diff: E**

26. Firm U and Firm L each have the same total assets. Both firms also have a basic earning power of 20 percent. Firm U is 100 percent equity financed, while Firm L is financed with 50 percent debt and 50 percent equity. Firm L's debt has a before-tax cost of 8 percent. Both firms have positive net income. Which of the following statements is most correct?

a. The two companies have the same times interest earned (TIE) ratio.
b. Firm L has a lower ROA than Firm U.
c. Firm L has a lower ROE than Firm U.
d. Statements a and b are correct.
e. Statements b and c are correct.

Medium:

Optimal capital structure **Answer: d Diff: M**

27. As a general rule, the capital structure that

a. Maximizes expected EPS also maximizes the price per share of common stock.
b. Minimizes the interest rate on debt also maximizes the expected EPS.
c. Minimizes the required rate on equity also maximizes the stock price.
d. Maximizes the price per share of common stock also minimizes the weighted average cost of capital.
e. None of the statements above is correct.

Operating and financial leverage **Answer: e Diff: M**

28. Which of the following statements is most correct?

a. Firms whose sales are very sensitive to changes in the business cycle are more likely to rely on debt financing.
b. Firms with large tax loss carry forwards are more likely to rely on debt financing.
c. Firms with a high operating leverage are more likely to rely on debt financing.
d. Statements a and c are correct.
e. None of the statements above is correct.

Financial leverage and ratios **Answer: c Diff: M**

29. Company A and Company B have the same total assets, operating income (EBIT), tax rate, and business risk. Company A, however, has a much higher debt ratio than Company B. Company A's basic earning power (BEP) exceeds its cost of debt financing (k_d). Which of the following statements is most correct?

a. Company A has a higher return on assets (ROA) than Company B.
b. Company A has a higher times interest earned (TIE) ratio than Company B.
c. Company A has a higher return on equity (ROE) than Company B, and its risk, as measured by the standard deviation of ROE, is also higher than Company B's.
d. Statements b and c are correct.
e. All of the statements above are correct.

Limits of leverage **Answer: d Diff: M**

30. Which of the following are practical difficulties associated with capital structure and degree of leverage analyses?

a. It is nearly impossible to determine exactly how P/E ratios or equity capitalization rates (k_s values) are affected by different degrees of financial leverage.
b. Managers' attitudes toward risk differ and some managers may set a target capital structure other than the one that would maximize stock price.
c. Managers often have a responsibility to provide continuous service; they must preserve the long-run viability of the enterprise. Thus, the goal of employing leverage to maximize short-run stock price and minimize capital cost may conflict with long-run viability.
d. All of the statements above are correct.
e. None of the statements above represents a serious impediment to the practical application of leverage analysis in capital structure determination.

Signaling theory **Answer: b Diff: M**

31. If you know that your firm is facing relatively poor prospects but needs new capital, and you know that investors do not have this information, signaling theory would predict that you would

a. Issue debt to maintain the returns of equity holders.
b. Issue equity to share the burden of decreased equity returns between old and new shareholders.
c. Be indifferent between issuing debt and equity.
d. Postpone going into capital markets until your firm's prospects improve.
e. Convey your inside information to investors using the media to eliminate the information asymmetry.

Capital structure and WACC **Answer: d Diff: M**

32. Which of the following statements is most correct?

a. The optimal capital structure minimizes the WACC.
b. If the after-tax cost of equity financing exceeds the after-tax cost of debt financing, firms are always able to reduce their WACC by increasing the amount of debt in their capital structure.
c. Increasing the amount of debt in a firm's capital structure is likely to increase the costs of both debt and equity financing.
d. Statements a and c are correct.
e. Statements b and c are correct.

Capital structure and WACC **Answer: b Diff: M**

33. Which of the following statements is most correct?

a. A firm can use retained earnings without paying a flotation cost. Therefore, while the cost of retained earnings is not zero, the cost of retained earnings is generally lower than the after-tax cost of debt financing.
b. The capital structure that minimizes the firm's weighted average cost of capital is also the capital structure that maximizes the firm's stock price.
c. The capital structure that minimizes the firm's weighted average cost of capital is also the capital structure that maximizes the firm's earnings per share.
d. If a firm finds that the cost of debt financing is currently less than the cost of equity financing, an increase in its debt ratio will always reduce its weighted average cost of capital.
e. Statements a and b are correct.

Miscellaneous capital structure concepts **Answer: a Diff: M**

34. Which of the following statements is most correct?

a. In general, a firm with low operating leverage has a small proportion of its total costs in the form of fixed costs.
b. An increase in the personal tax rate would not affect firms' capital structure decisions.
c. A firm with high business risk is more likely to increase its use of financial leverage than a firm with low business risk, assuming all else equal.
d. Statements a and b are correct.
e. All of the statements above are correct.

Miscellaneous capital structure concepts **Answer: c Diff: M**

35. Which of the following statements is correct?

a. "Business risk" is differentiated from "financial risk" by the fact that financial risk reflects only the use of debt, while business risk reflects both the use of debt and such factors as sales variability, cost variability, and operating leverage.
b. If corporate tax rates were decreased while other things were held constant, and if the Modigliani-Miller tax-adjusted tradeoff theory of capital structure were correct, this would tend to cause corporations to increase their use of debt.
c. If corporate tax rates were decreased while other things were held constant, and if the Modigliani-Miller tax-adjusted tradeoff theory of capital structure were correct, this would tend to cause corporations to decrease their use of debt.
d. The optimal capital structure is the one that simultaneously (1) maximizes the price of the firm's stock, (2) minimizes its WACC, and (3) maximizes its EPS.
e. None of the statements above is correct.

Tough:

Variations in capital structures **Answer: d Diff: T**

36. Which of the following is correct?

a. Generally, debt to total assets ratios do not vary much among different industries although they do vary for firms within a particular industry.
b. Utilities generally have very high common equity ratios due to their need for vast amounts of equity-supported capital.
c. The drug industry has a high debt to common equity ratio because their earnings are very stable and thus, can support the large interest costs associated with higher debt levels.
d. Wide variations in capital structures exist between industries and also between individual firms within industries and are influenced by unique firm factors including managerial attitudes.
e. Since most stocks sell at or around their book values, using accounting values provides an accurate picture of a firm's capital structure.

Multiple Choice: Problems

Easy:

Determining price from EBIT **Answer: e Diff: E**

37. The Price Company will produce 55,000 widgets next year. Variable costs will equal 40 percent of sales, while fixed costs will total $110,000. At what price must each widget be sold for the company to achieve an EBIT of $95,000?

    a. $2.00
    b. $4.45
    c. $5.00
    d. $5.37
    e. $6.21

Breakeven price **Answer: a Diff: E**

38. Texas Products Inc. has a division that makes burlap bags for the citrus industry. The division has fixed costs of $10,000 per month, and it expects to sell 42,000 bags per month. If the variable cost per bag is $2.00, what price must the division charge in order to break even?

    a. $2.24
    b. $2.47
    c. $2.82
    d. $3.15
    e. $2.00

Medium:

New financing **Answer: a Diff: M**

39. The Altman Company has a debt ratio of 33.33 percent, and it needs to raise $100,000 to expand. Management feels that an optimal debt ratio would be 16.67 percent. Sales are currently $750,000, and the total assets turnover is 7.5. How should the expansion be financed so as to produce the desired debt ratio?

    a. 100% equity
    b. 100% debt
    c. 20 percent debt, 80 percent equity
    d. 40 percent debt, 60 percent equity
    e. 50 percent debt, 50 percent equity

Net operating income **Answer: b Diff: M**

40. The Congress Company has identified two methods for producing playing cards. One method involves using a machine having a fixed cost of $10,000 and variable costs of $1.00 per deck of cards. The other method would use a less expensive machine (fixed cost = $5,000), but it would require greater variable costs ($1.50 per deck of cards). If the selling price per deck of cards will be the same under each method, at what level of output will the two methods produce the same net operating income?

a. 5,000 decks
b. 10,000 decks
c. 15,000 decks
d. 20,000 decks
e. 25,000 decks

Change in breakeven volume **Answer: b Diff: M**

41. Hensley Corporation uses breakeven analysis to study the effects of expansion projects it considers. Currently, the firm's plastic bag business segment has fixed costs of $120,000, while its unit price per carton is $1.20 and its variable unit cost is $0.60. The firm is considering a new bag machine and an automatic carton folder as modifications to its existing production lines. With the expansion, fixed costs would rise to $240,000, but variable cost would drop to $0.41 per unit. One key benefit is that Hensley can lower its wholesale price to its distributors to $1.05 per carton (that is, its selling price), and this would likely more than double its market share, as it will become the lowest cost producer. What is the change in the breakeven volume with the proposed project?

a. 100,000 units
b. 175,000 units
c. 75,000 units
d. 200,000 units
e. 0 units

Breakeven and expansion **Answer: c Diff: M**

42. Martin Corporation currently sells 180,000 units per year at a price of $7.00 per unit; its variable cost is $4.20 per unit; and fixed costs are $400,000. Martin is considering expanding into two additional states, which would increase its fixed costs to $650,000 and would increase its variable unit cost to an average of $4.48 per unit. If Martin expands, it expects to sell 270,000 units at $7.00 per unit. By how much will Martin's breakeven sales dollar level change?

a. $ 183,333
b. $ 456,500
c. $ 805,556
d. $ 910,667
e. $1,200,000

Breakeven **Answer: d Diff: M**

43. Elephant Books sells paperback books for $7 each. The variable cost per book is $5. At current annual sales of 200,000 books, the publisher is just breaking even. It is estimated that if the authors' royalties are reduced, the variable cost per book will drop by $1. Assume authors' royalties are reduced and sales remain constant; how much more money can the publisher put into advertising (a fixed cost) and still break even?

a. $600,000
b. $466,667
c. $333,333
d. $200,000
e. $175,225

Operating decision **Answer: d Diff: M**

44. Musgrave Corporation has fixed costs of $46,000 and variable costs that are 30 percent of the current sales price of $2.15. At a price of $2.15, Musgrave sells 40,000 units. Musgrave can increase sales by 10,000 units by cutting its unit price from $2.15 to $1.95, but variable cost per unit won't change. Should it cut its price?

a. No, EBIT decreases by $6,000.
b. No, EBIT decreases by $250.
c. Yes, EBIT increases by $11,500.
d. Yes, EBIT increases by $8,050.
e. Yes, EBIT increases by $5,050.

Capital structure and stock price **Answer: c Diff: M**

45. The following information applies to Lott Enterprises:

Operating income (EBIT)	$300,000	Shares outstanding	120,000
Debt	$100,000	EPS	$1.45
Interest expense	$ 10,000	Stock price	$17.40
Tax rate	40%		

The company is considering a recapitalization where it would issue $348,000 worth of new debt and use the proceeds to buy back $348,000 worth of common stock. The buyback will be undertaken at the pre-recapitalization share price ($17.40). The recapitalization is not expected to have an effect on operating income or the tax rate. After the recapitalization, the company's interest expense will be $50,000.

