CHAPTER 9
THE COST OF CAPITAL

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

Multiple Choice: Conceptual

Easy:

Capital components **Answer: c Diff: E**

1. Which of the following is not considered a capital component for the purpose of calculating the weighted average cost of capital (WACC) as it applies to capital budgeting?

   a. Long-term debt.
   b. Common stock.
   c. Accounts payable and accruals.
   d. Preferred stock.

Capital components **Answer: d Diff: E**

2. For a typical firm with a given capital structure, which of the following is correct? (Note: All rates are after taxes.)

   a. $k_d > k_e > k_s >$ WACC.
   b. $k_s > k_e > k_d >$ WACC.
   c. WACC $> k_e > k_s > k_d$.
   d. $k_e > k_s >$ WACC $> k_d$.
   e. None of the statements above is correct.

Capital components **Answer: a Diff: E**

3. Which of the following statements is most correct?

   a. If a company's tax rate increases but the yield to maturity of its noncallable bonds remains the same, the company's marginal cost of debt capital used to calculate its weighted average cost of capital will fall.
   b. All else equal, an increase in a company's stock price will increase the marginal cost of retained earnings, k_s.
   c. All else equal, an increase in a company's stock price will increase the marginal cost of issuing new common equity, k_e.
   d. Statements a and b are correct.
   e. Statements b and c are correct.

Capital components **Answer: c Diff: E**

4. Which of the following statements is most correct?

   a. Since the money is readily available, the cost of retained earnings is usually a lot cheaper than the cost of debt financing.
   b. When calculating the cost of preferred stock, a company needs to adjust for taxes, because preferred stock dividends are tax deductible.
   c. When calculating the cost of debt, a company needs to adjust for taxes, because interest payments are tax deductible.
   d. Statements a and b are correct.
   e. Statements b and c are correct.

DCF cost of equity estimation **Answer: b Diff: E**

5. Which of the following factors in the discounted cash flow (DCF) approach to estimating the cost of common equity is the least difficult to estimate?

   a. Expected growth rate, g.
   b. Dividend yield, D_1/P_0.
   c. Required return, k_s.
   d. Expected rate of return, $\hat{k}_s$.
   e. All of the above are equally difficult to estimate.

WACC **Answer: d Diff: E**

6. Which of the following statements is most correct?

   a. The WACC measures the after-tax cost of capital.
   b. The WACC measures the marginal cost of capital.
   c. There is no cost associated with using retained earnings.
   d. Statements a and b are correct.
   e. All of the statements above are correct.

WACC **Answer: c Diff: E**

7. Which of the following statements about the cost of capital is incorrect?

   a. A company's target capital structure affects its weighted average cost of capital.
   b. Weighted average cost of capital calculations should be based on the after-tax costs of all the individual capital components.
   c. If a company's tax rate increases, then, all else equal, its weighted average cost of capital will increase.
   d. Flotation costs can increase the weighted average cost of capital.
   e. An increase in the risk-free rate is likely to increase the marginal costs of both debt and equity financing.

WACC **Answer: e Diff: E**

8. Campbell Co. is trying to estimate its weighted average cost of capital (WACC). Which of the following statements is most correct?

   a. The after-tax cost of debt is generally cheaper than the after-tax cost of preferred stock.
   b. Since retained earnings are readily available, the cost of retained earnings is generally lower than the cost of debt.
   c. If the company's beta increases, this will increase the cost of equity financing, even if the company is able to rely on only retained earnings for its equity financing.
   d. Statements a and b are correct.
   e. Statements a and c are correct.

Factors influencing WACC **Answer: a Diff: E**

9. Wyden Brothers has no retained earnings. The company uses the CAPM to calculate the cost of equity capital. The company's capital structure consists of common stock, preferred stock, and debt. Which of the following events will reduce the company's WACC?

   a. A reduction in the market risk premium.
   b. An increase in the flotation costs associated with issuing new common stock.
   c. An increase in the company's beta.
   d. An increase in expected inflation.
   e. An increase in the flotation costs associated with issuing preferred stock.

WACC and capital components **Answer: c Diff: E**

10. Which of the following statements is most correct?

   a. The WACC is a measure of the before-tax cost of capital.
   b. Typically the after-tax cost of debt financing exceeds the after-tax cost of equity financing.
   c. The WACC measures the marginal after-tax cost of capital.
   d. Statements a and b are correct.
   e. Statements b and c are correct.

WACC and capital components **Answer: a Diff: E**

11. A company has a capital structure that consists of 50 percent debt and 50 percent equity. Which of the following statements is most correct?

   a. The cost of equity financing is greater than or equal to the cost of debt financing.
   b. The WACC exceeds the cost of equity financing.
   c. The WACC is calculated on a before-tax basis.
   d. The WACC represents the cost of capital based on historical averages. In that sense, it does not represent the marginal cost of capital.
   e. The cost of retained earnings exceeds the cost of issuing new common stock.

Internal vs. external common equity **Answer: e Diff: E**

12. A firm estimates that its proposed capital budget will force it to issue new common stock, which has a greater cost than the cost of retained earnings. The firm, however, would like to avoid issuing costly new common stock. Which of the following steps would mitigate the firm's need to raise new common stock?

    a. Increasing the company's dividend payout ratio for the upcoming year.
    b. Reducing the company's debt ratio for the upcoming year.
    c. Increasing the company's proposed capital budget.
    d. All of the statements above are correct.
    e. None of the statements above is correct.

Risk and project selection **Answer: c Diff: E**

13. Dick Boe Enterprises, an all-equity firm, has a corporate beta coefficient of 1.5. The financial manager is evaluating a project with an expected return of 21 percent, before any risk adjustment. The risk-free rate is 10 percent, and the required rate of return on the market is 16 percent. The project being evaluated is riskier than Boe's average project, in terms of both beta risk and total risk. Which of the following statements is most correct?

    a. The project should be accepted since its expected return (before risk adjustment) is greater than its required return.
    b. The project should be rejected since its expected return (before risk adjustment) is less than its required return.
    c. The accept/reject decision depends on the risk-adjustment policy of the firm. If the firm's policy were to reduce a riskier-than-average project's expected return by 1 percentage point, then the project should be accepted.
    d. Riskier-than-average projects should have their expected returns increased to reflect their added riskiness. Clearly, this would make the project acceptable regardless of the amount of the adjustment.
    e. Projects should be evaluated on the basis of their total risk alone. Thus, there is insufficient information in the problem to make an accept/reject decision.

Risk and project selection **Answer: b Diff: E**

14. A company estimates that an average-risk project has a WACC of 10 percent, a below-average risk project has a WACC of 8 percent, and an above-average risk project has a WACC of 12 percent. Which of the following independent projects should the company accept?

    a. Project A has average risk and a return of 9 percent.
    b. Project B has below-average risk and a return of 8.5 percent.
    c. Project C has above-average risk and a return of 11 percent.
    d. All of the projects above should be accepted.
    e. None of the projects above should be accepted.

Divisional risk **Answer: a Diff: E N**

15. Conglomerate Inc. consists of 2 divisions of equal size, and Conglomerate is 100 percent equity financed. Division A's cost of equity capital is 9.8 percent, while Division B's cost of equity capital is 14 percent. Conglomerate's composite WACC is 11.9 percent. Assume that all Division A projects have the same risk and that all Division B projects have the same risk. However, the projects in Division A are not the same risk as those in Division B. Which of the following projects should Conglomerate accept?

    a. Division A project with an 11 percent return.
    b. Division B project with a 12 percent return.
    c. Division B project with a 13 percent return.
    d. Statements a and c are correct.
    e. Statements b and d are correct.

Retained earnings break point **Answer: a Diff: E**

16. Which of the following will increase a company's retained earnings break point?

    a. An increase in its net income.
    b. An increase in its dividend payout.
    c. An increase in the amount of equity in its capital structure.
    d. An increase in its capital budget.
    e. All of the statements above are correct.

Retained earnings break point **Answer: b Diff: E**

17. Which of the following actions will increase the retained earnings break point?

    a. An increase in the dividend payout ratio.
    b. An increase in the debt ratio.
    c. An increase in the capital budget.
    d. An increase in flotation costs.
    e. All of the statements above are correct.

Miscellaneous cost of capital concepts **Answer: c Diff: E N**

18. Which of the following statements is most correct?

    a. Since debt capital is riskier than equity capital, the cost of debt is always greater than the WACC.
    b. Because of the risk of bankruptcy, the cost of debt capital is always higher than the cost of equity capital.
    c. If a company assigns the same cost of capital to all of its projects regardless of the project's risk, then it follows that the company will generally reject too many safe projects and accept too many risky projects.
    d. Because you are able to avoid flotation costs, the cost of retained earnings is generally lower than the cost of debt.
    e. Higher flotation costs tend to reduce the cost of equity capital.

Miscellaneous concepts **Answer: e Diff: E**

19. Which of the following statements is most correct?

a. Higher flotation costs reduce investor returns, and therefore reduce a company's WACC.
b. The WACC represents the historical cost of capital and is usually calculated on a before-tax basis.
c. The cost of retained earnings is zero because retained earnings are readily available and do not require the payment of flotation costs.
d. All of the statements above are correct.
e. None of the statements above is correct.

Medium:

Capital components **Answer: e Diff: M**

20. Which of the following statements is most correct?

a. In the weighted average cost of capital calculation, we must adjust the cost of preferred stock for the tax exclusion of 70 percent of dividend income.
b. We ideally would like to use historical measures of the component costs from prior financings in estimating the appropriate weighted average cost of capital.
c. The cost of a new equity issuance (k_e) could possibly be lower than the cost of retained earnings (k_s) if the market risk premium and risk-free rate decline by a substantial amount.
d. Statements b and c are correct.
e. None of the statements above is correct.

Capital components **Answer: a Diff: M**

21. Which of the following statements is most correct?

a. The cost of retained earnings is the rate of return stockholders require on a firm's common stock.
b. The component cost of preferred stock is expressed as $k_p(1 - T)$, because preferred stock dividends are treated as fixed charges, similar to the treatment of debt interest.
c. The bond-yield-plus-risk-premium approach to estimating a firm's cost of common equity involves adding a subjectively determined risk premium to the market risk-free bond rate.
d. The higher the firm's flotation cost for new common stock, the more likely the firm is to use preferred stock, which has no flotation cost.
e. None of the statements above is correct.

Cost of capital estimation **Answer: c Diff: M**

22. Which of the following statements is correct?

a. The cost of capital used to evaluate a project should be the cost of the specific type of financing used to fund that project.
b. The cost of debt used to calculate the weighted average cost of capital is based on an average of the cost of debt already issued by the firm and the cost of new debt.
c. One problem with the CAPM approach in estimating the cost of equity capital is that if a firm's stockholders are, in fact, not well diversified, beta may be a poor measure of the firm's true investment risk.
d. The bond-yield-plus-risk-premium approach is the most sophisticated and objective method of estimating a firm's cost of equity capital.
e. The cost of equity capital is generally easier to measure than the cost of debt, which varies daily with interest rates, or the cost of preferred stock since preferred stock is issued infrequently.

Cost of equity estimation **Answer: d Diff: M**

23. Which of the following statements is correct?

a. Although some methods of estimating the cost of equity capital encounter severe difficulties, the CAPM is a simple and reliable model that provides great accuracy and consistency in estimating the cost of equity capital.
b. The DCF model is preferred over other models to estimate the cost of equity because of the ease with which a firm's growth rate is obtained.
c. The bond-yield-plus-risk-premium approach to estimating the cost of equity is not always accurate but its advantages are that it is a standardized and objective model.
d. Depreciation-generated funds are an additional source of capital and, in fact, represent the largest single source of funds for some firms.
e. None of the statements above is correct.

CAPM cost of equity estimation **Answer: e Diff: M**

24. In applying the CAPM to estimate the cost of equity capital, which of the following elements is not subject to dispute or controversy?

a. The expected rate of return on the market, k_M.
b. The stock's beta coefficient, b_i.
c. The risk-free rate, k_{RF}.
d. The market risk premium (RP_M).
e. All of the above are subject to dispute.