Assume that the recapitalization has no effect on the company's price earnings (P/E) ratio. What is the expected price of the company's stock following the recapitalization?

a. $15.30
b. $17.75
c. $18.00
d. $19.03
e. $20.48

Capital structure and stock price **Answer: e Diff: M**

46. A consultant has collected the following information regarding Young Publishing:

Total assets	$3,000 million	Tax rate	40%
Operating income (EBIT)	$800 million	Debt ratio	0%
Interest expense	$0 million	WACC	10%
Net income	$480 million	M/B ratio	1.00×
Share price	$32.00	EPS = DPS	$3.20

The company has no growth opportunities (g = 0), so the company pays out all of its earnings as dividends (EPS = DPS). Young's stock price can be calculated by simply dividing earnings per share by the required return on equity capital, which currently equals the WACC because the company has no debt.

The consultant believes that the company would be much better off if it were to change its capital structure to 40 percent debt and 60 percent equity. After meeting with investment bankers, the consultant concludes that the company could issue $1,200 million of debt at a before-tax cost of 7 percent, leaving the company with interest expense of $84 million. The $1,200 million raised from the debt issue would be used to repurchase stock at $32 per share. The repurchase will have no effect on the firm's EBIT; however, after the repurchase, the cost of equity will increase to 11 percent. If the firm follows the consultant's advice, what will be its estimated stock price after the capital structure change?

a. $32.00
b. $33.48
c. $31.29
d. $32.59
e. $34.72

Tough:

Hamada equation and cost of equity **Answer: a Diff: T**

47. Simon Software Co. is trying to estimate its optimal capital structure. Right now, Simon has a capital structure that consists of 20 percent debt and 80 percent equity. (Its D/E ratio is 0.25.) The risk-free rate is 6 percent and the market risk premium, $k_M - k_{RF}$, is 5 percent. Currently the company's cost of equity, which is based on the CAPM, is 12 percent and its tax rate is 40 percent. What would be Simon's estimated cost of equity if it were to change its capital structure to 50 percent debt and 50 percent equity?

a. 14.35%
b. 30.00%
c. 14.72%
d. 15.60%
e. 13.64%

Optimal capital structure and Hamada equation **Answer: d Diff: T**

48. Aaron Athletics is trying to determine its optimal capital structure. The company's capital structure consists of debt and common stock. In order to estimate the cost of debt, the company has produced the following table:

Debt-to-total-assets ratio (w_d)	Equity-to-total-assets ratio (w_c)	Debt-to-equity ratio (D/E)	Bond rating	Before-tax cost of debt
0.10	0.90	0.10/0.90 = 0.11	AA	7.0%
0.20	0.80	0.20/0.80 = 0.25	A	7.2
0.30	0.70	0.30/0.70 = 0.43	A	8.0
0.40	0.60	0.40/0.60 = 0.67	BB	8.8
0.50	0.50	0.50/0.50 = 1.00	B	9.6

The company's tax rate, T, is 40 percent.

The company uses the CAPM to estimate its cost of common equity, k_s. The risk-free rate is 5 percent and the market risk premium is 6 percent. Aaron estimates that if it had no debt its beta would be 1.0. (Its "unlevered beta," b_U, equals 1.0.)

On the basis of this information, what is the company's optimal capital structure, and what is the firm's weighted average cost of capital (WACC) at this optimal capital structure?

a. $w_c = 0.9$; $w_d = 0.1$; WACC = 14.96%
b. $w_c = 0.8$; $w_d = 0.2$; WACC = 10.96%
c. $w_c = 0.7$; $w_d = 0.3$; WACC = 7.83%
d. $w_c = 0.6$; $w_d = 0.4$; WACC = 10.15%
e. $w_c = 0.5$; $w_d = 0.5$; WACC = 10.18%

Capital structure and stock price **Answer: d Diff: T**

49. Zippy Pasta Corporation (ZPC) has a constant growth rate of 7 percent. The company retains 30 percent of its earnings to fund future growth. ZPC's expected EPS (EPS_1) and k_s for various capital structures are given below. What is the optimal capital structure for ZPC?

Debt/Total Assets	Expected EPS	k_s
20%	$2.50	15.0%
30	3.00	15.5
40	3.25	16.0
50	3.75	17.0
70	4.00	18.0

a. Debt/Total Assets = 20%
b. Debt/Total Assets = 30%
c. Debt/Total Assets = 40%
d. Debt/Total Assets = 50%
e. Debt/Total Assets = 70%

Capital structure and stock price **Answer: b Diff: T**

50. Given the following choices, what is the optimal capital structure for Chip Co.? (Assume that the company's growth rate is 2 percent.)

Debt Ratio	Dividends Per Share	Cost of Equity (k_s)
0%	$5.50	11.5%
25	6.00	12.0
40	6.50	13.0
50	7.00	14.0
75	7.50	15.0

a. 0% debt; 100% equity
b. 25% debt; 75% equity
c. 40% debt; 60% equity
d. 50% debt; 50% equity
e. 75% debt; 25% equity

Capital structure and stock price **Answer: a Diff: T**

51. Flood Motors is an all-equity firm with 200,000 shares outstanding. The company's EBIT is $2,000,000, and EBIT is expected to remain constant over time. The company pays out all of its earnings each year, so its earnings per share equals its dividends per share. The company's tax rate is 40 percent.

The company is considering issuing $2 million worth of bonds (at par) and using the proceeds for a stock repurchase. If issued, the bonds would have an estimated yield to maturity of 10 percent. The risk-free rate in the economy is 6.6 percent, and the market risk premium is 6 percent. The company's beta is currently 0.9, but its investment bankers estimate that the company's beta would rise to 1.1 if it proceeds with the recapitalization.

Assume that the shares are repurchased at a price equal to the stock market price prior to the recapitalization. What would be the company's stock price following the recapitalization?

a. $51.14
b. $53.85
c. $56.02
d. $68.97
e. $76.03

Capital structure and stock price **Answer: a Diff: T**

52. Etchabarren Electronics has made the following forecast for the upcoming year based on the company's current capitalization:

Interest expense	$2,000,000
Operating income (EBIT)	$20,000,000
Earnings per share	$3.60

The company has $20 million worth of debt outstanding and all of its debt yields 10 percent. The company's tax rate is 40 percent. The company's price earnings (P/E) ratio has traditionally been 12×, so the company forecasts that under the current capitalization its stock price will be $43.20 at year end.

The company's investment bankers have suggested that the company recapitalize. Their suggestion is to issue enough new bonds at a yield of 10 percent to repurchase 1 million shares of common stock. Assume that the stock can be repurchased at today's $40 stock price.

Assume that the repurchase will have no effect on the company's operating income; however, the repurchase will increase the company's dollar interest expense. Also, assume that as a result of the increased financial risk the company's price earnings (P/E) ratio will be 11.5 after the repurchase. Given these assumptions, what would be the expected year-end stock price if the company proceeded with the recapitalization?

a. $48.30
b. $42.56
c. $44.76
d. $40.34
e. $46.90

Capital structure and stock price **Answer: d Diff: T**

53. Lascheid Enterprises is an all-equity firm with 175,000 shares outstanding. The company's stock price is currently $80 a share. The company's EBIT is $2,000,000, and EBIT is expected to remain constant over time. The company pays out all of its earnings each year, so its earnings per share equals its dividends per share. The firm's tax rate is 30 percent.

The company is considering issuing $800,000 worth of bonds and using the proceeds for a stock repurchase. If issued, the bonds would have an estimated yield to maturity of 8 percent. The risk-free rate is 5 percent and the market risk premium is also 5 percent. The company's beta is currently 1.0, but its investment bankers estimate that the company's beta would rise to 1.2 if it proceeded with the recapitalization. What would be the company's stock price following the repurchase transaction?

a. $106.67
b. $102.63
c. $ 77.14
d. $ 74.67
e. $ 70.40

Capital structure and EPS **Answer: d Diff: T**

54. Buchanan Brothers anticipates that its net income at the end of the year will be $3.6 million (before any recapitalization). The company currently has 900,000 shares of common stock outstanding and has no debt. The company's stock trades at $40 a share. The company is considering a recapitalization, where it will issue $10 million worth of debt at a yield to maturity of 10 percent and use the proceeds to repurchase common stock. Assume the stock price remains unchanged by the transaction, and the company's tax rate is 34 percent. What will be the company's earnings per share, if it proceeds with the recapitalization?

a. $2.23
b. $2.45
c. $3.26
d. $4.52
e. $5.54

Capital structure and EPS **Answer: a Diff: T**

55. TCH Corporation is considering two alternative capital structures with the following characteristics.

	A	B
Debt/Assets ratio	0.3	0.7
k_d	10%	14%

The firm will have total assets of $500,000, a tax rate of 40 percent, and a book value per share of $10, regardless of the capital structure. EBIT is expected to be $200,000 for the coming year. What is the difference in earnings per share (EPS) between the two alternatives?

a. $2.87
b. $7.62
c. $4.78
d. $3.03
e. $1.19

Capital structure, leverage, and WACC **Answer: d Diff: T N**

56. Pennington Airlines currently has a beta of 1.2. The company's capital structure consists of $7 million of equity and $3 million of debt. The company is considering changing its capital structure. Under the proposed plan the company would increase its debt by $2 million and use the proceeds to repurchase common stock. (So, after the plan is completed, the company will have $5 million of debt and $5 million of equity.) The company estimates that if it goes ahead with the plan, its bonds will have a nominal yield to maturity of 8.5 percent. The company's tax rate is 40 percent. The risk-free rate is 6 percent and the market risk premium is 7 percent. What is the company's estimated WACC if it goes ahead with the plan?

a. 8.35%
b. 9.75%
c. 12.27%
d. 10.90%
e. 11.45%

Multiple Part:

(The following information applies to the next four problems.)

Copybold Corporation is a start-up firm considering two alternative capital structures, one is conservative and the other aggressive. The conservative capital structure calls for a D/A ratio = 0.25, while the aggressive strategy calls for D/A = 0.75. Once the firm selects its target capital structure, it envisions two possible scenarios for its operations: Feast or Famine. The Feast scenario has a 60 percent probability of occurring and forecasted EBIT in this state is $60,000. The Famine state has a 40 percent chance of occurring and expected EBIT is $20,000. Further, if the firm selects the conservative capital structure its cost of debt will be 10 percent, while with the aggressive capital structure its debt cost will be 12 percent. The firm will have $400,000 in total assets, it will face a 40 percent marginal tax rate, and the book value of equity per share under either scenario is $10.00 per share.