CAPM and DCF estimation **Answer: a Diff: M**

25. Which of the following statements is most correct?

a. Beta measures market risk, but if a firm's stockholders are not well diversified, beta may not accurately measure stand-alone risk.
b. If the calculated beta underestimates the firm's true investment risk, then the CAPM method will overestimate k_s.
c. The discounted cash flow method of estimating the cost of equity can't be used unless the growth component, g, is constant during the analysis period.
d. An advantage shared by both the DCF and CAPM methods of estimating the cost of equity capital, is that they yield precise estimates and require little or no judgement.
e. None of the statements above is correct.

WACC **Answer: d Diff: M**

26. Which of the following statements is most correct?

a. The weighted average cost of capital for a given capital budget level is a weighted average of the marginal cost of each relevant capital component that makes up the firm's target capital structure.
b. The weighted average cost of capital is calculated on a before-tax basis.
c. An increase in the risk-free rate is likely to increase the marginal costs of both debt and equity financing.
d. Statements a and c are correct.
e. All of the statements above are correct.

WACC **Answer: d Diff: M**

27. Which of the following statements is correct?

a. The WACC should include only after-tax component costs. Therefore, the required rates of return (or "market rates") on debt, preferred, and common equity (k_d, k_p, and k_s) must be adjusted to an after-tax basis before they are used in the WACC equation.
b. The cost of retained earnings is generally higher than the cost of new common stock.
c. Preferred stock is riskier to investors than is debt. Therefore, if someone told you that the market rates showed $k_d > k_p$ for a given company, that person must have made a mistake.
d. If a company with a debt ratio of 50 percent were suddenly exempted from all future income taxes, then, all other things held constant, this would cause its WACC to increase.
e. None of the statements above is correct.

WACC **Answer: e Diff: M**

28. Which of the following statements is most correct?

a. An increase in flotation costs incurred in selling new stock will increase the cost of retained earnings.
b. The WACC should include only after-tax component costs. Therefore, the required rates of return (or "market rates") on debt, preferred, and common equity (k_d, k_p, and k_s) must be adjusted to an after-tax basis before they are used in the WACC equation.
c. An increase in a firm's corporate tax rate will increase the firm's cost of debt capital, as long as the yield to maturity on the company's bonds remains constant or falls.
d. Statements b and c are correct.
e. None of the statements above is correct.

WACC **Answer: e Diff: M**

29. Which of the following statements is most correct?

a. Since stockholders do not generally pay corporate taxes, corporations should focus on before-tax cash flows when calculating the weighted average cost of capital (WACC).
b. All else equal, an increase in flotation costs will increase the cost of retained earnings.
c. When calculating the weighted average cost of capital, firms should rely on historical costs rather than marginal costs of capital.
d. Statements a and b are correct.
e. None of the statements above is correct.

WACC and capital components **Answer: b Diff: M**

30. Which of the following statements is correct?

a. Because we often need to make comparisons among firms that are in different income tax brackets, it is best to calculate the WACC on a before-tax basis.
b. If a firm has been suffering accounting losses and is expected to continue suffering such losses, and therefore its tax rate is zero, it is possible that its after-tax component cost of preferred stock as used to calculate the WACC will be less than its after-tax component cost of debt.
c. Normally, the cost of external equity raised by issuing new common stock is above the cost of retained earnings. Moreover, the higher the growth rate is relative to the dividend yield, the more the cost of external equity will exceed the cost of retained earnings.
d. The lower a company's tax rate, the greater the advantage of using debt in terms of lowering its WACC.
e. None of the statements above is correct.

Risk-adjusted cost of capital **Answer: c Diff: M**

31. Kemp Consolidated has two divisions of equal size: a computer division and a restaurant division. Stand-alone restaurant companies typically have a cost of capital of 8 percent, while stand-alone computer companies typically have a 12 percent cost of capital. Kemp's restaurant division has the same risk as a typical restaurant company, and its computer division has the same risk as a typical computer company. Consequently, Kemp estimates that its composite corporate cost of capital is 10 percent. The company's consultant has suggested that they use an 8 percent hurdle rate for the restaurant division and a 12 percent hurdle rate for the computer division. However, Kemp has chosen to ignore its consultant, and instead, chooses to assign a 10 percent cost of capital to all projects in both divisions. Which of the following statements is most correct?

a. While Kemp's decision to not risk adjust its cost of capital will lead it to accept more projects in its computer division and fewer projects in its restaurant division, this should not affect the overall value of the company.
b. Kemp's decision to not risk adjust means that it is effectively subsidizing its restaurant division, which means that its restaurant division is likely to become a larger part of the overall company over time.
c. Kemp's decision to not risk adjust means that the company will accept too many projects in the computer business and too few projects in the restaurant business. This will lead to a reduction in the overall value of the company.
d. Statements a and b are correct.
e. Statements b and c are correct.

Risk-adjusted cost of capital **Answer: b Diff: M**

32. The Barabas Company has an equal amount of low-risk projects, average-risk projects, and high-risk projects. Barabas estimates that the overall company's WACC is 12 percent. This is also the correct cost of capital for the company's average-risk projects. The company's CFO argues that, even though the company's projects have different risks, the cost of capital for each project should be the same because the company obtains its capital from the same sources. If the company follows the CFO's advice, what is likely to happen over time?

a. The company will take on too many low-risk projects and reject too many high-risk projects.
b. The company will take on too many high-risk projects and reject too many low-risk projects.
c. Things will generally even out over time, and therefore, the risk of the firm should remain constant over time.
d. Statements a and c are correct.
e. Statements b and c are correct.

Risk-adjusted cost of capital **Answer: e Diff: M**

33. If a company uses the same cost of capital for evaluating all projects, which of the following results is likely?

a. Accepting poor, high-risk projects.
b. Rejecting good, low-risk projects.
c. Accepting only good, low-risk projects.
d. Accepting no projects.
e. Answers a and b are correct.

Risk-adjusted cost of capital **Answer: a Diff: M**

34. If a typical U.S. company uses the same cost of capital to evaluate all projects, the firm will most likely become

a. Riskier over time, and its value will decline.
b. Riskier over time, and its value will rise.
c. Less risky over time, and its value will rise.
d. Less risky over time, and its value will decline.
e. There is no reason to expect its risk position or value to change over time as a result of its use of a single discount rate.

Division WACCs and risk **Answer: e Diff: M**

35. Pearson Plastics has two equal-sized divisions, Division A and Division B. The company estimates that if the divisions operated as independent companies Division A would have a cost of capital of 8 percent, while Division B would have a cost of capital of 12 percent. Since the two divisions are the same size, Pearson's composite weighted average cost of capital (WACC) is 10 percent. In the past, Pearson has assigned separate hurdle rates to each division based on their relative risk. Now, however, Pearson has chosen to use the corporate WACC, which is currently 10 percent, for both divisions. Which of the following is likely to occur as a result of this change? Assume that this change is likely to have no effect on the average risk of each division and market conditions remain unchanged.

a. Over time, the overall risk of the company will increase.
b. Over time, Division B will become a larger part of the overall company.
c. Over time, the company's corporate WACC will increase.
d. Statements a and c are correct.
e. All of the statements above are correct.

Divisional risk and project selection **Answer: e Diff: M N**

36. Smith Electric Co. and Ferdinand Water Co. are the same size and have the same capital structure. Smith Electric Co. is riskier than Ferdinand and has a WACC of 12 percent. Ferdinand Water Co. is safer than Smith and has a WACC of 10 percent. Ferdinand Water Co. is considering Project X. Project X has an IRR of 10.5 percent, and has the same risk as a typical project undertaken by Ferdinand Water Co. Smith Electric Co. is considering Project Y. Project Y has an IRR of 11.5 percent, and has the same risk as a typical project undertaken by Smith Electric Co.

Now assume that Smith Electric Co. and Ferdinand Water Co. merge to form a new company, Leeds United Utilities. The merger has no impact on the cash flows or risk of either Project X or Project Y. Leeds United Utilities' CFO is trying to establish hurdle rates for the new company's projects that accurately reflect the risk of each project. (That is, he is using risk-adjusted hurdle rates.) Which of the following statements is most correct?

a. Leeds United Utilities' weighted average cost of capital is 11 percent.
b. Project X has a positive NPV.
c. After the merger, Leeds United Utilities should select Project X and reject Project Y.
d. Statements a and b are correct.
e. All of the statements above are correct.

Beta and project risk **Answer: a Diff: M**

37. Which of the following statements is correct?

a. A relatively risky future cash outflow should be evaluated using a relatively low discount rate.
b. If a firm's managers want to maximize the value of the stock, they should concentrate exclusively on projects' market, or beta, risk.
c. If a firm evaluates all projects using the same cost of capital, then the riskiness of the firm as measured by its beta will probably decline over time.
d. If a firm has a beta that is less than 1.0, say 0.9, this would suggest that its assets' returns are negatively correlated with the returns of most other firms' assets.
e. None of the statements above is correct.

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

38. Which of the following statements is most correct?

a. Suppose a firm is losing money and thus, is not paying taxes, and that this situation is expected to persist for a few years whether or not the firm uses debt financing. Then the firm's after-tax cost of debt will equal its before-tax cost of debt.
b. The component cost of preferred stock is expressed as $k_p(1 - T)$, because preferred stock dividends are treated as fixed charges, similar to the treatment of debt interest.
c. The reason that a cost is assigned to retained earnings is because these funds are already earning a return in the business; the reason does not involve the opportunity cost principle.
d. The bond-yield-plus-risk-premium approach to estimating a firm's cost of common equity involves adding a subjectively determined risk premium to the market risk-free bond rate.
e. None of the statements above is correct.

Multiple Choice: Problems

Easy:

Cost of new equity **Answer: b Diff: E**

39. Your company's stock sells for $50 per share, its last dividend (D_0) was $2.00, its growth rate is a constant 5 percent, and the company will incur a flotation cost of 15 percent if it sells new common stock. What is the firm's cost of new equity, k_e?

a. 9.20%
b. 9.94%
c. 10.50%
d. 11.75%
e. 12.30%

Cost of new equity **Answer: d Diff: E**

40. Blair Brothers' stock currently has a price of $50 per share and is expected to pay a year-end dividend of $2.50 per share ($D_1$ = $2.50). The dividend is expected to grow at a constant rate of 4 percent per year. The company has insufficient retained earnings to fund capital projects and must, therefore, issue new common stock. The new stock has an estimated flotation cost of $3 per share. What is the company's cost of equity capital?

a. 10.14%
b. 9.21%
c. 9.45%
d. 9.32%
e. 9.00%

Cost of retained earnings **Answer: d Diff: E**

41. Allison Engines Corporation has established a target capital structure of 40 percent debt and 60 percent common equity. The current market price of the firm's stock is P_0 = \$28; its last dividend was D_0 = \$2.20, and its expected dividend growth rate is 6 percent. What will Allison's marginal cost of retained earnings, k_s, be?

a. 15.8%
b. 13.9%
c. 7.9%
d. 14.3%
e. 9.7%

WACC **Answer: a Diff: E**

42. An analyst has collected the following information regarding Christopher Co.:

- The company's capital structure is 70 percent equity and 30 percent debt.
- The yield to maturity on the company's bonds is 9 percent.
- The company's year-end dividend is forecasted to be \$0.80 a share.
- The company expects that its dividend will grow at a constant rate of 9 percent a year.
- The company's stock price is \$25.
- The company's tax rate is 40 percent.
- The company anticipates that it will need to raise new common stock this year, and total flotation costs will equal 10 percent of the amount issued.