Capital structure and EPS **Answer: e Diff: M**

57. What is the difference between the EPS forecasts for Feast and Famine under the aggressive capital structure?

a. $ 0
b. $1.48
c. $0.62
d. $0.98
e. $2.40

Capital structure and EPS **Answer: b Diff: M**

58. What is the difference between the EPS forecasts for Feast and Famine under the conservative capital structure?

a. $1.00
b. $0.80
c. $2.20
d. $0.44
e. $ 0

Capital structure and CV of EPS **Answer: c Diff: M**

59. What is the coefficient of variation of expected EPS under the aggressive capital structure?

a. 1.00
b. 1.18
c. 2.45
d. 2.88
e. 3.76

Capital structure and CV of EPS **Answer: a Diff: M**

60. What is the coefficient of variation of expected EPS under the conservative capital structure?

a. 0.58
b. 0.39
c. 0.15
d. 0.23
e. 1.00

(The following information applies to the next three problems.)

Currently, the Fotopoulos Corporation's balance sheet is as follows:

Assets	$5 billion	Debt	$1 billion
		Common equity	4 billion
Total assets	$5 billion	Total debt & common equity	$5 billion

The book value of the company (both debt and common equity) equals its market value (both debt and common equity). Furthermore, the company has determined the following information:

- The company estimates that its before-tax cost of debt is 7.5 percent.
- The company estimates that its levered beta is 1.1.
- The risk-free rate is 5 percent.
- The market risk premium, $k_M - k_{RF}$, is 6 percent.
- The company's tax rate is 40 percent.

In addition, the Fotopoulos Corporation is considering a recapitalization. The proposed plan is to issue $1 billion worth of debt and to use the money to repurchase $1 billion worth of common stock. As a result of this recapitalization, the firm's size will not change.

Capital structure and WACC **Answer: c Diff: E N**

61. What is Fotopoulos' current WACC (before the proposed recapitalization)?

a. 5.92%
b. 9.88%
c. 10.18%
d. 10.78%
e. 11.38%

Hamada equation and unlevered beta **Answer: c Diff: E N**

62. What is Fotopoulos' current unlevered beta (before the proposed recapitalization)?

a. 0.6213
b. 0.8962
c. 0.9565
d. 1.0041
e. 1.2700

Hamada equation and cost of common equity **Answer: e Diff: M N**

63. What will be the company's new cost of common equity if it proceeds with the recapitalization? (Hint: Be sure that the beta you use is carried out to 4 decimal places.)

a. 10.74%
b. 11.62%
c. 12.27%
d. 12.62%
e. 13.03%

(The following information applies to the next two problems.)

An analyst has collected the following information regarding the Milbrett Corporation:

- Total assets = $100 million.
- Basic earning power (BEP) = 20%.
- Tax rate = 40%.

Currently, the company has no debt or preferred stock and its interest expense and preferred dividends equal zero. The book value and market value of common equity equals $100 million. The company has 5 million outstanding shares of common stock, and its stock price is $20 a share.

Milbrett is considering a recapitalization, where they will issue $20 million of debt and use the proceeds to buy back common stock at the current price of $20 a share. As a result of the recapitalization, the size of the firm will not change. Assume that the newly-issued debt will have a before-tax cost of 8 percent. Assume that the recapitalization will have no effect on the company's basic earning power.

Capital structure, financial leverage, and ratios **Answer: d Diff: E N**

64. Which of the following is likely to occur following the recapitalization?

a. The company's net income will increase.
b. The company's ROA will increase.
c. The company's operating income will decrease.
d. The company's ROE will increase.
e. None of the statements above is correct.

Capital structure and EPS **Answer: c Diff: T N**

65. Assume that after the recapitalization the company's times-interest-earned ratio will be 12.5. What is Milbrett's expected earnings per share following the recapitalization?

a. $2.44
b. $2.62
c. $2.76
d. $2.80
e. $2.88

(The following information applies to the next two problems.)

Financial analysts for Naulls Industries have revealed the following information about the company:

- Naulls Industries currently has a capital structure that consists of 75 percent common equity and 25 percent debt.
- The risk-free rate, k_{RF}, is 5 percent.
- The market risk premium , $k_M - k_{RF}$, is 6 percent.
- Naulls's common stock has a beta of 1.2.
- Naulls has 20-year bonds outstanding with an annual coupon rate of 12 percent and a face value of $1,000. The bonds sell today for $1,200.
- The company's tax rate is 40 percent.

Hamada equation and unlevered beta **Answer: c Diff: E N**

66. What is the company's unlevered beta?

a. 0.43
b. 0.93
c. 1.00
d. 1.06
e. 1.44

Hamada equation and cost of common equity **Answer: c Diff: M N**

67. What would be the company's new cost of common equity (using the CAPM) if it were to change its capital structure to 40 percent debt and 60 percent common equity? (Note: Here we are asking for the new cost of common equity, not the WACC!)

a. 11.36%
b. 12.62%
c. 13.40%
d. 14.30%
e. 16.40%

(The following information applies to the next four problems.)

Stewart Inc. has $4,000,000 in total assets. The company's current capital structure consists of 25 percent debt and 75 percent common equity. Currently, the company's before-tax cost of debt is 8 percent. The risk-free rate (k_{RF}) is 5 percent and the market risk premium ($k_M - k_{RF}$) is also 5 percent. At the firm's current capital structure, the company's beta is 1.15 (i.e., its current cost of common equity is 10.75 percent). Stewart's operating income (EBIT) is $300,000, its interest expense is $80,000, and its tax rate is 40 percent. The company has 80,000 outstanding shares of common stock. The company's net income is currently $132,000, and its earnings per share (EPS) is $1.65. The company pays out all of its earnings as dividends (EPS = DPS), and hence its growth rate is zero. Thus, its stock price is simply EPS/k_s; where k_s is the cost of common equity. It follows that the company's stock price is currently $15.3488 ($1.65/0.1075).

Capital structure, leverage, and WACC **Answer: c Diff: E N**

68. What is the company's WACC?

a. 6.29%
b. 8.86%
c. 9.26%
d. 10.06%
e. 10.70%

Hamada equation and unlevered beta **Answer: b Diff: M N**

69. What is the company's unlevered beta?

a. 0.4107
b. 0.9583
c. 1.0000
d. 1.0147
e. 1.3800

Hamada equation and cost of common equity **Answer: d Diff: M N**

70. The company is considering changing its capital structure. Specifically, the firm is considering a capital structure that consists of 50 percent debt and 50 percent common equity. In order to make this change, the company would issue additional debt and use the proceeds to repurchase common stock. Assume that if the firm adopts this change, its total interest expense would now be $200,000. Assume that the capital structure change would have no effect on the company's total assets, operating income, or tax rate. Assume that all common shares will be repurchased at $16 a share, which is slightly above the current stock price of $15.3488. What would be the company's new cost of common equity if it adopts a capital structure that consists of 50 percent debt and 50 percent common equity?

a. 11.23%
b. 11.71%
c. 12.25%
d. 12.67%
e. 13.00%

Capital structure, leverage, and EPS **Answer: c Diff: M N**

71. What would be the company's earnings per share, if it adopts a capital structure with 50 percent debt and 50 percent common equity?

a. $0.75
b. $2.46
c. $3.43
d. $4.04
e. $6.86

Web Appendix 13A

Multiple Choice: Conceptual

Easy:

DOL, DFL, and DTL **Answer: c Diff: E**

13A-1. Which of the following statements is most correct?

a. An increase in fixed costs, (holding sales and variable costs constant) will reduce the company's degree of operating leverage.
b. An increase in interest expense will reduce the company's degree of financial leverage.
c. If the company has no debt outstanding, then its degree of total leverage equals its degree of operating leverage.
d. Answers a and b are correct.
e. Answers b and c are correct.

Medium:

Financial leverage **Answer: e Diff: M**

13A-2. The use of financial leverage by the firm has a potential impact on which of the following?

(1) The risk associated with the firm.
(2) The return experienced by the shareholder.
(3) The variability of net income.
(4) The degree of operating leverage.
(5) The degree of financial leverage.

a. 1, 3, 5
b. 1, 2, 5
c. 2, 3, 5
d. 2, 3, 4, 5
e. 1, 2, 3, 5

Financial leverage **Answer: d Diff: M**

13A-3. If a firm uses debt financing (Debt ratio = 0.40) and sales change from the current level, which of the following statements is most correct?

a. The percentage change in net operating income (EBIT) resulting from the change in sales will exceed the percentage change in net income (NI).
b. The percentage change in EBIT will equal the percentage change in net income.
c. The percentage change in net income relative to the percentage change in sales (and in EBIT) will not depend on the interest rate paid on the debt.
d. The percentage change in net operating income will be less than the percentage change in net income.
e. Since debt is used, the degree of operating leverage must be greater than 1.

Financial risk **Answer: b Diff: M**

13A-4. Which of the following statements is most correct?

a. Suppose Company A's EPS is expected to experience a larger percentage change in response to a given percentage change in sales than Company B's EPS. Other things held constant, Company A would appear to have more business risk than Company B.
b. Statement a would be correct if the term "EBIT" were substituted for "EPS."
c. Statement a would be correct if the term "EBIT" were substituted for "sales."
d. Statement a would be correct if the words "financial risk" were substituted for "business risk."
e. The statements above are false.

Operating and financial leverage **Answer: a Diff: M**

13A-5. Which of the following statements is most correct?

a. The degree of operating leverage (DOL) depends on a company's fixed costs, variable costs, and sales. The DOL formula assumes (1) that fixed costs are constant and (2) that variable costs are a constant proportion of sales.
b. The degree of total leverage (DTL) is equal to the DOL plus the degree of financial leverage (DFL).
c. Arithmetically, financial leverage and operating leverage offset one another so as to keep the degree of total leverage constant. Therefore, the formula shows that the greater the degree of financial leverage, the smaller the degree of operating leverage.
d. The statements above are true.
e. The statements above are false.

Operating and financial leverage **Answer: e Diff: M**

13A-6. Which of the following statements is most correct?

a. All else being equal, an increase in a firm's fixed costs will increase its degree of operating leverage.
b. Firms that have large fixed costs and low variable costs have a higher degree of financial leverage than do firms with low fixed costs and high variable costs.
c. If a firm's net income rises 10 percent every time its EBIT rises 10 percent, this implies the firm has no debt outstanding.
d. None of the statements above is correct.
e. Answers a and c are correct.

DOL **Answer: c Diff: M**

13A-7. The degree of operating leverage has which of the following characteristics?

a. The closer the firm is operating to breakeven quantity, the smaller the DOL.
b. A change in quantity demanded will produce the same percentage change in EBIT as an identical change in price per unit of output, other things held constant.
c. The DOL is not a fixed number for a given firm, but will depend upon the time zero values of the economic variables Q (Quantity), P (Price), and V (Volume).
d. The DOL relates the change in net income to the change in net operating income.
e. If the firm has no debt, the DOL will equal 1.

Debt ratio and DOL **Answer: a Diff: M**

13A-8. Company D has a 50 percent debt ratio, whereas Company E has no debt financing. The two companies have the same level of sales, and the same degree of operating leverage. Which of the following statements is most correct?

a. If sales increase 10 percent for both companies, then Company D will have a larger percentage increase in its net income.
b. If sales increase 10 percent for both companies, then Company D will have a larger percentage increase in its operating income (EBIT).
c. If EBIT increases 10 percent for both companies, then Company D's net income will rise by more than 10 percent, while Company E's net income will rise by less than 10 percent.
d. Answers a and c are correct.
e. None of the answers above is correct.

Degree of leverage **Answer: a Diff: M**

13A-9. Which of the following is a key benefit of using the degree of leverage concept in financial analysis?

a. It allows decision makers a relatively clear assessment of the consequences of alternative actions.
b. It establishes the optimal capital structure for the firm.
c. It shows how a given change in leverage will affect sales.
d. All of the statements above.
e. Only statements a and c above are correct.

Multiple Choice: Problems

Easy:

DOL and changes in EBIT **Answer: a Diff: E**

13A-10. Maxvill Motors has annual sales of $15,000. Its variable costs equal 60 percent of its sales, and its fixed costs equal $1,000. If the company's sales increase 10 percent, what will be the percentage increase in the company's earnings before interest and taxes (EBIT)?

a. 12%
b. 14%
c. 16%
d. 18%
e. 20%

DTL and forecast EPS **Answer: d Diff: E**

13A-11. Quick Launch Rocket Company, a satellite launching firm, expects its sales to increase by 50 percent in the coming year as a result of NASA's recent problems with the space shuttle. The firm's current EPS is $3.25. Its degree of operating leverage is 1.6, while its degree of financial leverage is 2.1. What is the firm's projected EPS for the coming year using the DTL approach?

a. $ 3.25
b. $ 5.46
c. $10.92
d. $ 8.71
e. $19.63

Change in EPS **Answer: b Diff: E**

13A-12. Your firm's EPS last year was $1.00. You expect sales to increase by 15 percent during the coming year. If your firm has a degree of operating leverage equal to 1.25 and a degree of financial leverage equal to 3.50, then what is its expected EPS?

a. $1.3481
b. $1.6563
c. $1.9813
d. $2.2427
e. $2.5843

Medium:

DOL change **Answer: a Diff: M**

13A-13. Stromburg Corporation makes surveillance equipment for intelligence organizations. Its sales are $75,000,000. Fixed costs, including research and development, are $40,000,000, while variable costs amount to 30 percent of sales. Stromburg plans an expansion which will generate additional fixed costs of $15,000,000, decrease variable costs to 25 percent of sales, and also permit sales to increase to $100,000,000. What is Stromburg's degree of operating leverage at the new projected sales level?

a. 3.75
b. 4.20
c. 3.50
d. 4.67
e. 3.33

DOL **Answer: d Diff: M**

13A-14. The "degree of leverage" concept is designed to show how changes in sales will affect EBIT and EPS. If a 10 percent increase in sales causes EPS to increase from $1.00 to $1.50, and if the firm uses no debt, then what is its degree of operating leverage?

a. 3.6
b. 4.2
c. 4.7
d. 5.0
e. 5.5

DOL in sales dollars **Answer: c Diff: M**

13A-15. Marcus Corporation currently sells 150,000 units a year at a price of $4.00 a unit. Its variable costs are approximately 30 percent of sales, and its fixed costs amount to 50 percent of revenues at its current output level. Although fixed costs are based on revenues at the current output level, the cost level is fixed. What is Marcus's degree of operating leverage in sales dollars?

a. 1.0
b. 2.2
c. 3.5
d. 4.0
e. 5.0

DOL, DFL, and DTL **Answer: c Diff: M**

13A-16. PQR Manufacturing Corporation has $1,500,000 in debt outstanding. The company's before-tax cost of debt is 10 percent. Sales for the year totaled $3,500,000 and variable costs were 60 percent of sales. Net income was equal to $600,000 and the company's tax rate was 40 percent. If PQR's degree of total leverage is equal to 1.40, what is its degree of operating leverage?

a. 1.15
b. 1.00
c. 1.22
d. 1.12
e. 2.68

DTL and interest expense **Answer: d Diff: M**

13A-17. Coats Corp. generates $10,000,000 in sales. Its variable costs equal 85 percent of sales and its fixed costs are $500,000. Therefore, the company's operating income (EBIT) equals $1,000,000. The company estimates that if its sales were to increase 10 percent, its net income and EPS would increase 17.5 percent. What is the company's interest expense? (Assume that the change in sales would have no effect on the company's tax rate.)

a. $100,000
b. $105,874
c. $111,584
d. $142,857
e. $857,142

DTL **Answer: e Diff: M**

13A-18. Alvarez Technologies has sales of $3,000,000. The company's fixed operating costs total $500,000 and its variable costs equal 60 percent of sales, so the company's current operating income is $700,000. The company's interest expense is $500,000. What is the company's degree of total leverage (DTL)?

a. 1.714
b. 3.100
c. 3.250
d. 3.500
e. 6.000

DTL and change in NI **Answer: e Diff: M**

13A-19. Bell Brothers has $3,000,000 in sales. Its fixed costs are estimated to be $100,000, and its variable costs are equal to fifty cents for every dollar of sales. The company has $1,000,000 in debt outstanding at a before-tax cost of 10 percent. If Bell Brothers' sales were to increase by 20 percent, how much of a percentage increase would you expect in the company's net income?

a. 15.66%
b. 18.33%
c. 19.24%
d. 21.50%
e. 23.08%

Expected EBIT **Answer: c Diff: M**

13A-20. Assume that a firm currently has EBIT of $2,000,000, a degree of total leverage of 7.5, and a degree of financial leverage of 1.875. If sales decline by 20 percent next year, then what will be the firm's expected EBIT in one year?

a. $2,400,000
b. $1,600,000
c. $ 400,000
d. $3,600,000
e. $1,350,000

Expected EBIT **Answer: d Diff: M**

13A-21. Assume that a firm has a degree of financial leverage of 1.25. If sales increase by 20 percent, the firm will experience a 60 percent increase in EPS, and it will have an EBIT of $100,000. What will be the EBIT for this firm if sales do not increase?

a. $113,412
b. $100,000
c. $ 84,375
d. $ 67,568
e. $ 42,115

Expected EBIT **Answer: e Diff: M**

13A-22. Kulwicki Corporation wants to determine the effect of an expansion of its sales on its operating income (EBIT). The firm's current degree of operating leverage is 2.5. It projects new unit sales to be 170,000, an increase of 45,000 over last year's level of 125,000 units. Last year's EBIT was $60,000. Based on a degree of operating leverage of 2.5, what is this year's expected EBIT with the increase in sales?

a. $ 60,000
b. $175,000
c. $100,000
d. $ 90,000
e. $114,000

Degree of financial leverage **Answer: d Diff: M**

13A-23. A company currently sells 75,000 units annually. At this sales level, its EBIT is $4 million, and its degree of total leverage is 2.0. The firm's debt consists of $15 million in bonds with a 9.5 percent coupon. The company is considering a new production method which will entail an increase in fixed costs but a decrease in variable costs, and will result in a degree of operating leverage of 1.6. The president, who is concerned about the stand-alone risk of the firm, wants to keep the degree of total leverage at 2.0. If EBIT remains at $4 million, what amount of bonds must be retired to accomplish this?

a. $8.42 million
b. $9.19 million
c. $7.63 million
d. $6.58 million
e. $4.44 million

Tough:

Financial leverage, DOL, and DTL **Answer: a Diff: T**

13A-24. A company has an EBIT of $4 million, and its degree of total leverage is 2.4. The firm's debt consists of $20 million in bonds with a 10 percent yield to maturity. The company is considering a new production process that will require an increase in fixed costs but a decrease in variable costs. If adopted, the new process will result in a degree of operating leverage of 1.4. The president wants to keep the degree of total leverage at 2.4. If EBIT remains at $4 million, what amount of bonds must be outstanding to accomplish this (assuming the yield to maturity remains at 10 percent)?

a. $16.7 million
b. $18.5 million
c. $19.2 million
d. $19.8 million
e. $20.1 million

DOL, DFL, and fixed operating costs **Answer: c Diff: T**

13A-25. Lincoln Lodging Inc. estimates that if its sales increase 10 percent then its net income will increase 18 percent. The company's EBIT equals $2.4 million, and its interest expense is $400,000. The company's operating costs include fixed and variable costs. What is the level of the company's fixed operating costs?

a. $ 450,000
b. $ 666,667
c. $1,200,000
d. $2,000,000
e. $2,125,000

CHAPTER 13
ANSWERS AND SOLUTIONS

1. Business risk **Answer: c Diff: E**

2. Business risk **Answer: d Diff: E**

3. Business risk **Answer: d Diff: E N**

The correct answer is statement d. Statements a and b are correct. Both relate directly to the business side of the firm. Statement c, on the other hand, is related to the financial risk of the firm. Since statements a and b are correct, statement d is the correct choice.

4. Business and financial risk **Answer: d Diff: E**

5. Optimal capital structure **Answer: e Diff: E**

The optimal capital structure maximizes the firm's stock price and minimizes the firm's WACC.

6. Optimal capital structure **Answer: c Diff: E**

7. Optimal capital structure **Answer: e Diff: E**

8. Target capital structure **Answer: e Diff: E**

9. Leverage and capital structure **Answer: d Diff: E**

Both an increase in the corporate tax rate and a decrease in the company's degree of operating leverage will encourage the firm to use more debt in its capital structure. Therefore, the correct choice is statement d.

10. Leverage and capital structure **Answer: e Diff: E**

Statement e is the correct choice. Lowering the corporate tax rate reduces the tax advantages of debt leading firms to use less debt financing. If the personal tax rate were to increase, individuals would now find interest received on corporate debt less attractive, causing firms to utilize less debt financing. An increase in the costs of bankruptcy would lead firms to use less debt in order to reduce the probability of having to incur these higher costs.

11. Leverage and capital structure **Answer: e Diff: E**

Statement e is correct. Less stable sales would lead a firm to reduce its debt ratio. A lower corporate tax rate reduces the tax advantage of the deductibility of interest expense. This reduction in the tax shield provided by debt would encourage less use of debt. If management believes the firm's stock is overvalued, then it would want to issue equity rather than debt, thereby increasing the firm's equity ratio.

12. Leverage and capital structure **Answer: a Diff: E**

Statement a is correct; all the other statements are false. Since interest is tax deductible, it would make sense to increase debt if the corporate tax rate rises. Interest received by individual investors is not tax exempt, so an increase in the personal tax rate would not encourage a firm to increase its debt level in the capital structure. Increasing operating leverage would discourage a company from increasing debt. If a company's assets become less liquid, it would hurt the company's financial position, making it less likely that the firm could make interest payments when necessary. An increase in expected bankruptcy costs would encourage a company to use less debt.

13. Leverage and capital structure **Answer: e Diff: E**

If the costs incurred when filing for bankruptcy increased, firms would be penalized more if they filed for bankruptcy and would be less willing to take that risk. Therefore, they would reduce debt levels to help avoid bankruptcy risk, so statement a is false. An increase in the corporate tax rate would mean that firms would get larger tax breaks for interest payments. Therefore, firms have an incentive to increase interest payments, in order to reduce taxes. Therefore, they will increase their debt ratios, so statement b is true. An increase in the personal tax rate decreases the after-tax return that investors will receive. Firms will have to issue debt at higher interest rates in order to provide investors with the same after-tax returns they used to receive. This will raise firms' costs of debt, which will increase their WACCs, so firms will not increase their debt ratios. Therefore, statement c is false. If a firm's business risk decreases, then this will tend to increase its debt ratio. Therefore, statement d is true. Since both statements b and d are true, the correct choice is statement e.