Assume the company accounts for flotation costs by adjusting the cost of capital. Given this information, calculate the company's WACC.

a. 10.41%
b. 12.56%
c. 10.78%
d. 13.55%
e. 9.29%

WACC **Answer: a Diff: E**

43. Flaherty Electric has a capital structure that consists of 70 percent equity and 30 percent debt. The company's long-term bonds have a before-tax yield to maturity of 8.4 percent. The company uses the DCF approach to determine the cost of equity. Flaherty's common stock currently trades at \$45 per share. The year-end dividend (D_1) is expected to be \$2.50 per share, and the dividend is expected to grow forever at a constant rate of 7 percent a year. The company estimates that it will have to issue new common stock to help fund this year's projects. The flotation cost on new common stock issued is 10 percent, and the company's tax rate is 40 percent. What is the company's weighted average cost of capital, WACC?

a. 10.73%
b. 10.30%
c. 11.31%
d. 7.48%
e. 9.89%

WACC **Answer: b Diff: E**

44. Billick Brothers is estimating its WACC. The company has collected the following information:

- Its capital structure consists of 40 percent debt and 60 percent common equity.
- The company has 20-year bonds outstanding with a 9 percent annual coupon that are trading at par.
- The company's tax rate is 40 percent.
- The risk-free rate is 5.5 percent.
- The market risk premium is 5 percent.
- The stock's beta is 1.4.

What is the company's WACC?

a. 9.71%
b. 9.66%
c. 8.31%
d. 11.18%
e. 11.10%

Divisional risk **Answer: c Diff: E**

45. Dandy Product's overall weighted average required rate of return is 10 percent. Its yogurt division is riskier than average, its fresh produce division has average risk, and its institutional foods division has below-average risk. Dandy adjusts for both divisional and project risk by adding or subtracting 2 percentage points. Thus, the maximum adjustment is 4 percentage points. What is the risk-adjusted required rate of return for a low-risk project in the yogurt division?

a. 6%
b. 8%
c. 10%
d. 12%
e. 14%

Retained earnings break point **Answer: e Diff: E**

46. Stephenson & Sons has a capital structure that consists of 20 percent equity and 80 percent debt. The company expects to report $3 million in net income this year, and 60 percent of the net income will be paid out as dividends. How large must the firm's capital budget be this year without it having to issue any new common stock?

a. $ 1.20 million
b. $13.00 million
c. $ 1.50 million
d. $ 0.24 million
e. $ 6.00 million

Medium:

Cost of retained earnings **Answer: d Diff: M**

47. The common stock of Anthony Steel has a beta of 1.20. The risk-free rate is 5 percent and the market risk premium ($k_M - k_{RF}$) is 6 percent. Assume the firm will be able to use retained earnings to fund the equity portion of its capital budget. What is the company's cost of retained earnings, k_s?

a. 7.0%
b. 7.2%
c. 11.0%
d. 12.2%
e. 12.4%

Cost of external equity **Answer: d Diff: M**

48. A company just paid a $2.00 per share dividend on its common stock (D_0 = $2.00). The dividend is expected to grow at a constant rate of 7 percent per year. The stock currently sells for $42 a share. If the company issues additional stock, it must pay its investment banker a flotation cost of $1.00 per share. What is the cost of external equity, k_e?

a. 11.76%
b. 11.88%
c. 11.98%
d. 12.22%
e. 12.30%

Component cost of debt **Answer: b Diff: M**

49. Hamilton Company's 8 percent coupon rate, quarterly payment, $1,000 par value bond, which matures in 20 years, currently sells at a price of $686.86. The company's tax rate is 40 percent. Based on the nominal interest rate, not the EAR, what is the firm's component cost of debt for purposes of calculating the WACC?

a. 3.05%
b. 7.32%
c. 7.36%
d. 12.20%
e. 12.26%

WACC **Answer: e Diff: M N**

50. Trojan Services' CFO is interested in estimating the company's WACC and has collected the following information:

- The company has bonds outstanding that mature in 26 years with an annual coupon of 7.5 percent. The bonds have a face value of $1,000 and sell in the market today for $920.
- The risk-free rate is 6 percent.
- The market risk premium is 5 percent.
- The stock's beta is 1.2.
- The company's tax rate is 40 percent.
- The company's target capital structure consists of 70 percent equity and 30 percent debt.
- The company uses the CAPM to estimate the cost of equity and does not include flotation costs as part of its cost of capital.

What is Trojan's WACC?

a. 9.75%
b. 9.39%
c. 10.87%
d. 9.30%
e. 9.89%

WACC **Answer: a Diff: M**

51. A company has determined that its optimal capital structure consists of 40 percent debt and 60 percent equity. Assume the firm will not have enough retained earnings to fund the equity portion of its capital budget. Also, assume the firm accounts for flotation costs by adjusting the cost of capital. Given the following information, calculate the firm's weighted average cost of capital.

- k_d = 8%.
- Net income = $40,000.
- Payout ratio = 50%.
- Tax rate = 40%.
- P_0 = $25.
- Growth = 0%.
- Shares outstanding = 10,000.
- Flotation cost on additional equity = 15%.

a. 7.60%
b. 8.05%
c. 11.81%
d. 13.69%
e. 14.28%

WACC **Answer: b Diff: M**

52. Hatch Corporation's target capital structure is 40 percent debt, 50 percent common stock, and 10 percent preferred stock. Information regarding the company's cost of capital can be summarized as follows:

- The company's bonds have a nominal yield to maturity of 7 percent.
- The company's preferred stock sells for $42 a share and pays an annual dividend of $4 a share.
- The company's common stock sells for $28 a share, and is expected to pay a dividend of $2 a share at the end of the year (i.e., D_1 = $2.00). The dividend is expected to grow at a constant rate of 7 percent a year.
- The firm will be able to use retained earnings to fund the equity portion of its capital budget.
- The company's tax rate is 40 percent.

What is the company's weighted average cost of capital (WACC)?

a. 9.25%
b. 9.70%
c. 10.03%
d. 10.59%
e. 11.30%

WACC **Answer: a Diff: M**

53. Hilliard Corp. wants to calculate its weighted average cost of capital (WACC). The company's CFO has collected the following information:

- The company's long-term bonds currently offer a yield to maturity of 8 percent.
- The company's stock price is $32 a share ($P_0$ = $32).
- The company recently paid a dividend of $2 a share ($D_0$ = $2.00).
- The dividend is expected to grow at a constant rate of 6 percent a year (g = 6%).
- The company pays a 10 percent flotation cost whenever it issues new common stock (F = 10 percent).
- The company's target capital structure is 75 percent equity and 25 percent debt.
- The company's tax rate is 40 percent.
- The firm will be able to use retained earnings to fund the equity portion of its capital budget.

What is the company's WACC?

a. 10.67%
b. 11.22%
c. 11.47%
d. 12.02%
e. 12.56%

WACC **Answer: c Diff: M**

54. Johnson Industries finances its projects with 40 percent debt, 10 percent preferred stock, and 50 percent common stock.

- The company can issue bonds at a yield to maturity of 8.4 percent.
- The cost of preferred stock is 9 percent.
- The risk-free rate is 6.57 percent.
- The market risk premium is 5 percent.
- Johnson Industries' beta is equal to 1.3.
- Assume that the firm will be able to use retained earnings to fund the equity portion of its capital budget.
- The company's tax rate is 30 percent.

What is the company's weighted average cost of capital (WACC)?

a. 8.33%
b. 8.95%
c. 9.79%
d. 10.92%
e. 13.15%

WACC **Answer: b Diff: M**

55. Helms Aircraft has a capital structure that consists of 60 percent debt and 40 percent common stock. The firm will be able to use retained earnings to fund the equity portion of its capital budget. The company recently issued bonds with a yield to maturity of 9 percent. The risk-free rate is 6 percent, the market risk premium is 6 percent, and Helms' beta is equal to 1.5. If the company's tax rate is 35 percent, what is the company's weighted average cost of capital (WACC)?

a. 8.33%
b. 9.51%
c. 9.95%
d. 10.98%
e. 11.84%

WACC **Answer: e Diff: M**

56. Dobson Dairies has a capital structure that consists of 60 percent long-term debt and 40 percent common stock. The company's CFO has obtained the following information:

- The before-tax yield to maturity on the company's bonds is 8 percent.
- The company's common stock is expected to pay a $3.00 dividend at year end (D_1 = $3.00), and the dividend is expected to grow at a constant rate of 7 percent a year. The common stock currently sells for $60 a share.
- Assume the firm will be able to use retained earnings to fund the equity portion of its capital budget.
- The company's tax rate is 40 percent.

What is the company's weighted average cost of capital (WACC)?

a. 12.00%
b. 8.03%
c. 9.34%
d. 8.00%
e. 7.68%

WACC **Answer: d Diff: M**

57. Longstreet Corporation has a target capital structure that consists of 30 percent debt, 50 percent common equity, and 20 percent preferred stock. The tax rate is 30 percent. The company has projects in which it would like to invest with costs that total $1,500,000. Longstreet will retain $500,000 of net income this year. The last dividend was $5, the current stock price is $75, and the growth rate of the company is 10 percent. If the company raises capital through a new equity issuance, the flotation costs are 10 percent. The cost of preferred stock is 9 percent and the cost of debt is 7 percent. (Assume debt and preferred stock have no flotation costs.) What is the weighted average cost of capital at the firm's optimal capital budget?

a. 12.58%
b. 18.15%
c. 12.18%
d. 12.34%
e. 11.94%

WACC **Answer: a Diff: M**

58. A stock analyst has obtained the following information about J-Mart, a large retail chain:

- The company has noncallable bonds with 20 years maturity remaining and a maturity value of $1,000. The bonds have a 12 percent annual coupon and currently sell at a price of $1,273.8564.
- Over the past four years, the returns on the market and on J-Mart were as follows:

Year	Market	J-Mart
1999	12.0%	14.5%
2000	17.2	22.2
2001	-3.8	-7.5
2002	20.0	24.0

- The current risk-free rate is 6.35 percent, and the expected return on the market is 11.35 percent. The company's tax rate is 35 percent. The company anticipates that its proposed investment projects will be financed with 70 percent debt and 30 percent equity.

What is the company's estimated weighted average cost of capital (WACC)?

a. 8.04%
b. 9.00%
c. 10.25%
d. 12.33%
e. 13.14%

WACC **Answer: c Diff: M**

59. Clark Communications has a capital structure that consists of 70 percent common stock and 30 percent long-term debt. In order to calculate Clark's weighted average cost of capital (WACC), an analyst has accumulated the following information:

- The company currently has 15-year bonds outstanding with annual coupon payments of 8 percent. The bonds have a face value of $1,000 and sell for $1,075.
- The risk-free rate is 5 percent.
- The market risk premium is 4 percent.
- The beta on Clark's common stock is 1.1.
- The company's retained earnings are sufficient so that they do not have to issue any new common stock to fund capital projects.
- The company's tax rate is 38 percent.

Given this information, what is Clark's WACC?

a. 5.93%
b. 7.40%
c. 7.91%
d. 8.07%
e. 8.73%

WACC **Answer: d Diff: M**

60. Reading Foods is interested in calculating its weighted average cost of capital (WACC). The company's CFO has collected the following information:

- The target capital structure consists of 40 percent debt and 60 percent common stock.
- The company has 20-year noncallable bonds with a par value of $1,000, a 9 percent annual coupon, and a price of $1,075.
- Equity flotation costs are 2 percent.
- The company's common stock has a beta of 0.8.
- The risk-free rate is 5 percent.
- The market risk premium is 4 percent.
- The company's tax rate is 40 percent.
- The company plans to use retained earnings to finance the equity portion of its capital structure, so it does not intend to issue any new common stock.

What is the company's WACC?

a. 13.13%
b. 6.24%
c. 8.21%
d. 6.89%
e. 6.57%

WACC **Answer: c Diff: M N**

61. 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.