14. Leverage and capital structure **Answer: a Diff: E N**

The correct answer is statement a. If corporate tax rates increase, then companies get a larger tax advantage from debt in their capital structure, so they will increase their debt ratios. If personal taxes increase, bondholders will pay more taxes and will demand a higher rate of return from companies to compensate them. Therefore, companies will need to pay higher interest rates, which makes debt more expensive. Therefore, an increase in the personal tax rate will not encourage corporations to increase their debt ratios. If their assets become less liquid, companies will have to pay a higher interest rate on their bonds. (Remember, $k = k^* + IP + DRP + MRP + LP$. If assets are less liquid, LP increases.) This makes the debt more expensive and makes companies less likely to increase their debt ratios.

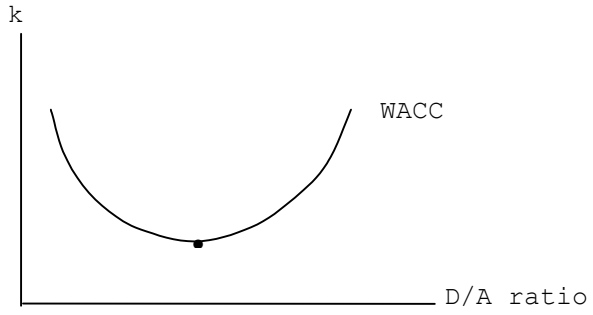
15. Leverage and capital structure **Answer: c Diff: E N**

The correct answer is statement c. The company will have higher debt interest payments, so net income will decline. Thus, statement a is false. The effect on EPS is ambiguous. Earnings decline (NI), but so will the number of shares. Therefore, statement b is false. The firm's recapitalization will not change total assets. However, since net income declines, ROA will decrease; so statement d is false. As long as the BEP ratio is greater than the cost of debt, ROE will increase. However, you don't have enough information to determine the cost of debt, so you can make no determination about ROE. Thus, statement e is false. The increase in debt will increase the risk to shareholders, so the cost of equity will increase. Therefore, statement c is correct.

16. Leverage and capital structure **Answer: e Diff: E N**

The correct answer is statement e. Statement a is incorrect. Typically, the cost of debt rises slower than the cost of equity. Also, the firm is substituting cheaper debt for more expensive equity. At some point, increasing debt will likely lead to an increase in the WACC. But this is not true across all levels of debt. [Think of a firm with no debt: increasing the debt ratio to just 10% will probably lower the WACC]. This also explains why statement c is incorrect. A firm with a high debt ratio (i.e., 90%) will likely increase its WACC by further increasing its debt. Statement b is incorrect. Although EPS is maximized, the total value of the company may be compromised. This contrasts with statement d. The capital structure that maximizes stock price should minimize the WACC. So, statement d is also incorrect.

17. Leverage and capital structure **Answer: c Diff: E**



Statement a is false. The WACC does not necessarily increase. Remember, you are replacing high cost equity with low cost debt. When there is very little debt in the capital structure, the WACC will actually decrease. (See the diagram above.) The capital structure that maximizes stock price is not necessarily the capital structure that maximizes EPS, so statement b is false. If the corporate tax rate increases, companies will obtain a bigger tax advantage for their interest payments. Thus, they may increase their debt levels to take advantage of this situation, and this would raise debt ratios. Therefore, the correct answer is statement c.

18. Capital structure and WACC **Answer: e Diff: E**

Statement a is false; if you are to the left of the firm's optimal capital structure on the WACC curve, increasing a company's debt ratio will actually decrease the firm's WACC. Statement b is false; if you are to the right of the firm's optimal capital structure on the WACC curve, increasing a company's debt ratio will actually increase the firm's WACC. Statement c is false; as you increase the firm's debt ratio the cost of debt will increase because you're using more debt. Because you're using more debt the cost of equity also increases because the firm's financial risk has increased. From statements a and b you can see that whether the WACC is increased depends on where you are on the WACC curve relative to the firm's optimal capital structure. Therefore, the correct answer is statement e.

19. Capital structure, ROA, and ROE **Answer: d Diff: E**

Statements a and b are correct; therefore, statement d is the appropriate choice. ROA = NI/TA. If total assets remain the same, but NI decreases (because of the new interest payment), ROA will decrease. NI will fall, but not as much in comparison to the amount that common equity will fall because BEP > k_d, thus ROE = NI/CE will rise. BEP will remain the same. BEP = EBIT/TA, where TA and EBIT remain the same (which was given in the problem).

20. Capital structure, WACC, TIE, and EPS **Answer: a Diff: E**

Statement a is correct; the other statements are false. The capital structure that maximizes the firm's stock price generally calls for a debt ratio that is lower than the one that maximizes EPS. The firm could maximize its TIE by having no debt (that is zero interest payments). But, this capital structure would probably not maximize the firm's stock price.

21. Capital structure theory **Answer: d Diff: E**

Statements a and c are correct; therefore, statement d is the correct choice. An increase in the corporate tax rate reduces the after-tax cost of debt making it more attractive relative to equity. Thus, firms might be expected to use more debt in their capital structure rather than less debt.

22. Miscellaneous capital structure concepts **Answer: c Diff: E N**

The correct answer is statement c. Statement a is not correct. Just the opposite is true--we would expect companies to use less debt. Statement b is not correct. The additional debt would result in an increase in interest expense and a decrease in net income. Since assets are unchanged, the company's ROA must decrease. Statement c is correct. The additional debt would be used to purchase additional assets. We are told that the ROA stays the same. Therefore, if assets increase, it must mean that net income also increases. There is no change in equity, so the ROE of the firm must increase.

23. Financial leverage and EPS **Answer: a Diff: E**

Statement a is true; a higher EPS does not always mean that the stock price will increase. Statement b is false; a lower WACC will mean a higher stock price. Statement c is false; EPS can increase just because shares outstanding decline. (The firm's net income will decline because its interest expense increases.)

24. Financial leverage and EPS **Answer: c Diff: E**

Statement a is false because BEP = EBIT/Total assets. The extent to which the firm uses debt financing does not affect EBIT or total assets. Statement b is false because firms with a high percentage of fixed costs have a high degree of operating leverage by definition.

25. Financial leverage and ratios **Answer: d Diff: E**

BEP = EBIT/TA. Since they both have the same total assets and the same BEP, then EBIT must be the same for both companies. If A has a higher debt ratio and higher interest expense than B, and they both have the same EBIT and tax rate, then A must have a lower NI than B. Therefore, statement a is true. If A has a lower NI than B but both have the same total assets, then A's ROA (NI/TA) must be lower than B's ROA. Therefore, statement b is true. If both companies have the same total assets but A's debt ratio is higher than B's, then A's equity must be lower (since Total assets = Total debt + Total equity). If A has less equity, and a lower NI than B, it is not possible to judge which company's ROE (NI/EQ) is higher.

26. Financial leverage and ratios **Answer: b Diff: E**

BEP = EBIT/TA. If both firms have the same BEP ratio and same total assets, then they must have the same EBIT. Since Firm U has no debt in its capital structure, Firm U will have higher net income than Firm L because U has no interest expense and L does. The TIE ratio is EBIT/Int. If the two companies have the same EBIT, the one with the lower interest expense (Firm U), will have a higher TIE. Therefore, statement a is false. Firms L and U have the same EBIT, but Firm L has a higher interest expense, so its net income will be lower than Firm U. Since ROA is equal to NI/TA, and the two firms have the same total assets, Firm L will have a lower ROA than Firm U. Therefore, statement b is true. Leverage will increase ROE if BEP > k_d. Since BEP is 20 percent and k_d is 8 percent, leverage will increase Firm L's ROE. Therefore, statement c is false.

27. Optimal capital structure **Answer: d Diff: M**

28. Operating and financial leverage **Answer: e Diff: M**

29. Financial leverage and ratios **Answer: c Diff: M**

Statement a is false; A's net income is lower than B's due to higher interest expense, but its assets are equal to B's, so A's ROA must be lower than B's ROA. Statement b is false; A has the same EBIT as B, but higher interest payments than B; therefore, A's TIE is lower than B's. Statement c is correct.

30. Limits of leverage **Answer: d Diff: M**

31. Signaling theory **Answer: b Diff: M**

32. Capital structure and WACC **Answer: d Diff: M**

Statement b is false because it is not always true.

33. Capital structure and WACC **Answer: b Diff: M**

Statement b is true; the other statements are false. The cost of retained earnings should be higher than debt financing. EPS is maximized at a higher capital structure than the one that minimizes the firm's weighted average cost of capital. Increasing debt increases the risk of bankruptcy, which can increase the costs of both debt and equity.

34. Miscellaneous capital structure concepts **Answer: a Diff: M**

Statement a is true; the other statements are false. If the personal tax rate were increased, investors would prefer to receive less of their income as interest--implying firms would substitute equity for debt. High business risk is associated with high operating leverage; therefore, firms with high business risk would use less debt.

35. Miscellaneous capital structure concepts **Answer: c Diff: M**

If corporate tax rates were decreased while other things were held constant, and if the MM tax-adjusted tradeoff theory of capital structure were correct, corporations would decrease their use of debt because the tax shelter benefit would not be as great as when tax rates are high. Business risk is the riskiness of the firm's operations if it uses no debt. The optimal capital structure does not maximize EPS, and the degree of total leverage shows how a given change in sales will affect earnings per share.

36. Variations in capital structures **Answer: d Diff: T**

37. Determining price from EBIT **Answer: e Diff: E**

$$
\begin{aligned}
EBIT &= PQ - VQ - FC \\
\$95{,}000 &= P(55{,}000) - (0.4)P(55{,}000) - \$110{,}000 \\
\$205{,}000 &= (0.6)(55{,}000)P \\
\$205{,}000 &= 33{,}000P \\
P &= \$6.21.
\end{aligned}
$$

38. Breakeven price **Answer: a Diff: E**

Total costs = \$10,000 + \$2(42,000) = \$94,000.
Price = \$94,000/42,000 = \$2.24.

39. New financing **Answer: a Diff: M**

Old debt ratio = 0.3333; New debt ratio = 0.1667.

$$\frac{\text{Sales}}{\text{TA}} = 7.5.$$

$$\text{TA} = \frac{\$750,000}{7.5} = \$100,000.$$

Debt = 0.3333($100,000) = $33,333.
New TA = $100,000 + $100,000 = $200,000.
New Debt = $200,000(0.1667) = $33,333.

Altman's current debt of $33,333 represents approximately 16.67% of total assets following the expansion, thus the firm should finance with 100 percent equity.

40. Net operating income **Answer: b Diff: M**

$\text{Total cost}_{\text{Method 1}} = \$1.00(Q) + \$10,000.$
$\text{Total cost}_{\text{Method 2}} = \$1.50(Q) + \$5,000.$

Set equal and solve for Q:
Q + $10,000 = $1.50(Q) + $5,000
$5,000 = $0.5(Q)
10,000 = Q.

41. Change in breakeven volume **Answer: b Diff: M**

Calculate the old and new breakeven volumes using the old data and new projections:
Old Q_{BE} = $120,000/($1.20 - $0.60) = $120,000/$0.60 = 200,000 units.
New Q_{BE} = $240,000/($1.05 - $0.41) = $240,000/$0.64 = 375,000 units.
Change in breakeven volume = 375,000 - 200,000 = 175,000 units.

42. Breakeven and expansion **Answer: c Diff: M**

Calculate the initial breakeven volume in dollars:

$$\text{Old } S_{BE} = \frac{\text{FC}}{1 - \frac{\text{VC}}{\text{Sales}}} = \frac{\text{FC}}{1 - \frac{\text{VC/unit}}{\text{Price/unit}}} = \frac{\$400,000}{1 - \frac{\$4.20}{\$7.00}}$$

$$= \frac{\$400,000}{1 - 0.60} = \$1,000,000.$$

Calculate the new breakeven volume in sales dollars:

$$\text{New } S_{BE} = \frac{\$650,000}{1 - \frac{\$4.48}{\$7.00}} = \frac{\$650,000}{1 - 0.64} = \$1,805,556.$$

The increase in S_B = $1,805,556 - $1,000,000 = $805,556.

43. Breakeven **Answer: d Diff: M**

$7(200,000) - $5(200,000) - F = 0
F = $400,000.

$7(200,000) - $4(200,000) - F = 0
F = $600,000.

$600,000 - $400,000 = $200,000.

44. Operating decision **Answer: d Diff: M**

Calculate $EBIT_1$ at 40,000 units using the current sales price:
$EBIT_1 = S - VC - FC$
$= 40,000(\$2.15) - 0.30(40,000)(\$2.15) - \$46,000$
$= \$86,000 - \$25,800 - \$46,000 = \$14,200.$

Calculate $EBIT_2$ at 50,000 units using the lower price of $1.95:
$EBIT_2 = 50,000(\$1.95) - 0.30(50,000)(\$1.95) - \$46,000$
$= \$97,500 - \$29,250 - \$46,000 = \$22,250.$

The change in EBIT = $22,250 - $14,200 = +$8,050. Yes, Musgrave should cut its price, EBIT increases by $8,050.

45. Capital structure and stock price **Answer: c Diff: M**

We can do this problem by using the P/E before and after the recapitalization. Recall that P/E = Price/EPS.

	Before recap.	After recap.
EBIT	$300,000	$300,000
Interest	-10,000	-50,000
EBT	$290,000	$250,000
Tax (40%)	116,000	100,000
NI	$174,000	$150,000
Shares	120,000	100,000*
EPS	$174,000/120,000 = $1.45.	$150,000/100,000 = $1.50.
P/E	$17.40/1.45 = 12×.	

*120,000 - ($348,000/$17.40) = 100,000 shares.

As P/E = 12 after the recapitalization (recall the question states that it does not change), we know 12 = Price/$1.50; Price = 12 × $1.50 = $18.00.

46. Capital structure and stock price **Answer: e Diff: M**

Step 1: Find the current number of shares outstanding:
Shares = NI/EPS = \$480 million/\$3.20 = 150 million shares.

Step 2: Find the number of shares after the repurchase:
New shares = 150 – \$1,200/\$32 = 150 – 37.5 = 112.5 million shares.

Step 3: Find the new EPS after the repurchase:
EPS = [(EBIT – INT)(1 - T)]/New shares
= [(\$800 – \$84) × 0.6]/112.5 = \$3.818667.

Step 4: Find the new stock price:
Stock price = EPS/New WACC
= \$3.818667/0.11 = \$34.72.

47. Hamada equation and cost of equity **Answer: a Diff: T**

Facts given: $k_s = 12\%$; D/E = 0.25; $k_{RF} = 6\%$; $RP_M = 5\%$; T = 40%.

Step 1: Find the firm's current levered beta using the CAPM:
$k_s = k_{RF} + RP_M(b)$
$12\% = 6\% + 5\%(b)$
$b = 1.2$.

Step 2: Find the firm's unlevered beta using the Hamada equation:
$b = b_U[1 + (1 - T)(D/E)]$
$1.2 = b_U[1 + (0.6)(0.25)]$
$1.2 = 1.15b_U$
$1.0435 = b_U$.

Step 3: Find the new levered beta given the new capital structure using the Hamada equation:
$b = b_U[1 + (1 - T)(D/E)]$
$b = 1.0435[1 + (0.6)(1)]$
$b = 1.6696$.

Step 4: Find the firm's new cost of equity given its new beta and the CAPM:
$k_s = k_{RF} + RP_M(b)$
$k_s = 6\% + 5\%(1.6696)$
$k_s = 14.35\%$.

48. Optimal capital structure and Hamada equation **Answer: d Diff: T**

k_{RF} = 5%; $k_M - k_{RF}$ = 6%; $k_s = k_{RF} + (k_M - k_{RF})b$; WACC = $w_d k_d(1 - T) + w_c k_s$.

You need to use the D/E ratio given for each capital structure to find the levered beta using the Hamada equation. Then, use each of these betas with the CAPM to find the k_s for that capital structure. Use this k_s and k_d for each capital structure to find the WACC. The optimal capital structure is the one that minimizes the WACC.

(D/E)	$b = b_U[1 + (1 - T)(D/E)]$	$k_s = k_{RF} + (k_M - k_{RF})b$	w_c	k_d	w_d	WACC
0.11	1.0667	11.4000%	0.9	7.0%	0.1	10.68%
0.25	1.1500	11.9000	0.8	7.2	0.2	10.38
0.43	1.2571	12.5429	0.7	8.0	0.3	10.22
0.67	**1.4000**	**13.4000**	**0.6**	**8.8**	**0.4**	**10.15**
1.00	1.6000	14.6000	0.5	9.6	0.5	10.18

For example, if the D/E is 0.11:
$b = 1.0[1 + (1 - T)(D/E)] = 1.0[1 + (1 - 0.4)(0.1111)] = 1.0667$.

$k_s = k_{RF} + (k_M - k_{RF})b = 5\% + 6\%(1.0667) = 11.40\%$.

The weights are given at 0.9 and 0.1 for equity and debt, respectively, and the k_d for that capital structure is given as 7 percent.
$WACC = w_d k_d(1 - T) + w_c k_s$
$= (0.1)(7\%)(1 - 0.4) + (0.9)(11.40\%) = 10.68\%$.

Do the same calculation for each of the capital structures and find each WACC. The optimal capital structure is the one that minimizes the WACC, which is 10.15%. Therefore, the optimal capital structure is 40% debt and 60% equity.

49. Capital structure and stock price **Answer: d Diff: T**

The optimal capital structure maximizes the firm's stock price. When the debt ratio is 20%, expected EPS is \$2.50. Given the firm's policy of retaining 30% of earnings, the expected dividend per share D_1 is \$2.50 × 0.70 = \$1.75. The stock price P_0 is \$1.75/(15% - 7%) or \$21.88. When the debt ratio is 30%, expected EPS is \$3.00 and expected D_1 is \$3.00 × 0.70 = \$2.10. The stock price P_0 is \$2.10/(15.5% - 7%) = \$24.71. Similarly, when the debt ratio is 40%, D_1 = \$2.275 and P_0 = \$25.28. When the debt ratio is 50%, D_1 = \$2.625 and P_0 = \$26.25. When the debt ratio is 70%, D_1 = \$2.80 and P_0 = \$25.45. The stock price is highest when the debt ratio is 50%.

50. Capital structure and stock price **Answer: b Diff: T**

First, calculate the stock price for each debt level using the dividend growth model, $P_0 = D_1/(k_S - g)$:

Debt	Div/share	k_S	P_0
0%	\$5.50	11.5%	\$5.50/(0.115 - 0.02) = \$57.89.
25	**6.00**	**12.0**	**\$6.00/(0.12 - 0.02) = \$60.00.**
40	6.50	13.0	\$6.50/(0.13 - 0.02) = \$59.09.
50	7.00	14.0	\$7.00/(0.14 - 0.02) = \$58.33.
75	7.50	15.0	\$7.50/(0.15 - 0.02) = \$57.69.

Clearly, \$60.00 is the highest price, so 25% debt and 75% equity is the optimal capital structure.

51. Capital structure and stock price **Answer: a Diff: T**

First, find the company's current cost of capital, dividends per share, and stock price:
$k_s = 0.066 + (0.06)0.9 = 12\%$. To find the stock price, you still need the dividends per share or DPS = ($2,000,000(1 - 0.4))/200,000 = $6.00. Thus, the stock price is $P_0 = \$6.00/0.12 = \$50.00$. Thus, by issuing $2,000,000 in new debt the company can repurchase $2,000,000/$50.00 = 40,000 shares.

Now after recapitalization, the new cost of capital, DPS, and stock price can be found:
$k_s = 0.066 + (0.06)1.1 = 13.20\%$. DPS for the remaining (200,000 - 40,000) = 160,000 shares are thus [($2,000,000 - ($2,000,000 × 0.10))(1 - 0.4)]/ 160,000 = $6.75. And, finally, $P_0 = \$6.75/0.132 = \$51.14$.

52. Capital structure and stock price **Answer: a Diff: T**

To answer this we need to determine the following:
1. How many shares are currently outstanding?
2. What are the interest expense and net income, before and after the change?

Before recapitalization:

EBIT	$20,000,000
Interest	2,000,000
EBT	$18,000,000
Taxes (40%)	7,200,000
NI	$10,800,000

EPS = $3.60. Shares outstanding = $10,800,000/$3.60 = 3,000,000 shares.

After recapitalization:
New shares = 3 million - 1 million = 2 million shares.
Total debt = $20,000,000 + ($1,000,000)($40) = $60,000,000.
Interest payment = ($60,000,000)(0.1) = $6,000,000.

Net income:

EBIT	$20,000,000
Interest	6,000,000
EBT	$14,000,000
Taxes (40%)	5,600,000
NI	$ 8,400,000

EPS = $8,400,000/2,000,000 = $4.20. P/E = 11.5. $P_0 = (\$4.20)(11.5) = \$48.30$.

53. Capital structure and stock price **Answer: d Diff: T**

The bonds used in the repurchase will create a new interest expense for the company. This will change net income. Dividends per share will change because net income changes and the number of shares outstanding changes.

New interest expense: $800,000 × 8% = $64,000.
New net income: ($2,000,000 - $64,000)(1 - 0.3) = $1,355,200.
Shares repurchased: $800,000/80 = 10,000 shares.
New shares outstanding: 175,000 - 10,000 = 165,000 shares.
New dividends per share: $1,355,200/165,000 = $8.2133.
We must also calculate a new cost of equity: 5% + (5%)1.2 = 11%.
New stock price: $8.21/11% = $74.67.