What is the company's current WACC?

a. 7.41%
b. 9.17%
c. 10.61%
d. 10.99%
e. 11.57%

WACC and dividend growth rate **Answer: c Diff: M**

62. Grateway Inc. has a weighted average cost of capital of 11.5 percent. Its target capital structure is 55 percent equity and 45 percent debt. The company has sufficient retained earnings to fund the equity portion of its capital budget. The before-tax cost of debt is 9 percent, and the company's tax rate is 30 percent. If the expected dividend next period (D_1) is $5 and the current stock price is $45, what is the company's growth rate?

a. 2.68%
b. 3.44%
c. 4.64%
d. 6.75%
e. 8.16%

WACC and optimal capital budget **Answer: e Diff: M**

63. The managers of Kenforest Grocers are trying to determine the company's optimal capital budget for the upcoming year. Kenforest is considering the following projects:

Project	Size	Rate of Return	Risk
A	$200,000	16%	High
B	500,000	14	Average
C	400,000	12	Low
D	300,000	11	High
E	100,000	10	Average
F	200,000	10	Low
G	400,000	7	Low

The company estimates that its WACC is 11 percent. All projects are independent. The company adjusts for risk by adding 2 percentage points to the WACC for high-risk projects and subtracting 2 percentage points from the WACC for low-risk projects. Which of the projects will the company accept?

a. A, B, C, E, F
b. B, D, F, G
c. A, B, C, E
d, A, B, C, D, E
e. A, B, C, F

CAPM, beta, and WACC **Answer: e Diff: M**

64. Bradshaw Steel has a capital structure with 30 percent debt (all long-term bonds) and 70 percent common equity. The yield to maturity on the company's long-term bonds is 8 percent, and the firm estimates that its overall composite WACC is 10 percent. The risk-free rate of interest is 5.5 percent, the market risk premium is 5 percent, and the company's tax rate is 40 percent. Bradshaw uses the CAPM to determine its cost of equity. What is the beta on Bradshaw's stock?

a. 1.07
b. 1.48
c. 1.31
d. 0.10
e. 1.35

Required rate of return **Answer: c Diff: M**

65. Arizona Rock, an all-equity firm, currently has a beta of 1.25. The risk-free rate, k_{RF}, is 7 percent and k_M is 14 percent. Suppose the firm sells 10 percent of its assets with beta equal to 1.25 and purchases the same proportion of new assets with a beta of 1.1. What will be the firm's new overall required rate of return, and what rate of return must the new assets produce in order to leave the stock price unchanged?

a. 15.645%; 15.645%
b. 15.750%; 14.700%
c. 15.645%; 14.700%
d. 15.750%; 15.645%
e. 14.750%; 15.750%

Beta risk **Answer: b Diff: M**

66. Sun State Mining Inc., an all-equity firm, is considering the formation of a new division that will increase the assets of the firm by 50 percent. Sun State currently has a required rate of return of 18 percent, U.S. Treasury bonds yield 7 percent, and the market risk premium is 5 percent. If Sun State wants to reduce its required rate of return to 16 percent, what is the maximum beta coefficient the new division could have?

a. 2.2
b. 1.0
c. 1.8
d. 1.6
e. 2.0

Tough:

WACC **Answer: b Diff: T**

67. Heavy Metal Corp. is a steel manufacturer that finances its operations with 40 percent debt, 10 percent preferred stock, and 50 percent equity. The interest rate on the company's debt is 11 percent. The preferred stock pays an annual dividend of $2 and sells for $20 a share. The company's common stock trades at $30 a share, and its current dividend (D_0) of $2 a share is expected to grow at a constant rate of 8 percent per year. The flotation cost of external equity is 15 percent of the dollar amount issued, while the flotation cost on preferred stock is 10 percent. The company estimates that its WACC is 12.30 percent. Assume that the firm will not have enough retained earnings to fund the equity portion of its capital budget. What is the company's tax rate?

a. 30.33%
b. 32.86%
c. 35.75%
d. 38.12%
e. 40.98%

WACC and cost of preferred stock **Answer: b Diff: T**

68. Anderson Company has four investment opportunities with the following costs (paid at t = 0) and expected returns:

Project	Cost	Expected Return
A	$2,000	16.0%
B	3,000	14.5
C	5,000	11.5
D	3,000	9.5

The company has a target capital structure that consists of 40 percent common equity, 40 percent debt, and 20 percent preferred stock. The company has $1,000 in retained earnings. The company expects its year-end dividend to be $3.00 per share ($D_1$ = $3.00). The dividend is expected to grow at a constant rate of 5 percent a year. The company's stock price is currently $42.75. If the company issues new common stock, the company will pay its investment bankers a 10 percent flotation cost.

The company can issue corporate bonds with a yield to maturity of 10 percent. The company is in the 35 percent tax bracket. How large can the cost of preferred stock be (including flotation costs) and it still be profitable for the company to invest in all four projects?

a. 7.75%
b. 8.90%
c. 10.46%
d. 11.54%
e. 12.68%

Multiple Part:

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

The Global Advertising Company has a marginal tax rate of 40 percent. The company can raise debt at a 12 percent interest rate and the last dividend paid by Global was $0.90. Global's common stock is selling for $8.59 per share, and its expected growth rate in earnings and dividends is 5 percent. If Global issues new common stock, the flotation cost incurred will be 10 percent. Global plans to finance all capital expenditures with 30 percent debt and 70 percent equity.

Cost of retained earnings **Answer: e Diff: E**

69. What is Global's cost of retained earnings if it can use retained earnings rather than issue new common stock?

a. 12.22%
b. 17.22%
c. 10.33%
d. 9.66%
e. 16.00%

Cost of external equity **Answer: b Diff: E**

70. What is the cost of common equity raised by selling new stock?

a. 12.22%
b. 17.22%
c. 10.33%
d. 9.66%
e. 16.00%

WACC **Answer: d Diff: E**

71. What is the firm's weighted average cost of capital if the firm has sufficient retained earnings to fund the equity portion of its capital budget?

a. 11.95%
b. 12.22%
c. 12.88%
d. 13.36%
e. 14.21%

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

Byron Corporation's present capital structure, which is also its target capital structure, is 40 percent debt and 60 percent common equity. Assume that the firm has no retained earnings. The company's earnings and dividends are growing at a constant rate of 5 percent; the last dividend (D_0) was $2.00; and the current equilibrium stock price is $21.88. Byron can raise all the debt financing it needs at 14 percent. If Byron issues new common stock, a 20 percent flotation cost will be incurred. The firm's marginal tax rate is 40 percent.

Cost of external equity **Answer: a Diff: E**

72. What is the component cost of the equity raised by selling new common stock?

a. 17.0%
b. 16.4%
c. 15.0%
d. 14.6%
e. 12.0%

WACC **Answer: b Diff: E**

73. What is the firm's weighted average cost of capital?

a. 10.8%
b. 13.6%
c. 14.2%
d. 16.4%
e. 18.0%

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

Rollins Corporation has a target capital structure consisting of 20 percent debt, 20 percent preferred stock, and 60 percent common equity. Assume the firm has insufficient retained earnings to fund the equity portion of its capital budget. Its bonds have a 12 percent coupon, paid semiannually, a current maturity of 20 years, and sell for $1,000. The firm could sell, at par, $100 preferred stock that pays a 12 percent annual dividend, but flotation costs of 5 percent would be incurred. Rollins' beta is 1.2, the risk-free rate is 10 percent, and the market risk premium is 5 percent. Rollins is a constant growth firm that just paid a dividend of $2.00, sells for $27.00 per share, and has a growth rate of 8 percent. The firm's policy is to use a risk premium of 4 percentage points when using the bond-yield-plus-risk-premium method to find k_s. Flotation costs on new common stock total 10 percent, and the firm's marginal tax rate is 40 percent.

Cost of debt **Answer: e Diff: E**

74. What is Rollins' component cost of debt?

a. 10.0%
b. 9.1%
c. 8.6%
d. 8.0%
e. 7.2%

Cost of preferred stock **Answer: d Diff: E**

75. What is Rollins' cost of preferred stock?

a. 10.0%
b. 11.0%
c. 12.0%
d. 12.6%
e. 13.2%

Cost of equity: CAPM **Answer: c Diff: E**

76. What is Rollins' cost of retained earnings using the CAPM approach?

a. 13.6%
b. 14.1%
c. 16.0%
d. 16.6%
e. 16.9%

Cost of equity: DCF **Answer: c Diff: E**

77. What is the firm's cost of retained earnings using the DCF approach?

a. 13.6%
b. 14.1%
c. 16.0%
d. 16.6%
e. 16.9%

Cost of equity: risk premium **Answer: c Diff: E**

78. What is Rollins' cost of retained earnings using the bond-yield-plus-risk-premium approach?

a. 13.6%
b. 14.1%
c. 16.0%
d. 16.6%
e. 16.9%

WACC **Answer: b Diff: E**

79. What is Rollins' WACC, if the firm has insufficient retained earnings to fund the equity portion of its capital budget?

a. 13.6%
b. 14.1%
c. 16.0%
d. 16.6%
e. 16.9%

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

The Jackson Company has just paid a dividend of $3.00 per share on its common stock, and it expects this dividend to grow by 10 percent per year, indefinitely. The firm has a beta of 1.50; the risk-free rate is 10 percent; and the expected return on the market is 14 percent. The firm's investment bankers believe that new issues of common stock would have a flotation cost equal to 5 percent of the current market price.

Stock price--constant growth **Answer: d Diff: E**

80. How much should an investor be willing to pay for this stock today?

a. $62.81
b. $70.00
c. $43.75
d. $55.00
e. $30.00

Cost of external equity **Answer: b Diff: E**

81. What will be Jackson's cost of new common stock if it issues new stock in the marketplace today?

a. 15.25%
b. 16.32%
c. 17.00%
d. 12.47%
e. 9.85%

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

Becker Glass Corporation expects to have earnings before interest and taxes during the coming year of $1,000,000, and it expects its earnings and dividends to grow indefinitely at a constant annual rate of 12.5 percent. The firm has $5,000,000 of debt outstanding bearing a coupon interest rate of 8 percent, and it has 100,000 shares of common stock outstanding. Historically, Becker has paid 50 percent of net earnings to common shareholders in the form of dividends. The current price of Becker's common stock is $40, but it would incur a 10 percent flotation cost if it were to sell new stock. The firm's tax rate is 40 percent.

Cost of retained earnings **Answer: e Diff: M**

82. What is the firm's cost of retained earnings?

a. 15.0%
b. 15.5%
c. 16.0%
d. 16.5%
e. 17.0%

Cost of external equity **Answer: d Diff: E**

83. What is Becker's cost of newly issued stock?

a. 16.0%
b. 16.5%
c. 17.0%
d. 17.5%
e. 18.0%

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

J. Ross and Sons Inc. has a target capital structure that calls for 40 percent debt, 10 percent preferred stock, and 50 percent common equity. The firm's current after-tax cost of debt is 6 percent, and it can sell as much debt as it wishes at this rate. The firm's preferred stock currently sells for $90 a share and pays a dividend of $10 per share; however, the firm will net only $80 per share from the sale of new preferred stock. Ross' common stock currently sells for $40 per share, but the firm will net only $34 per share from the sale of new common stock. The firm recently paid a dividend of $2 per share on its common stock, and investors expect the dividend to grow indefinitely at a constant rate of 10 percent per year. Assume the firm has sufficient retained earnings to fund the equity portion of its capital budget.

Cost of retained earnings **Answer: c Diff: E**

84. What is the firm's cost of retained earnings?

a. 10.0%
b. 12.5%
c. 15.5%
d. 16.5%
e. 18.0%

Cost of external equity **Answer: d Diff: E**

85. What is the firm's cost of newly issued common stock?

a. 10.0%
b. 12.5%
c. 15.5%
d. 16.5%
e. 18.0%

Cost of preferred stock **Answer: b Diff: E**

86. What is the firm's cost of newly issued preferred stock?

a. 10.0%
b. 12.5%
c. 15.5%
d. 16.5%
e. 18.0%

WACC **Answer: d Diff: E**

87. What is the firm's weighted average cost of capital?

a. 9.5%
b. 10.3%
c. 10.8%
d. 11.4%
e. 11.9%

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

The following information applies to the Coetzer Company:

- Coetzer has a target capital structure of 40 percent debt and 60 percent common equity.
- Coetzer has $1,000 par value bonds outstanding with a 15-year maturity, a 12 percent annual coupon, and a current price of $1,150.
- The risk-free rate is 5 percent. The market risk premium ($k_M - k_{RF}$) is also 5 percent.
- Coetzer's common stock has a beta of 1.4.
- Coetzer's tax rate is 40 percent.

Cost of debt **Answer: b Diff: E N**

88. What is the company's after-tax cost of debt?

a. 3.6%
b. 6.0%
c. 7.2%
d. 10.0%
e. 12.0%

Cost of common equity: CAPM **Answer: e Diff: E N**

89. What is the company's after-tax cost of common equity?

a. 6.0%
b. 8.4%
c. 9.6%
d. 10.0%
e. 12.0%

WACC **Answer: c Diff: E N**

90. What is the company's WACC?

a. 6.0%
b. 7.4%
c. 9.6%
d. 10.8%
e. 12.2%

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

Viduka Construction's CFO wants to estimate the company's WACC. She has collected the following information:

- The company currently has 20-year bonds outstanding. The bonds have an 8.5 percent annual coupon, a face value of $1,000, and they currently sell for $945.
- The company's stock has a beta = 1.20.
- The market risk premium, $k_M - k_{RF}$, equals 5 percent.
- The risk-free rate is 6 percent.
- The company has outstanding preferred stock that pays a $2.00 annual dividend. The preferred stock sells for $25 a share.
- The company's tax rate is 40 percent.
- The company's capital structure consists of 40 percent long-term debt, 40 percent common stock, and 20 percent preferred stock.

Cost of debt **Answer: b Diff: M N**

91. What is the company's after-tax cost of debt?

a. 5.10%
b. 5.46%
c. 6.46%
d. 8.50%
e. 9.11%

Cost of preferred stock **Answer: d Diff: E N**

92. What is the company's after-tax cost of preferred stock?

a. 4.80%
b. 5.60%
c. 7.10%
d. 8.00%
e. 8.40%

Cost of common equity: CAPM **Answer: d Diff: E N**

93. What is the company's after-tax cost of common equity?

a. 7.20%
b. 7.32%
c. 7.94%
d. 12.00%
e. 12.20%

WACC **Answer: c Diff: E N**

94. What is the company's WACC?

a. 7.95%
b. 8.12%
c. 8.59%
d. 8.67%
e. 10.04%

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

Burlees Inc.'s CFO is interested in calculating the cost of capital. In order to calculate the cost of capital, the company has collected the following information:

- The company's capital structure consists of 40 percent debt and 60 percent common stock.
- The company has bonds outstanding with 25 years to maturity. The bonds have a 12 percent annual coupon, a face value of $1,000, and a current price of $1,252.
- The company uses the CAPM to calculate the cost of common stock. Currently, the risk-free rate is 5 percent and the market risk premium, ($k_M - k_{RF}$), equals 6 percent. The company's common stock has a beta of 1.6.
- The company's tax rate is 40 percent.

After-tax cost of debt **Answer: c Diff: E N**

95. What is the company's after-tax cost of debt?

a. 3.74%
b. 4.80%
c. 5.62%
d. 7.20%
e. 8.33%

Cost of common equity: CAPM **Answer: c Diff: E N**

96. What is the company's cost of common equity?

a. 9.65%
b. 14.00%
c. 14.60%
d. 17.60%
e. 18.91%

WACC **Answer: b Diff: E N**

97. What is the company's weighted average cost of capital (WACC)?

a. 10.5%
b. 11.0%
c. 11.5%
d. 12.0%
e. 12.5%

Web Appendix 9A

Multiple Choice: Conceptual

Easy:

Risk and divisional costs of capital **Answer: a Diff: E N**

9A-1. Sunshine Inc. has two divisions. 50 percent of the firm's capital is invested in Division A, which has a beta of 0.8. The other 50 percent of the firm's capital is invested in Division B, which has a beta of 1.2. The company has no debt, and it is 100 percent equity financed. The risk-free rate is 6 percent and the market risk premium is 5 percent. Sunshine assigns different hurdle rates to each division, and these hurdle rates are based on each division's market risk. Which of the following statements is most correct?

a. Sunshine's composite WACC is 11 percent.
b. Division B has a lower weighted average cost of capital than Division A.
c. If Sunshine assigned the same hurdle rate to each division, this would lead the firm to select too many projects in Division A and reject too many projects in Division B.
d. Statements a and b are correct.
e. Statements a and c are correct.

Medium:

Risk and project betas **Answer: d Diff: M**

9A-2. If the firm is being operated so as to maximize shareholder wealth, and if our basic assumptions concerning the relationship between risk and return are true, then which of the following should be true?

a. If the beta of the asset is larger than the firm's beta, then the required return on the asset is less than the required return on the firm.
b. If the beta of the asset is smaller than the firm's beta, then the required return on the asset is greater than the required return on the firm.
c. If the beta of the asset is greater than the firm's beta prior to the addition of that asset, then the firm's beta after the purchase of the asset will be smaller than the original firm's beta.
d. If the beta of an asset is larger than the firm's beta prior to the addition of that asset, then the required return on the firm will be greater after the purchase of that asset than prior to its purchase.
e. None of the statements above is correct.

SML and capital budgeting **Answer: a Diff: M**

9A-3. Using the Security Market Line concept in capital budgeting, which of the following is correct?

a. If the expected rate of return on a given capital project lies above the SML, the project should be accepted even if its beta is above the beta of the firm's average project.
b. If a project's return lies below the SML, it should be rejected if it has a beta greater than the firm's existing beta but accepted if its beta is below the firm's beta.
c. If two mutually exclusive projects' expected returns are both above the SML, the project with the lower risk should be accepted.
d. If a project's expected rate of return is greater than the expected rate of return on an average project, it should be accepted.
e. None of the statements above is correct.

Multiple Choice: Problems

Easy:

Project cost of capital **Answer: c Diff: E**

9A-4. Louisiana Enterprises, an all-equity firm, is considering a new capital investment. Analysis has indicated that the proposed investment has a beta of 0.5 and will generate an expected return of 7 percent. The firm currently has a required return of 10.75 percent and a beta of 1.25. The investment, if undertaken, will double the firm's total assets. If k_{RF} is 7 percent and the market return is 10 percent, should the firm undertake the investment? (Choose the best answer.)

a. Yes; the expected return of the asset (7%) exceeds the required return (6.5%).
b. Yes; the beta of the asset will reduce the risk of the firm.
c. No; the expected return of the asset (7%) is less than the required return (8.5%).
d. No; the risk of the asset (beta) will increase the firm's beta.
e. No; the expected return of the asset is less than the firm's required return, which is 10.75%.

Medium:

Project cost of capital **Answer: e Diff: M**

9A-5. Assume you are the director of capital budgeting for an all-equity firm. The firm's current cost of equity is 16 percent; the risk-free rate is 10 percent; and the market risk premium is 5 percent. You are considering a new project that has 50 percent more beta risk than your firm's assets currently have, that is, its beta is 50 percent larger than the firm's existing beta. The expected return on the new project is 18 percent. Should the project be accepted if beta risk is the appropriate risk measure? Choose the correct statement.

a. Yes; its expected return is greater than the firm's cost of capital.
b. Yes; the project's risk-adjusted required return is less than its expected return.
c. No; a 50 percent increase in beta risk gives a risk-adjusted required return of 24 percent.
d. No; the project's risk-adjusted required return is 2 percentage points above its expected return.
e. No; the project's risk-adjusted required return is 1 percentage point above its expected return.

Web Appendix 9B

Multiple Choice: Conceptual

Medium:

Pure play method **Answer: b Diff: M**

9B-1. Which of the following methods involves calculating an average beta for firms in a similar business and then applying that beta to determine a project's beta?

a. Risk premium method.
b. Pure play method.
c. Accounting beta method.
d. CAPM method.
e. Statements b and c are correct.

Multiple Choice: Problems

Easy:

Corporate WACC for firm with divisions **Answer: c Diff: E N**

9B-2. Northern Conglomerate has two divisions, Division A and Division B. Northern looks at competing pure-play firms to estimate the betas of each of the two divisions. After this analysis, Northern concludes that Division A has a beta of 0.8 and Division B has a beta of 1.5. The two divisions are the same size. The risk-free rate is 5 percent and the market risk premium, $k_M - k_{RF}$, is 6 percent. Assume that Northern is 100 percent equity financed. What is the overall composite WACC for Northern Conglomerate?

a. 9.8%
b. 10.2%
c. 11.9%
d. 13.6%
e. 14.0%

Medium:

Pure play method **Answer: b Diff: M**

9B-3. Interstate Transport has a target capital structure of 50 percent debt and 50 percent common equity. The firm is considering a new independent project that has a return of 13 percent and is not related to transportation. However, a pure play proxy firm has been identified that is exclusively engaged in the new line of business. The proxy firm has a beta of 1.38. Both firms have a marginal tax rate of 40 percent, and Interstate's before-tax cost of debt is 12 percent. The risk-free rate is 10 percent and the market risk premium is 5 percent. The firm should

a. Reject the project; its return is less than the firm's required rate of return on the project of 16.9 percent.
b. Accept the project; its return is greater than the firm's required rate of return on the project of 12.05 percent.
c. Reject the project; its return is only 13 percent.
d. Accept the project; its return exceeds the risk-free rate and the before-tax cost of debt.
e. Be indifferent between accepting or rejecting; the firm's required rate of return on the project equals its expected return.

CHAPTER 9
ANSWERS AND SOLUTIONS

1. Capital components **Answer: c Diff: E**

2. Capital components **Answer: d Diff: E**

3. Capital components **Answer: a Diff: E**

The debt cost used to calculate a firm's WACC is $k_d(1 - T)$. If k_d remains constant but T increases, then the term (1 - T) decreases and the value of the entire equation, $k_d(1 - T)$, decreases. Statement b is false; if a company's stock price increases, and all else remains constant, then the dividend yield decreases and k_s decreases. This can be seen from the equation $k_s = D_1/P_0 + g$. Statement c is false for the same reason. The cost of issuing new common stock is $k_e = D_1/[P_0(1 - F)] + g$. If P_0 increases but there's no change in the flotation cost, k_e will decrease.

4. Capital components **Answer: c Diff: E**

Retained earnings are just another form of equity. When the company has retained earnings, they can do one of two things--reinvest it or pay it out as dividends. If the firm reinvests the earnings, it needs to earn a return that is at least as high as the k_s of the stock. Otherwise, investors would be happier receiving the dividends and investing them in something that will earn k_s. Therefore, statement a is false. Some of the preferred stock dividends are excluded from taxation when another company owns them. It makes no tax difference to the company that pays the dividends, since dividends come out of after-tax dollars. Therefore, statement b is false. Interest payments are tax deductible. Therefore, statement c is true.

5. DCF cost of equity estimation **Answer: b Diff: E**

6. WACC **Answer: d Diff: E**

The correct answer is statement d because statements a and b are correct. Statement c is false. Shareholders can either receive a dividend or they can let you reinvest in the company. If they receive a dividend, they can invest that money and earn a return on it. Consequently, if the company keeps the money as retained earnings and reinvests in projects, it had better earn a return on that money. Therefore, there is a cost associated with using retained earnings.

7. WACC **Answer: c Diff: E**

Statement c is the correct choice. A tax rate increase would lead to a decrease in the after-tax cost of debt and, consequently, the firm's WACC would decrease.

8. WACC **Answer: e Diff: E**

The preferred stock dividend is not tax deductible like the interest payment on debt. Therefore, there is no tax benefit from preferred stock. Statement a is true. Retained earnings are equity, and equity will have a higher cost than debt. Therefore, statement b is false. If the beta increases, investors will require a higher rate of return to hold or buy the stock. Therefore, the cost of equity will go up, and statement c is true. Because statements a and c are true, the correct choice is statement e.

9. Factors influencing WACC **Answer: a Diff: E**

Statement a is true; the other statements are false. If RP_M decreases, the cost of equity will be reduced. Answers b through e will all increase the company's WACC.

10. WACC and capital components **Answer: c Diff: E**

WACC measures the marginal after-tax cost of capital; therefore, statement a is false. The after-tax cost of debt financing is less than the after-tax cost of equity financing; therefore, statement b is false. The correct choice is statement c.