54. Capital structure and EPS **Answer: d Diff: T**

After issuing the debt, the company can repurchase \$10,000,000/\$40 = 250,000 shares leaving 650,000 shares outstanding. We still need to find the expected NI after issuing the debt. We're given the anticipated NI is \$3.6 million. Thus, the EBIT (before the debt issue) can be found as follows: \$3,600,000 = EBIT(1 - 0.34) or EBIT = \$5,454,545.45. The company will pay \$1,000,000 in interest after issuing the debt so the new EBT will be \$5,454,545.45 - \$1,000,000 = \$4,454,545.45. The new NI figure will be \$4,454,545.45(1 - 0.34) = \$2,940,000. Finally, EPS = \$2,940,000/650,000 = \$4.52 after the recapitalization.

55. Capital structure and EPS **Answer: a Diff: T**

Capital structure A: The firm will have debt of \$500,000(0.3) = \$150,000 and equity of \$350,000. We're told the shares have a book value of \$10 so the number of shares outstanding is \$350,000/\$10 = 35,000. Interest expense will be \$150,000(10%) = \$15,000. We can compute EBT as EBIT - I or \$200,000 - \$15,000 = \$185,000. Also, we can compute NI as EBT(1 - T) or \$185,000(1 - 0.4) = \$111,000. Finally, EPS = \$111,000/35,000 = \$3.17.

Capital structure B: The firm will have debt of \$500,000(0.7) = \$350,000 and equity of \$150,000. The number of shares outstanding is \$150,000/\$10 = 15,000. Interest expense will be \$350,000(14%) = \$49,000. We can compute EBT as \$200,000 - \$49,000 = \$151,000. Also, we can compute NI as \$151,000(1 - 0.4) = \$90,600. Finally, EPS = \$90,600/15,000 = \$6.04.

The difference in EPS between capital structure A and capital structure B is \$6.04 - \$3.17 = \$2.87.

56. Capital structure, leverage, and WACC **Answer: d Diff: T N**

You need to find the beta with no debt and the new k_s with the new capital structure before you can calculate the firm's WACC.

Step 1: Calculate the firm's unlevered beta using the Hamada equation:
$b_L = b_U[1 + (1 - T)(D/E)]$
$1.2 = b_U[1 + (0.6)(\$3/\$7)]$
$1.2 = 1.2571b_U$
$b_U = 0.954545.$

Step 2: Calculate the firm's new beta with the new capital structure:
$b_L = b_U[1 + (1 - T)(D/E)]$
$b_L = 0.954545[1 + (0.6)(\$5/\$5)]$
$b_L = 1.5273.$

Step 3: Calculate the firm's new cost of equity with the new capital structure:
$k_s = k_{RF} + (RP)b$
$k_s = 6\% + 7\%(1.5273)$
$k_s = 16.6909\%.$

Step 4: Calculate the firm's new WACC:
$WACC = w_d k_d(1 - T) + w_c k_s$
$WACC = 0.5(8.5\%)(0.6) + 0.5(16.6909\%)$
$WACC = 10.8955\% \approx 10.90\%.$

57. Capital structure and EPS **Answer: e Diff: M**

Debt = 75% = $300,000; Equity = 25% = $100,000; BVPS = $10; Total assets = $400,000.

	Feast	Famine
Probability	0.6	0.4
EBIT	$60,000	$20,000
Less: Interest	36,000	36,000
EBT	$24,000	($16,000)
Less: Taxes (40%)	9,600	(6,400)
NI	$14,400	($ 9,600)
# shares	10,000	10,000
EPS	$1.44	-$0.96

Difference in EPS for aggressive capital structure:
$EPS_{Feast} - EPS_{Famine} = \$1.44 - (\$0.96) = \$2.40$.

58. Capital structure and EPS **Answer: b Diff: M**

Debt = 25% = $100,000; Equity = 75% = $300,000; BVPS = $10; Total assets = $400,000.

	Feast	Famine
Probability	0.6	0.4
EBIT	$60,000	$20,000
Less: Interest	10,000	10,000
EBT	$50,000	$10,000
Less: Taxes (40%)	20,000	4,000
NI	$30,000	$ 6,000
# shares	30,000	30,000
EPS	$1.00	$0.20

Difference in EPS for conservative capital structure:
$EPS_{Feast} - EPS_{Famine} = \$1.00 - \$0.20 = \$0.80$.

59. Capital structure and CV of EPS **Answer: c Diff: M**

Calculate coefficient of variation.
Expected $EPS_{Aggressive}$:
$E(EPS) = 0.6\ EPS_{Feast} + 0.4\ EPS_{Famine} = (0.6)(\$1.44) + 0.4(-\$0.96) = \$0.48$.

Standard deviation:
$SD_{EPS\text{-}aggressive} = [0.6(\$1.44 - \$0.48)^2 + 0.4(-\$0.96 - \$0.48)^2]^{½}$
$= [0.5530 + 0.8294]^{1/2} = 1.176$.

$CV_{Aggressive} = 1.176/0.48 \approx 2.45$.

60. Capital structure and CV of EPS **Answer: a Diff: M**

Calculate coefficient of variation.
Expected EPS conservative:
E(EPS) = 0.6($1.00) + 0.4($0.20) = $0.68.

Standard deviation:
$SD_{EPS\text{-}Conservative} = [0.6(\$1.00 - \$0.68)^2 + 0.4(\$0.20 - \$0.68)^2]^{½}$
$= [0.0614 + 0.0922]^{1/2} = 0.3919.$

$CV_{Conservative} = 0.3919/0.68 = 0.576 \approx 0.58.$

61. Capital structure and WACC **Answer: c Diff: E N**

First, we will calculate the cost of common equity and then use that to solve for the WACC.

$k_s = k_{RF} + (k_M - k_{RF})b$
$k_s = 5\% + (6\%)1.1$
$k_s = 11.6\%.$

$WACC = w_d k_d(1 - T) + w_c k_s$
$WACC = (0.2)(7.5\%)(1 - 0.4) + (0.8)(11.6\%)$
$WACC = 10.18\%.$

62. Hamada equation and unlevered beta **Answer: c Diff: E N**

To unlever the beta, we must use the Hamada equation, substituting the known values.

$b_L = b_U[1 + (1 - T)(D/E)]$
$1.1 = b_U[1 + (1 - 0.4)(1/4)]$
$1.1 = b_U[1.15]$
$b_U = 0.9565.$

63. Hamada equation and cost of common equity **Answer: e Diff: M N**

First, we must find the levered beta after the recapitalization, using the unlevered beta calculated in the previous problem.

$b_L = b_U[1 + (1 - T)(D/E)]$
$b_L = 0.9565[1 + (1 - 0.4)(2/3)]$
$b_L = 0.9565[1.4]$
$b_L = 1.3391.$

$k_s = k_{RF} + (k_M - k_{RF})b_L$
$k_s = 5\% + (6\%)1.3391$
$k_s = 13.03\%.$

64. Capital structure, financial leverage, and ratios Answer: d Diff: E N

The correct answer is statement d. Statement a is incorrect; since operating income is unchanged and interest expense goes up, net income must decrease. Statement b is incorrect; if net income decreases and assets remain the same, ROA must decrease. Statement c is incorrect; we are told the firm's basic earning power (BEP) and assets do not change, so operating income must also remain the same. Statement d is correct; since BEP > k_d, the use of debt to buy back stock will increase ROE.

65. Capital structure and EPS Answer: c Diff: T N

Total assets = $100,000,000; BEP = 20%; TIE = 12.5; T = 40%.

Step 1: Determine the firm's operating income:

BEP = EBIT/TA
0.20 = EBIT/$100,000,000
EBIT = $20,000,000.

Step 2: Determine the firm's interest expense, given the TIE and EBIT:

$$TIE = \frac{EBIT}{Interest}$$

$$12.5 = \frac{\$20,000,000}{Interest}$$

12.5Interest = $20,000,000
$1,600,000 = Interest.

Step 3: Determine the firm's net income:

Operating income	$20,000,000
Interest expense	1,600,000
EBT	$18,400,000
Taxes (40%)	7,360,000
Net income	$11,040,000

Step 4: Determine the number of shares outstanding after recapitalization: If the firm repurchased $20 million worth of stock and the stock price is $20, then the firm bought 1 million shares. Shares outstanding now = 5,000,000 – 1,000,000 = 4,000,000.

Step 5: Determine the firm's EPS after recapitalization:

EPS = NI/# of shares
EPS = $11,040,000/4,000,000
EPS = $2.76.

66. Hamada equation and unlevered beta Answer: c Diff: E N

$b_L = b_U[1 + (1 - T)(D/E)]$
$1.2 = b_U[1 + (0.60)(0.25/0.75)]$
$1.2 = b_U[1.2]$
$b_U = 1.00$.

67. Hamada equation and cost of common equity **Answer: c Diff: M N**

$b_U = 1.00$ was calculated previously in the problem above.

Step 1: Calculate the new levered beta using the Hamada equation and the unlevered beta calculated previously:
$b_L = b_U[1 + (1 - T)(D/E)]$
$b_L = 1.00[1 + (0.60)(0.40/0.60)]$
$b_L = 1.40$.

Step 2: Calculate the new cost of equity using the CAPM equation and the new levered beta:
$k_s = 5\% + (6\%)1.40 = 13.40\%$.

68. Capital structure, leverage, and WACC **Answer: c Diff: E N**

$w_d = 25\%$; $w_s = 75\%$; $k_d = 8\%$; $k_s = 10.75\%$; $T = 40\%$.

The after-tax cost of debt is 8.0% × (1 - 0.40) = 4.8%. Its cost of common equity is (given as) 10.75%. So, the WACC = 0.25(4.8%) + 0.75(10.75%) = 9.2625% ≈ 9.26%.

69. Hamada equation and unlevered beta **Answer: b Diff: M N**

$b_L = 1.15$; $T = 40\%$; $D = 25\%$; $E = 75\%$.

$$\begin{aligned} b_L &= b_U[1 + (1 - T)(D/E)] \\ 1.15 &= b_U[1 + (0.6)(0.25/0.75)] \\ 1.15 &= b_U[1.2] \\ 0.9583 &= b_U. \end{aligned}$$

70. Hamada equation and cost of common equity **Answer: d Diff: M N**

Step 1: Calculate the new levered beta for the firm, using the new capital structure:
$b_U = 0.9583$; New $D = 50\%$; New $E = 50\%$; $T = 40\%$.

$$\begin{aligned} b_L &= b_U[1 + (1 - T)(D/E)] \\ &= 0.9583[1 + (0.60)(0.50/0.50)] \\ &= 1.5333. \end{aligned}$$

Step 2: Calculate the firm's new cost of common equity:
$k_{RF} = 5\%$; $k_M - k_{RF} = 5\%$; $b_L = 1.5333$.