11. WACC and capital components **Answer: a Diff: E**

Statement a is true; the other statements are false. Statement b is false; WACC is an average of debt and equity financing. Since debt financing is cheaper and is adjusted downward for taxes, it should, when averaged with equity, cause the WACC to be less than the cost of equity financing. Statement c is false; WACC is calculated on an after-tax basis. Statement d is false; the WACC is based on marginal, not embedded, costs. Statement e is false; the cost of issuing new common stock is greater than the cost of retained earnings.

12. Internal vs. external common equity **Answer: e Diff: E**

Statements a through c will increase the need to raise new common stock; therefore, statement e is the correct answer.

13. Risk and project selection **Answer: c Diff: E**

$k_s = 10\% + (16\% - 10\%)1.5 = 10\% + 9\% = 19\%$.
Expected return = 21%. 21% - Risk adjustment 1% = 20%.
Risk-adjusted return = 20% > k_s = 19%. Thus, the project should be selected.

14. Risk and project selection **Answer: b Diff: E**

The project whose return is greater than its risk-adjusted cost of capital should be selected. Only Project B meets this criteria.

15. Divisional risk **Answer: a Diff: E N**

The correct answer is statement a. Division A should accept only projects with a return greater than 9.8 percent, and Division B should accept only projects with a return greater than 14 percent. Only statement a fits this criteria. The company's composite WACC is irrelevant in the decision.

16. Retained earnings break point **Answer: a Diff: E**

Statement a is true; an increase in net income will increase the retained earnings break point. Statements b and c will serve to lower the break point. Statement b will result in less earnings being retained, so the retained earnings break point will be reduced. Statement c will result in more earnings being needed, so the retained earnings break point will be reduced. Statement d will have no effect on the retained earnings break point.

17. Retained earnings break point **Answer: b Diff: E**

Statement a is false; increasing the dividend payout will result in the firm running out of retained earnings earlier. Statement b is true; a higher debt ratio means that retained earnings are a smaller portion of the funding mix and, therefore, retained earnings will go further. Statement c will have no effect on the retained earnings break point, as is the case for statement d.

18. Miscellaneous cost of capital concepts **Answer: c Diff: E N**

The correct answer is statement c. Debt is usually safer than equity because it has promised payments over the life of the debt. So, the cost of debt is typically below the WACC. So, statement a is incorrect. If bankruptcy occurs, debt holders may get something. Equity holders will get nothing! So, the cost of debt is again typically below the cost of equity. So, statement b is incorrect. Statement c is correct. Statement d is incorrect. The cost of retained earnings is generally equal to the required return on equity, which exceeds the cost of debt. Higher flotation costs increase the cost of equity. So statement e is incorrect.

19. Miscellaneous concepts **Answer: e Diff: E**

Flotation costs do not reduce investor returns; they reduce the amount of the company's proceeds. This drives the company's cost of equity, and thus its WACC, higher. Therefore, statement a is false. The WACC is based on marginal costs and incorporates taxes. Consequently, statement b is false. Retained earnings have no flotation costs but the company still must earn a return on them, so they are not without a cost. Investors expect a required rate of return, and if they don't receive it, they would prefer that the company pay out retained earnings as dividends, so that they can then invest in something that does give them their expected return. Thus, retained earnings have a cost. Therefore, statement c is false. Since statements a, b, and c are false, the correct choice is statement e.

20. Capital components **Answer: e Diff: M**

Statement e is the correct answer. Unlike interest expense on debt, preferred dividends are not deductible, hence there are no tax savings associated with the use of preferred stock. The component costs of WACC should reflect the costs of new financing, not historical measures. The cost of issuing new equity is always greater than the cost of retained earnings.

21. Capital components **Answer: a Diff: M**

Statement a is true; the other statements are false. Preferred stock dividends are not tax deductible; therefore, the cost of preferred stock is only k_p. The risk premium in the bond-yield-plus-risk premium approach would be added to the firm's cost of debt, not the risk-free rate. Preferred stock also has flotation costs.

22. Cost of capital estimation **Answer: c Diff: M**

23. Cost of equity estimation **Answer: d Diff: M**

24. CAPM cost of equity estimation **Answer: e Diff: M**

25. CAPM and DCF estimation **Answer: a Diff: M**

26. WACC **Answer: d Diff: M**

Both statements a and c are true; therefore, statement d is the correct choice. Statement a recites the definition of the weighted average cost of capital. Statement c is correct because $k_d = k_{RF} + LP + MRP + DRP$ while $k_s = k_{RF} + (k_M - k_{RF})b$. If k_{RF} increases then the values for k_d and k_s will increase.

27. WACC **Answer: d Diff: M**

If a firm paid no income taxes, its cost of debt would not be adjusted downward, hence the component cost of debt would be higher than if T were greater than 0. With a higher component cost of debt, the WACC would increase. Of course, the company would have higher earnings, and its cash flows from a given project would be high, so the higher WACC would not impede its investments, that is, its capital budget would be larger than if it were taxed.

28. WACC **Answer: e Diff: M**

Statement e is the correct answer. An increase in flotation costs has no effect on the cost of retained earnings. Since interest is tax deductible, while preferred and common dividends are not, only the cost of debt used in the WACC equation must be adjusted by multiplying by (1 - T). An increase in the firm's corporate tax rate reduces the after-tax component cost of debt.

29. WACC **Answer: e Diff: M**

Statement e is the correct answer. After-tax cash flows must be considered in order to account for the tax deductibility of interest payments on corporate debt. An increase in flotation costs will leave the cost of retained earnings unchanged, but will raise the cost of new equity issues. The marginal, not the embedded, cost of capital is the relevant cost of capital.

30. WACC and capital components **Answer: b Diff: M**

Because corporations can exclude dividends for tax purposes, preferred stock often has a before-tax market return that is less than the issuing company's before-tax cost of debt. Then, if the issuer's tax rate is zero, its component cost of preferred would be less than its after-tax cost of debt.

31. Risk-adjusted cost of capital **Answer: c Diff: M**

By Kemp not making the risk adjustment, it is true that the company will accept more projects in the computer division, and fewer projects in the restaurant division. However, this will make the company riskier overall, raising its cost of equity. Investors will discount their cash flows at a higher rate, and the company's value will fall. In addition, some of the computer projects might not exceed the appropriate risk-adjusted hurdle rate, and will actually be negative NPV projects, further destroying value. Therefore, statement a is false. Because fewer of the restaurant projects will be accepted, the restaurant division will become a smaller part of the overall company. Therefore, statement b is false. As explained above, statement c is true.

32. Risk-adjusted cost of capital **Answer: b Diff: M**

By not risk adjusting the cost of capital, the firm will tend to reject low-risk projects since their returns will be lower than the average cost of capital, and it will take on high-risk projects since their returns will be higher than the average cost of capital.

33. Risk-adjusted cost of capital **Answer: e Diff: M**

34. Risk-adjusted cost of capital **Answer: a Diff: M**

35. Division WACCs and risk **Answer: e Diff: M**

If the company uses the 10 percent WACC, it will turn down all projects with a return of less than 10 percent but more than 8 percent. Thus, these "safer" projects will no longer be taken, and the company will increase the proportion of risky projects it undertakes. Therefore, statement a is true. If Division A's projects have lower returns than Division B's because they have less risk, fewer and fewer projects will be accepted from Division A and more projects will be accepted from Division B. Therefore, Division B will grow and Division A will shrink. Therefore, statement b is true. If the company becomes riskier, then its cost of equity will increase causing WACC to increase. Therefore, statement c is true. Because all of the statements are true, the correct choice is statement e.

36. Divisional risk and project selection **Answer: e Diff: M N**

The correct answer is statement e. Statement a is correct; the firms have the same size and capital structure, so the WACC of the merged company is just a simple average of their separate WACCs. Statement b is correct; Project X has an IRR of 10.5% and its appropriate cost of capital is 10%, therefore, the project has a positive net present value. Statement c is also correct; Project X should be accepted because of the previous argument. Project Y should be rejected because it has an 11.5% return and its appropriate cost of capital is 12%. Therefore, statement e is the correct choice.

37. Beta and project risk **Answer: a Diff: M**

38. Miscellaneous concepts **Answer: a Diff: M**

39. Cost of new equity **Answer: b Diff: E**

$$k_e = \frac{\$2.00(1.05)}{\$50(1 - 0.15)} + 5\% = 9.94\%.$$

40. Cost of new equity **Answer: d Diff: E**

The firm must issue new equity to fund its capital projects, so we need to find the cost of new equity capital, k_e:

$k_e = D_1/(P_0 - F) + g$
$= \$2.50/(\$50 - \$3) + 4\%$
$= \$2.50/\$47 + 4\%$
$= 5.32\% + 4\%$
$= 9.32\%.$

41. Cost of retained earnings **Answer: d Diff: E**

Use the dividend growth model to calculate k_s:

$$k_s = \frac{D_0(1 + g)}{P_0} + g = \frac{\$2.20(1.06)}{\$28} + 0.06$$
$$= 0.0833 + 0.06 = 0.1433 \approx 14.3\%.$$

42. WACC **Answer: a Diff: E**

$WACC = w_d k_d(1 - T) + w_c k_e$. k_d is given = 9%. Find k_e:

$k_e = D_1/[P_0(1 - F)] + g$
$= \$0.8/[\$25(1 - 0.1)] + 0.09$
$= 0.125556.$

Now you can calculate WACC:
$WACC = (0.3)(0.09)(0.6) + (0.7)(0.125556) = 10.41\%.$

43. WACC **Answer: a Diff: E**

$WACC = [0.3 \times 0.084 \times (1 - 0.4)] + [0.7 \times (\$2.5/(\$45 \times (1 - 0.1)) + 0.07)]$
$= 10.73\%.$

44. WACC **Answer: b Diff: E**

$WACC = w_d k_d(1 - T) + w_c k_s$.

$k_s = k_{RF} + RP_M(b)$
$k_s = 5.5\% + 5\%(1.4)$
$k_s = 5.5\% + 7\% = 12.5\%$.

$WACC = w_d k_d(1 - T) + w_c k_s$
$WACC = 0.4(9\%)(1 - 0.4) + (0.6)12.5\%$
$WACC = 9.66\%$.

45. Divisional risk **Answer: c Diff: E**

$k_{YD} = 10\% + 2\% = 12\%$.
However, for a low-risk project, Dandy Product subtracts 2 percentage points. Therefore, the required rate of return is 10 percent.
$k_{YD,\text{Low-risk project}} = 10\% + 2\% - 2\% = 10\%$.

46. Retained earnings break point **Answer: e Diff: E**

Additions to retained earnings will be: \$3.0 million × 0.4 = \$1.2 million.
The retained earnings breakpoint is \$1.2 million/0.2 = \$6 million.

47. Cost of retained earnings **Answer: d Diff: M**

The cost of retained earnings as calculated from the CAPM is
$k_s = k_{RF} + (k_M - k_{RF})b$
$= 5\% + (6\%)1.2$
$= 12.2\%$.

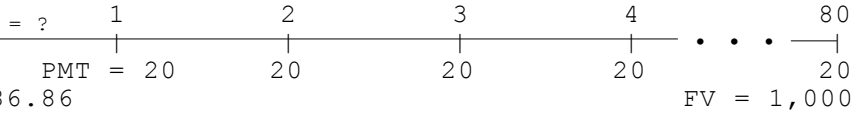
48. Cost of external equity **Answer: d Diff: M**

$D_0 = \$2$; $D_1 = \$2(1.07) = \$2.14$.

$k_e = D_1/[P_0(1 - F)] + g$
$= \$2.14/(\$42 - \$1) + 7\% = 12.22\%$.

49. Component cost of debt **Answer: b Diff: M**

Time line:



Financial calculator solution:
Calculate the nominal YTM of bond:
Inputs: N = 80; PV = -686.86; PMT = 20; FV = 1000.
Output: I = 3.05% periodic rate.
Nominal annual rate = 3.05% × 4 = 12.20%.
Calculate k_d after-tax: $k_{d,AT} = 12.20(1 - T) = 12.20(1 - 0.4) = 7.32\%$.

50. WACC **Answer: e Diff: M N**

Data given:
k_{RF} = 6%; RP_M = 5%; b = 1.2; T = 40%; w_d = 0.3; w_c = 0.7.
WACC = $w_d k_d(1 - T) + w_c k_s$.

Step 1: Determine the firm's costs of debt and equity:
Enter the following data as inputs in your calculator:
N = 26; PV = -920; PMT = 75; FV = 1000; and then solve for I = k_d = 8.2567%.

$k_s = k_{RF} + (RP_M)b$
$= 6\% + (5\%)1.2$
$= 12\%$.

Step 2: Given the firm's component costs of capital, calculate the firm's WACC:
$WACC = w_d k_d(1 - T) + w_c k_s$
$= 0.3(8.2567\%)(1 - 0.4) + 0.7(12\%)$
$= 1.4862\% + 8.4\%$
$= 9.8862\% \approx 9.89\%$.

51. WACC **Answer: a Diff: M**

Find the dividend, D_1 = [(0.5)$40,000]/# of Shares = $20,000/10,000 = $2.00.

Since the firm will not have enough retained earnings to fund the equity portion of its capital budget, the firm will have to issue new common stock.

Find the cost of new common stock:
$k_e = D_1/[P_0(1 - F)] + g = \$2.00/[\$25(1 - 0.15)] + 0\% = 0.0941 = 9.41\%$.

Finally, calculate WACC, using k_e = 0.0941, and k_d = 0.08, so
$WACC = (D/A)(1 - \text{Tax rate})k_d + (E/A)k_e$
$= 0.4(0.08)(1 - 0.4) + 0.6(0.0941) = 0.0757 \approx 7.6\%$.

52. WACC **Answer: b Diff: M**

AT cost of debt = 0.07(1 - 0.40) = 0.042 = 4.2%.
Cost of preferred stock = $4/$42 = 0.0952 = 9.52%.
Cost of retained earnings = $2/$28 + 0.07 = 0.1414 = 14.14%.
WACC = 0.40(0.042) + 0.10(0.0952) + 0.50(0.1414) = 0.0970 = 9.70%.

53. WACC **Answer: a Diff: M**

AT cost of debt = 0.08(1 - 0.40) = 0.048 = 4.80%.
Cost of retained earnings = $2.12/$32 + 0.06 = 0.1263 = 12.63%.
WACC = 0.75(0.1263) + 0.25(0.048) = 10.67%.

54. WACC **Answer: c Diff: M**

Cost of debt = 0.084(1 - 0.30) = 0.0588 = 5.88%.
Cost of preferred stock = 0.09 = 9%.
Cost of retained earnings = k_{RF} + (RP_M)b = 6.57% + (5%)1.3 = 13.07%.
WACC = 0.4(0.0588) + 0.10(0.09) + 0.50(0.1307) = 9.79%.

55. WACC **Answer: b Diff: M**

Cost of debt = 0.09(1 - 0.35) = 0.0585 = 5.85%.
Cost of retained earnings = k_{RF} + (RP_M)b = 6% + 6%(1.5) = 15%.
WACC = 0.60(0.0585) + 0.40(0.1500) = 0.0951 = 9.51%.

56. WACC **Answer: e Diff: M**

The firm will not be issuing new equity because there are adequate retained earnings available to fund available projects. Therefore, WACC should be calculated using k_s rather than k_e.

$k_s = D_1/P_0 + g$
$= \$3.00/\$60.00 + 0.07$
$= 0.12 = 12\%$.

$WACC = w_d k_d(1 - T) + w_c k_s$
$= (0.6)(0.08)(1 - 0.4) + (0.4)(0.12)$
$= 0.0768 = 7.68\%$.

57. WACC **Answer: d Diff: M**

AT cost of debt = 7%(1 - 0.3) = 4.9%.
Retained earnings breakpoint = \$500,000/0.5 = \$1,000,000.

Thus, to finance its optimal capital budget, Longstreet must issue some new equity and flotation costs of 10% will be incurred.

Cost of new equity = [\$5(1.10)/\$75(1 - 0.1)] + 10% = 8.15% + 10% = 18.15%.
WACC = 4.9%(0.3) + 9%(0.2) + 18.15%(0.5) = 12.34%.

58. WACC **Answer: a Diff: M**

WACC = [(0.7)(k_d)(1 - T)] + [(0.3)(k_s)].

Use bond information to solve for k_d:
N = 20; PV = -1273.8564; PMT = 120; FV = 1000; and then solve for k_d = 9%.

To solve for k_s, we can use the SML equation, but we need to find beta. Using Market and J-Mart return information and a calculator's regression feature we find b = 1.3585.

$k_s = 0.0635 + (0.1135 - 0.0635)(1.3585) = 0.1314 = 13.14\%$.

Plug these values into the WACC equation and solve:
WACC = [(0.7)(0.09)(1 - 0.35)] + [(0.3)(0.1314)] = 0.0804 = 8.04%.

59. WACC **Answer: c Diff: M**

Step 1: Find the cost of debt:
Enter the following input data in the calculator:
N = 15; PV = -1075; PMT = 80; FV = 1000; and then solve for I = k_d = 7.1678%.

Step 2: Find the cost of equity:
$k_s = k_{RF} + (k_M - k_{RF})b$
$= 5\% + 4\%(1.1)$
$= 5\% + 4.4\%$
$= 9.4\%$.

Step 3: Calculate the firm's WACC:
$WACC = w_d k_d(1 - T) + w_c k_s$
$= (0.3)(7.1678\%)(1 - 0.38) + (0.7)(9.4\%)$
$= 1.3332\% + 6.58\%$
$= 7.9132\% \approx 7.91\%$.

60. WACC **Answer: d Diff: M**

$w_d = 0.4$; $w_c = 0.6$.

Step 1: Calculate k_d:
Use the information about the company's existing bonds to enter the following input data in the calculator:
N = 20; PV = -1075; PMT = 90; FV = 1000; and then solve for I = 8.2234%.

Step 2: Calculate k_s:
$k_{RF} = 5\%$; $k_M - k_{RF} = 4\%$; b = 0.8.

$k_s = k_{RF} + (k_M - k_{RF})b$
$= 5\% + (4\%)0.8$
$= 8.2\%$.

Step 3: Calculate WACC:
$WACC = w_d k_d(1 - T) + w_c k_s$
$= (0.4)(8.2234\%)(1 - 0.4) + (0.6)(8.2\%)$
$= 6.89\%$.

61. WACC **Answer: c Diff: M N**

$WACC = w_d k_d(1 - T) + w_c k_s$.

Step 1: Calculate the cost of common equity using the CAPM equation:
$k_s = 5\% + (6\%)1.2 = 12.20\%$.

Step 2: Calculate the cost of debt using a financial calculator by entering the following input data:
N = 20; PV = -1200; PMT = 120; FV = 1000; and then solve for I = k_d = 9.7%.

Step 3: Calculate the firm's WACC by substituting the values calculated above in the WACC equation:
$WACC = (0.25)9.7\%(1 - 0.40) + (0.75)12.20\% = 10.61\%$.

62. WACC and dividend growth rate **Answer: c Diff: M**

Solve for k_s: $WACC = w_d k_d(1 - T) + w_c k_s$
$11.5\% = 0.45(0.09)(0.70) + 0.55k_s$
$k_s = 15.75\%$.

Solve for g: $15.75\% = D_1/P_0 + g$
$15.75\% = \$5/\$45 + g$
$g = 4.64\%$.

63. WACC and optimal capital budget **Answer: e Diff: M**

Project	Rate of Return	Risk-Adjusted Cost of Capital
A	16%	13%
B	14	11
C	12	9
D	11	13
E	10	11
F	10	9
G	7	9

Projects A, B, and C are profitable because their returns surpass their risk-adjusted costs of capital. D is not profitable because its return (11%) is less than its risk-adjusted cost of capital (13%). E is not acceptable for the same reason: Its return (10%) is less than its risk-adjusted cost of capital (11%). F is accepted since it is low risk and its return (10%) surpasses the risk-adjusted cost of capital of 9%. G is rejected because its return (7%) is less than the risk-adjusted cost of capital (9%).

64. CAPM, beta, and WACC **Answer: e Diff: M**

Data given: $w_d = 0.3$; $w_c = 0.7$; $k_d = 8\%$; WACC = 10%; T = 40%; $k_{RF} = 5.5\%$, $k_M - k_{RF} = 5\%$.

Step 1: Determine the firm's cost of equity using the WACC equation:
$WACC = w_d k_d(1 - T) + w_c k_s$
$10\% = (0.3)(8\%)(1 - 0.4) + (0.7)k_s$
$8.56\% = (0.7)k_s$
$k_s = 12.2286\%$.

Step 2: Calculate the firm's beta using the CAPM equation:
$k_s = k_{RF} + (k_M - k_{RF})b$
$12.2286\% = 5.5\% + (5\%)b$
$6.7286\% = 5\%b$
$b = 1.3457 \approx 1.35$.

65. Required rate of return **Answer: c Diff: M**

$b_{Old,\ firm} = 1.25$.
$k_{Old,\ firm} = 0.07 + (0.14 - 0.07)1.25 = 15.75\%$.
$b_{New,\ firm} = 0.9(1.25) + 0.1(1.1) = 1.235$.
$k_{New,\ firm} = 0.07 + 1.235(0.07) = 15.645\%$.
$k_{New,\ assets} = 0.07 + 1.1(0.07) = 14.7\%$.

66. Beta risk **Answer: b Diff: M**

Old assets = 1.0. New assets = 0.5. Total assets = 1.5.
Old required rate: New required rate:
18% = 7% + (5%)b 16% = 7% + (5%)b
beta = 2.2. beta = 1.8.

New b must not be greater than 1.8, therefore

$$\frac{1}{1.5}(2.2) + \frac{0.5}{1.5}(b) = 1.8$$

$$0.3333(b) = 0.3333$$

$$b = 1.0.$$

Therefore, beta of the new division cannot exceed 1.0.

67. WACC **Answer: b Diff: T**

Capital structure: 40% D, 10% P, 50% E.
WACC = 12.30% (given).
k_d = 11% (given).
WACC = $0.4(k_d)(1 - T) + 0.1(k_p) + 0.5(k_e)$.

Because the firm has insufficient retained earnings to fund the equity portion of the firm's capital budget, use k_e in the WACC calculation.

a. Calculate k_e:

$$k_e = \frac{\$2(1.08)}{\$30(0.85)} + 8\% = 8.47\% + 8\% = 16.47\%.$$

b. Calculate k_p:

$$k_p = \frac{D_p}{P_p} = \frac{\$2}{\$20(0.9)} = 11.11\%.$$

c. Find T by substituting values for k_d, k_p, and k_e in the WACC equation:

$0.1230 = 0.4(0.11)(1 - T) + 0.1(0.1111) + 0.5(0.1647)$
$0.1230 = 0.044(1 - T) + 0.0111 + 0.08235$
$0.02954 = 0.044(1 - T)$
$0.671364 = 1 - T$
$0.328636 = T.$

68. WACC and cost of preferred stock **Answer: b Diff: T**

We need to find k_p at the point where all 4 projects are accepted. In other words, the capital budget = \$2,000 + \$3,000 + \$5,000 + \$3,000 = \$13,000. The WACC at that point is equal to IRR_D = 9.5%.

Step 1: Find the retained earnings break point to determine whether k_s or k_e is used in the WACC calculation:

$$BP_{RE} = \frac{\$1,000}{0.4} = \$2,500.$$

Since the capital budget > the retained earnings break point, k_e is used in the WACC calculation.