$k_S = 5\% + (5\%)1.5333 = 12.666\% \approx 12.67\%$.

71. Capital structure, leverage, and EPS **Answer: c Diff: M N**

Step 1: Calculate net income under the firm's new capital structure as follows:

EBIT	$300,000	(given)
Interest	200,000	(given)
EBT	$100,000	
Taxes (40%)	40,000	
NI	$ 60,000	

Step 2: Calculate EPS under the firm's new capital structure:
The firm has assets of $4 million. Originally, $3 million was in common equity and $1 million was in debt. Now, that amount is split evenly, $2 million in common equity and $2 million in debt. The firm will borrow $1 million and use the proceeds to repurchase $1 million worth of common equity. At the repurchase price of $16/share, the firm will buy back $1,000,000/$16 = 62,500 shares, leaving 80,000 – 62,500 = 17,500 shares outstanding.

EPS = NI/# shares = $60,000/17,500 = $3.4286 ≈ $3.43.

WEB APPENDIX 13A SOLUTIONS

13A-1. DOL, DFL, and DTL **Answer: c Diff: E**

13A-2. Financial leverage **Answer: e Diff: M**

13A-3. Financial leverage **Answer: d Diff: M**

13A-4. Financial risk **Answer: b Diff: M**

13A-5. Operating and financial leverage **Answer: a Diff: M**

13-6. Operating and financial leverage **Answer: e Diff: M**

13-7. DOL **Answer: c Diff: M**

13-8. Debt ratio and DOL **Answer: a Diff: M**

Statement a is correct; the other statements are false. After the sales increase, the percentage increase in EBIT will be the same for both companies. Company E's net income will rise by exactly 10%.

13-9. Degree of leverage **Answer: a Diff: M**

13-10. DOL and changes in EBIT **Answer: a Diff: E**

First, find EBIT before sales increase:
EBIT = Sales - (Sales × VC%) - FC
= $15,000 - ($15,000 × 0.60) - $1,000
= $5,000.

Now, assuming sales increase by 10% or to $15,000 × 1.10 = $16,500, calculate the new EBIT. EBIT = $16,500 - ($16,500 × 0.60) - $1,000 = $5,600.

So, the percentage increase is [($5,600 - $5,000)/$5,000] × 100 = 12%.

13-11. DTL and forecast EPS **Answer: d Diff: E**

$EPS_1 = EPS_0 + EPS_0[DTL \times (\text{percent change in sales})]$
$= \$3.25[1 + (1.6)(2.1)(0.5)]$
$= \$3.25(2.68)$
$= \$8.71.$

13-12. Change in EPS **Answer: b Diff: E**

$EPS_0 = \$1.00$. DOL = 1.25. $EPS_1 = ?$
$\%\Delta S = 15\%$. DFL = 3.50.

DTL = DOL(DFL) = 1.25(3.50) = 4.375.

$EPS_1 = EPS_0[1.0 + (DTL)(\%\Delta Sales)]$
$= \$1.00[1.0 + (4.375)(0.15)]$
$= \$1.00(1.6563) = \$1.6563.$

13-13. DOL change **Answer: a Diff: M**

Calculate DOL using new sales, new variable cost percentage, and new fixed costs:
S_0 = \$75,000,000; FC_0 = \$40,000,000; VC = 0.30(S_0) = \$22,500,000.
S_1 = \$100,000,000; FC_1 = \$55,000,000; VC = 0.25(S_1) = \$25,000,000.
DOL (In millions):

$$DOL_S = \frac{100 - 25}{100 - 25 - 55} = \frac{75}{20} = 3.75.$$

13-14. DOL **Answer: d Diff: M**

These two equations could be used:
DTL = (DOL)(DFL).
$EPS_1 = EPS_0[1 + (DTL)(\%\Delta Sales)]$.

Note that EPS rises by 50 percent, from \$1.00 to \$1.50, on a 10 percent increase in sales, so
1.50 = 1.00[1 + (DTL)(0.1)]
1.50 = 1 + 0.1 DTL
0.1 DTL = 0.50
DTL = 5.00.

Now DTL = 5 = (DOL)(DFL)
But if Debt = 0, then DFL = 1, so DOL = DTL = 5.0.

13-15. DOL in sales dollars **Answer: c Diff: M**

Use the information provided and the formula for DOL in sales dollars:

$$DOL_S = \frac{150{,}000(\$4) - 0.3(150{,}000)(\$4)}{150{,}000(\$4) - 0.3(150{,}000)(\$4) - 0.5(150{,}000)(\$4)}$$

$$DOL_S = \frac{\$600{,}000 - \$180{,}000}{\$600{,}000 - \$180{,}000 - \$300{,}000}$$

$$DOL_S = \frac{\$420{,}000}{\$120{,}000} = 3.5.$$

Alternate method:
Express P as 1.0 or 100% of price and V and FC as a percent of price:

$$DOL_Q = \frac{Q(P - V)}{Q(P - V) - FC} = \frac{150{,}000(1.0 - 0.3)}{150{,}000[(1.0 - 0.3) - 0.5]} = \frac{0.7}{0.2} = 3.50.$$

13-16. DOL, DFL, and DTL **Answer: c Diff: M**

First, calculate PQR's DFL as EBIT/(EBIT - I). Interest expense (I) on the debt is \$1,500,000(10%) = \$150,000. We can work backwards from NI to find EBIT as follows: EBT = NI/(1 - T) or \$600,000/0.6 = \$1,000,000. EBIT = EBT + I or \$1,000,000 + \$150,000 = \$1,150,000. DFL is thus \$1,150,000/(\$1,150,000 - \$150,000) = 1.15. Recognizing DTL = DFL × DOL, we can solve 1.40 = 1.15 × DOL for DOL = 1.22.

13-17. DTL and interest expense **Answer: d Diff: M**

Recall that DTL = % change in NI/% change in sales
= 0.175/0.10 = 1.75.

$$DTL = \frac{S - VC}{S - VC - FC - I}$$

$$1.75 = \frac{\$10,000,000 - \$8,500,000}{\$10,000,000 - \$8,500,000 - \$500,000 - I}$$

$$1.75 = \frac{\$1,500,000}{\$1,000,000 - I}$$

$\$1,500,000 = \$1,750,000 - 1.75I$

$I = \$142,857.14 \approx \$142,857.$

13-18. DTL **Answer: e Diff: M**

DTL = (S - VC)/(EBIT - I)
= ($3,000,000 - $1,800,000)/($700,000 - $500,000)
= 6.

13-19. DTL and change in NI **Answer: e Diff: M**

Step 1: Find Degree of total leverage (DTL)

$$DTL = \frac{S - V}{S - V - F - I}$$

$$= \frac{\$3,000,000 - 0.5(\$3,000,000)}{\$3,000,000 - 0.5(\$3,000,000) - \$100,000 - 0.1(\$1,000,000)}$$

$$= \frac{\$1,500,000}{\$1,300,000}$$

$= 1.1538.$

Step 2: Find percentage increase in net income:
$\%\Delta NI = (0.20)(DTL) = (0.20)(1.1538) = 0.2308 = 23.08\%.$

13-20. Expected EBIT **Answer: c Diff: M**

DOL = DTL/DFL
= 7.5/1.875 = 4.0.

$\Delta EBIT = (-0.20)(4.0)(\$2,000,000) = -\$1,600,000.$

EBIT = $2,000,000 - $1,600,000 = $400,000.

13-21. Expected EBIT **Answer: d Diff: M**

DTL = %ΔEPS/%ΔSales = 60%/20% = 3.0.
DOL = DTL/DFL = 3.0/1.25 = 2.40.
Old EBIT = \$100,000/[1 + (0.20)(2.40)] = \$100,000/1.48 = \$67,568.

Alternate solution:
Use DFL expression to calculate change in EBIT and previous EBIT:
DFL = 1.25 = %ΔEPS/%ΔEBIT
1.25 = 0.60/[ΔEBIT/(\$100,000 - ΔEBIT)]
1.25 = [0.60(\$100,000) - 0.60(ΔEBIT)]/ΔEBIT
1.25ΔEBIT = \$60,000 - 0.60(ΔEBIT)
1.85ΔEBIT = \$60,000
ΔEBIT = \$32,432.

Old EBIT = \$100,000 - \$32,432 = \$67,568.

13-22. Expected EBIT **Answer: e Diff: M**

Set up the DOL equation, letting X be the unknown new EBIT:
Let X = New EBIT.

$$DOL_Q = 2.5 = \frac{\frac{X - 60{,}000}{60{,}000}}{\frac{170{,}000 - 125{,}000}{125{,}000}} = \frac{\frac{X - 60{,}000}{60{,}000}}{0.36}$$

$$2.5(0.36) = \frac{X - 60{,}000}{60{,}000}$$

$$0.90 = \frac{X - 60{,}000}{60{,}000}$$

\$54,000 = X - \$60,000
X = \$114,000.

New EBIT = \$114,000.

13-23. Degree of financial leverage **Answer: d Diff: M**

DTL = (DOL)(DFL)
2.0 = 1.6(DFL)
1.25 = DFL.

$$1.25 = \frac{\$4{,}000{,}000}{\$4{,}000{,}000 - I}$$

\$5,000,000 - 1.25(I) = \$4,000,000
I = \$800,000.

$$Debt = \frac{\$800{,}000}{0.095} = \$8{,}421{,}053.$$

Must retire = \$15,000,000 - \$8,421,053 = \$6.58 million of debt.

13-24. Financial leverage, DOL, and DTL **Answer: a Diff: T**

First, find the new DFL:
DTL = (DOL)(DFL)
2.4 = (1.4)(DFL)
DFL = 1.7143.

Then, find the new interest payments in a year:
DFL = (EBIT)/(EBIT - I)
1.7143 = ($4,000,000)/($4,000,000 - I)
I = $1,666,686.11.

Finally, solve for the new debt level, knowing that the yield to maturity remains at 10%:
Debt value(YTM) = Interest payment
Debt(0.10) = $1,666,686.11
Debt = $16,666,861.11 ≈ $16.7 million.

13-25. DOL, DFL, and fixed operating costs **Answer: c Diff: T**

We're given enough information to find both DFL and DTL.

$$\text{DTL} = \text{DOL} \times \text{DFL}$$
$$= \frac{\%\,\text{EBIT}}{\%\,\text{Sales}} \times \frac{\%\,\text{EPS}}{\%\,\text{EBIT}}$$
$$= \frac{\%\,\text{EPS}}{\%\,\text{Sales}}$$
$$= \frac{18\%}{10\%}$$
$$\text{DTL} = 1.8.$$

$$\text{DFL} = \$2,400,000/(\$2,400,000 - \$400,000)$$
$$= 1.2.$$

Given DTL = DFL × DOL, we can calculate DOL = 1.5. Recognizing S - VC - FC = EBIT, 1.5 = (S - VC)/$2,400,000 or S - VC = $3,600,000. The difference between (S - VC) and EBIT must represent fixed operating costs. Thus, FC = $3,600,000 - $2,400,000 = $1,200,000.