Step 2: Calculate k_e:

$$k_e = \frac{\$3.00}{\$42.75(0.9)} + 5\% = 12.80\%.$$

Step 3: Find k_p:

$$9.5\% = 0.4(10\%)(0.65) + 0.2(k_p) + 0.4(12.80\%)$$
$$9.5\% = 2.60\% + 0.2(k_p) + 5.12\%$$
$$1.78\% = 0.2k_p$$
$$8.90\% = k_p.$$

69. Cost of retained earnings **Answer: e Diff: E**

$$k_s = \frac{\$0.90(1.05)}{\$8.59} + 0.05 = 0.1600 = 16.00\%.$$

70. Cost of external equity **Answer: b Diff: E**

$$k_e = \frac{\$0.90(1.05)}{\$8.59(1 - 0.10)} + 0.05 = 0.1722 = 17.22\%.$$

71. WACC **Answer: d Diff: E**

Since the firm can fund the equity portion of its capital budget with retained earnings, use k_s in WACC.

$$\begin{aligned} WACC &= w_d k_d(1 - T) + w_c k_s \\ &= 0.3(0.12)(1 - 0.4) + 0.7(0.16) \\ &= 0.0216 + 0.112 \\ &= 0.1336 = 13.36\%. \end{aligned}$$

72. Cost of external equity **Answer: a Diff: E**

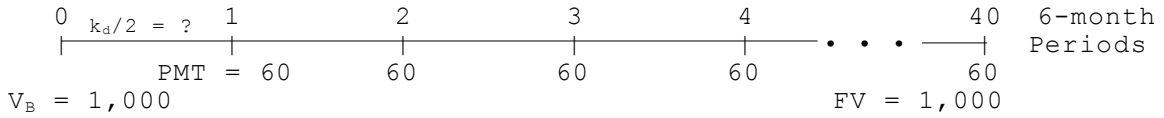
$$k_e = \frac{\$2.00(1.05)}{\$21.88(1 - 0.2)} + 0.05 = 17\%.$$

73. WACC **Answer: b Diff: E**

$$WACC = 0.4(0.14)(1 - 0.4) + 0.6(0.17) = 0.1356 = 13.56\% \approx 13.6\%.$$

74. Cost of debt **Answer: e Diff: E**

Time line:



Since the bond sells at par of $1,000, its YTM and coupon rate (12 percent) are equal. Thus, the before-tax cost of debt to Rollins is 12.0 percent. The after-tax cost of debt equals:
$k_{d,After\text{-}tax} = 12.0\%(1 - 0.40) = 7.2\%$.

Financial calculator solution:
Inputs: N = 40; PV = -1000; PMT = 60; FV = 1000;
Output: I = 6.0% = $k_d/2$.
$k_d = 6.0\% \times 2 = 12\%$.
$k_d(1 - T) = 12.0\%(0.6) = 7.2\%$.

75. Cost of preferred stock **Answer: d Diff: E**

Cost of preferred stock: $k_p = \$12/\$100(0.95) = 12.6\%$.

76. Cost of equity: CAPM **Answer: c Diff: E**

Cost of retained earnings (CAPM approach):
$k_s = 10\% + (5\%)1.2 = 16.0\%$.

77. Cost of equity: DCF **Answer: c Diff: E**

Cost of retained earnings (DCF approach):

$$k_s = \frac{\$2.00(1.08)}{\$27} + 8\% = 16.0\%.$$

78. Cost of equity: risk premium **Answer: c Diff: E**

Cost of retained earnings (bond yield-plus-risk-premium approach):
$k_s = 12.0\% + 4.0\% = 16.0\%$.

79. WACC **Answer: b Diff: E**

Calculate k_e: $$k_e = \frac{\$2.00(1.08)}{\$27(1 - 0.1)} + 8\% = 16.89\%.$$

$$WACC = w_d k_d(1 - T) + w_p k_p + w_c k_e$$
$$= 0.2(12.0\%)(0.6) + 0.2(12.6\%) + 0.6(16.89\%) = 14.09 \approx 14.1\%.$$

80. Stock price--constant growth **Answer: d Diff: E**

$k_s = 10\% + (4\%)1.5 = 16\%$.

$$P_0 = \frac{\$3.00(1.10)}{0.16 - 0.10} = \$55.00.$$

81. Cost of external equity **Answer: b Diff: E**

Cost of new common equity:

$$k_e = \frac{\$3.30}{\$55.00(0.95)} + 0.10 = 16.32\%.$$

82. Cost of retained earnings **Answer: e Diff: M**

EBIT	$1,000,000
Interest	400,000
EBT	$ 600,000
Taxes (40%)	240,000
Net income	$ 360,000

$EPS_1 = \$360,000/100,000 = \$3.60.$
$D_1 = \$3.60(0.5) = \$1.80.$
$k_s = (\$1.80/\$40.00) + 0.125 = 17.0\%.$

83. Cost of external equity **Answer: d Diff: E**

Cost of new common equity:

$$k_e = \frac{\$1.80}{(\$40)(0.90)} + 0.125 = 17.5\%.$$

84. Cost of retained earnings **Answer: c Diff: E**

$$k_s = \frac{\$2.00(1.10)}{\$40.00} + 0.10 = 15.5\%.$$

85. Cost of external equity **Answer: d Diff: E**

Cost of new common equity:

$$k_e = \frac{\$2.20}{\$34.00} + 0.10 = 0.1647 \approx 16.5\%.$$

86. Cost of preferred stock **Answer: b Diff: E**

$$k_p = \frac{\$10}{\$80} = 12.5\%.$$

87. WACC **Answer: d Diff: E**

Since the firm has sufficient retained earnings to fund the equity portion of its capital budget, use k_s in WACC equation.

$$\begin{aligned} WACC &= w_d k_d(1 - T) + w_p k_p + w_c k_s \\ &= 0.4(6\%) + 0.1(12.5\%) + 0.5(15.5\%) \\ &= 11.4\%. \end{aligned}$$

88. Cost of debt **Answer: b Diff: E N**

To determine the cost of debt, use market values and the bond information given. Enter the following data as inputs into your calculator as follows: N = 15; PV = -1150; PMT = 120; FV = 1000; and then solve for I = k_d = 10.03%. The after-tax cost of debt is 10.03%(1 - Tax rate) = 10.03%(0.6) = 6.02% ≈ 6%.

89. Cost of common equity: CAPM **Answer: e Diff: E N**

Using the CAPM equation: $k_s = k_{RF} + (k_M - k_{RF})b$
$k_s = 5\% + (5\%)1.4$
$k_s = 12\%$.

Since equity costs are not tax-deductible, this is also the after-tax cost of equity.

90. WACC **Answer: c Diff: E N**

Use the target debt and equity ratios and the WACC equation as follows:

$WACC = w_d k_d(1 - T) + w_c k_s$
$= (0.40)(0.06) + (0.60)(0.12)$
$= 0.096$, or 9.6%.

91. Cost of debt **Answer: b Diff: M N**

The after-tax cost of debt is found by using the firm's bond information to solve for the YTM on bonds outstanding. Then, the YTM needs to be converted to an after-tax yield.

N = 20; PV = -945; PMT = 85; FV = 1000; and then solve for k_d = I = 9.11%.

AT k_d = 9.11%(1 - 0.4) = 5.46%.

92. Cost of preferred stock **Answer: d Diff: E N**

The after-tax cost of preferred stock can be derived by simply dividing the preferred dividend paid by the price of preferred stock.

$$k_p = \frac{D_p}{P_p}$$
$k_p = \$2/\$25$
$k_p = 8.0\%$.

93. Cost of common equity: CAPM **Answer: d Diff: E N**

The cost of common equity can be found in a variety of ways. In this case, we have been given information about the market risk premium and beta. Therefore, we can use the CAPM to value the cost of common equity.

$k_s = k_{RF} + (k_M - k_{RF})b$
$k_s = 6\% + (5\%)1.2$
$k_s = 12.0\%$.

94. WACC **Answer: c Diff: E N**

The WACC is merely a weighted-average of the capital component costs.

$WACC = w_d k_d(1 - T) + w_p k_p + w_c k_s$
$WACC = 0.4(9.11\%)(1 - 0.4) + 0.2(8\%) + 0.4(12\%)$
$WACC = 8.59\%.$

95. After-tax cost of debt **Answer: c Diff: E N**

To find the cost of debt, enter the following data into your calculator: N = 25; PV = -1252; PMT = 120; FV = 1000; and then solve for I = 9.3594%, which is the before-tax cost of debt.

To calculate the after-tax cost of debt, multiply by (1 – T) as follows: $(1 - 0.40) \times 9.3594\% = 5.6156\% \approx 5.62\%.$

96. Cost of common equity: CAPM **Answer: c Diff: E N**

$k_s = 5\% + (6\%)1.6 = 14.6\%.$

97. WACC **Answer: b Diff: E N**

$WACC = (0.40)(5.6156\%) + (0.60)(14.6\%) = 11.0062\% \approx 11.0\%.$

WEB APPENDIX 9A SOLUTIONS

9A-1. Risk and divisional costs of capital **Answer: a Diff: E N**

The correct answer is statement a. The composite WACC will be the average of the two divisional WACCs. Since there is no debt, the WACC = k_s. There is no cost of equity given, but it can be calculated from the beta, the risk-free rate, and the market risk premium using CAPM. The beta of the entire company is the weighted average of the two divisions' betas (0.5 × 0.8 + 0.5 × 1.2 = 1.0). The firm's cost of equity will be equal to 11% ($k_s = k_{RF} + (RP_M)b = 6\% + 5\% \times 1.0 = 11\%$). Therefore, the WACC is 11%, and statement a is correct. Division B has a higher beta, therefore its cost of capital will be higher than A's. Therefore, statement b is false. If both divisions were assigned the same hurdle rate, this rate would reflect the required return on projects with a beta of 1.0. Since Division A's average projects have a beta of 0.8, they would tend to have a lower return. Therefore, fewer of them would meet the hurdle rate of 11%, and the company would choose too few of them. Conversely, the company would choose too many projects in Division B. Therefore, statement c is false.

9A-2. Risk and project betas **Answer: d Diff: M**

9A-3. SML and capital budgeting **Answer: a Diff: M**

9A-4. Project cost of capital **Answer: c Diff: E**

Calculate the required return, k_s, and compare to the expected return, $\hat{k}_s$.
$\hat{k}_s = 7\%$.
$k_s = k_{RF} + (k_M - k_{RF})b = 7\% + (10\% - 7\%)0.5 = 8.5\%$.
$k_s > \hat{k}_s$; 8.5% > 7.0%; reject the investment.

9A-5. Project cost of capital **Answer: e Diff: M**

Calculate the beta of the firm, and use to calculate project beta:
$k_s = 0.16 = 0.10 + (0.05)b_{Firm}$. $b_{Firm} = 1.2$.
$b_{Project} = (b_{Firm})1.5$. ($b_{Project}$ is 50% greater than current b_{Firm})
$b_{Project} = (1.2)1.5 = 1.8$.

Calculate required return on project, kProject, and compare to expected return:
Project: $k_{Project} = 0.10 + (0.05)1.8 = 0.19 = 19\%$. Expected return = 0.18 = 18%. Since the required return is one percentage point greater than the expected return, the firm should not accept the new project.

WEB APPENDIX 9B SOLUTIONS

9B-1. Pure play method **Answer: b Diff: M**

9B-2. Corporate WACC for firm with divisions **Answer: c Diff: E N**

For Division A: $k_A = k_{RF} + (k_M - k_{RF})b_A$
$k_A = 5\% + (6\%)0.8$
$k_A = 9.8\%$.

For Division B: $k_B = k_{RF} + (k_M - k_{RF})b_B$
$k_B = 5\% + (6\%)1.5$
$k_B = 14\%$.

$WACC = w_A k_A + w_B k_B$
$= (0.50)(0.098) + (0.50)(0.14)$
$= 0.119$, or 11.9%.

9B-3. Pure play method **Answer: b Diff: M**

Calculate the required return, k_s, and use to calculate the WACC:
$k_s = 10\% + 1.38(5\%) = 16.9\%$.
$WACC = 0.5(12.0\%)(0.6) + 0.5(16.9\%) = 12.05\%$.
Compare expected project return, $\hat{k}_{Project}$, to WACC:
But $\hat{k}_{Project} = 13.0\%$.
Accept the project since $\hat{k}_{Project}$ > WACC: 13.0% > 12.05%.