MULTIPLE CHOICE

1. Operating leverage describes the relationship between...
   a. EBIT and sales
   b. taxes and sales
   c. debt and equity
   d. fixed costs and variable costs
   
   ANS: A           DIF: E           REF: 10.1 Choosing the Right Discount Rate

2. Everything else being equal a higher corporate tax rate...
   a. will increase the WACC of a firm with debt and equity in its capital structure
   b. will not affect the WACC of a firm with debt in its capital structure
   c. will decrease the WACC of a firm with some debt in its capital structure
   d. will decrease the WACC of a firm with only equity in its capital structure
   
   ANS: C           DIF: M           REF: 10.1 Choosing the Right Discount Rate

3. Which of the following is considered a type of real options
   a. expansion option
   b. abandonment option
   c. flexibility option
   d. all of the above
   
   ANS: D           DIF: E           REF: 10.3 Real Options

4. A manager who wants to find out at which point a project’s profits and costs are equal will conduct a(n)
   a. sensitivity analysis
   b. scenario analysis
   c. breakeven analysis
   d. none of the above
   
   ANS: C           DIF: E           REF: 10.2 A Closer Look at Risk

5. The appropriate cost of capital for a project depends on . . .
   a. the type of assets used in the project (that is, whether they are current or fixed assets)
   b. the interest rate on the firm's outstanding long-term bonds
   c. the type of security issued to finance the project
   d. the risk associated with the project
   
   ANS: D           DIF: M           REF: 10.1 Choosing the Right Discount Rate

6. The following data have been computed for a firm: when sales are $20,000, EBIT is $5,000 and operating leverage is 2.5. Suppose sales increase to $23,000; what is the new level of EBIT?
   a. $1,875
   b. $6,875
   c. $3,000
   d. $8,435
   
   ANS: B
   
   2.5 = (change EBIT/$5000)/(3,000/20,000)
change EBIT = $1,875
new EBIT = $6,875

DIF: H       REF: 10.1 Choosing the Right Discount Rate

7. Bavarian Sausage, Inc. has a cost equity of 22% and a beta of 1.8. The expected market return is 14%. What is the risk-free rate?
   a. 4%
   b. 22%
   c. 8%
   d. 12%

ANS: A
   .22 = Rf + 1.8(.14-Rf)
   Rf = .04

DIF: M       REF: 10.1 Choosing the Right Discount Rate

8. Bavarian Sausage has a beta of 1.8. The risk free rate is 5% and the expected market risk premium is 12%. What is the company’s cost of equity?
   a. 17.0%
   b. 26.6%
   c. 21.6%
   d. 13.5%

ANS: B
   E(Ri) = .05 + 1.8(.12)
   E(Ri) = .266

DIF: E       REF: 10.1 Choosing the Right Discount Rate

NARRBEGIN: Never-crash Airlines

Never-crash Airline
Never-crash Airline has a capital structure that consists of 30% debt and 70% equity. The company’s cost of debt is 7%. The company has a beta of 1.9. The risk free rate equals 4.5% and the expected return on the market portfolio is 15%.

NARREND

9. Assuming no taxes, what is Never-crash Airline’s WACC?
   a. 7%
   b. 19.22%
   c. 24.45%
   d. 17.12%

ANS: B
   Ri = .045 + 1.9(.15-.045) = .2445
   WACC = (.7)(.2445) + (.3)(.07) = .1922

DIF: E       REF: 10.1 Choosing the Right Discount Rate
NAR: Never-crash Airlines

10. What is Never-crash Airline’s WACC, if their marginal tax rate equals 34%?
    a. 19.22%
    b. 24.45%
    c. 18.50%
11. What is the Never-crash Airline’s after tax cost of debt?
   a. 7.00%
   b. 4.62%
   c. 2.38%
   d. 4.50%

   **Ans:** B
   
   after tax \( R_d = 7\%(1 - .34) = 4.62\% \)

12. What is the Never-crash Airline’s cost of equity?
   a. 33.00%
   b. 7.05%
   c. 24.45%
   d. 28.50%

   **Ans:** C
   
   \( R_i = .045 + 1.9(.15 - .045) = .2445 \)

NARRBEGIN: Bavarian Brewhouse

**Bavarian Brewhouse**

Capital Structure Information for Bavarian Brewhouse

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt (in million)</td>
<td>$25</td>
</tr>
<tr>
<td>Preferred Stock (in million)</td>
<td>$5</td>
</tr>
<tr>
<td>Common Stock (in million)</td>
<td>$45</td>
</tr>
<tr>
<td>Total Capital</td>
<td>$75</td>
</tr>
</tbody>
</table>

Cost of debt 8%
Annual Preferred Stock Dividend $2.50
Preferred Stock Market Price $16.13
Common Stock Beta 0.85
Risk free rate 3.75%
Expected return on market portfolio 17.55%

NARREND

13. What is Bavarian Brewhouse’s cost of preferred stock?
   a. 8.00%
   b. 15.5%
   c. 10.7%
14. What is Bavarian Brewhouse’s cost of common equity?
   a. 10.67%
   b. 12.55%
   c. 16.23%
   d. 15.48%

   ANS: D
   Ri = .0375 + 0.85(.1755 - .0375) = .1548

15. What is Bavarian Brewhouse’s after tax cost of debt, if their marginal tax rate equals 34%?
   a. 8.00%
   b. 5.28%
   c. 6.95%
   d. 2.72%

   ANS: B
   after tax Rd = 8%(1-.34) = 5.28%

16. What percentage of Bavarian Brewhouse’s capital structure consists of total equity?
   a. 6.67%
   b. 60.00%
   c. 33.33%
   d. 66.67%

   ANS: D
   total equity = $5 + $45 = $50
   $50/$75 = .6667

17. Assuming no corporate taxes, what is Bavarian Brewhouse’s WACC?
   a. 16.23%
   b. 12.99%
   c. 13.44%
   d. 5.28%

   ANS: B
   Rp = .155
   Rd = .08
   Re = .1548
WACC = \((45/75)\times0.1548 + (25/75)\times0.08 + (5/75)\times0.155 = 0.1299\)

18. What is Bavarian Brewhouse’s WACC if their marginal tax rate equals 34%
   a. 12.08%
   b. 12.99%
   c. 13.44%
   d. 5.28%

   ANS: A
   Rp = 0.155
   Rd = 0.08
   Re = 0.1548
   WACC = \((45/75)\times0.1548 + (25/75)\times0.08(1-0.34) + (5/75)\times0.155 = 0.1208\)

19. As a result of a company’s 15% increase in sales their EBIT increased by 25%. What is the company’s operating leverage?
   a. 2.33
   b. 1.67
   c. 1.50
   d. 3.33

   ANS: B
   OL = \(0.25/0.15 = 1.67\)

20. Miller’s Dairy Products reported sales of $1.5 million in 2002 and $2.25 million in 2003. Their EBIT in 2002 was $550,000 and in 2003 the EBIT rose to $925,000. What is the company’s operating leverage?
   a. 2.36
   b. 1.36
   c. 1.96
   d. 2.86

   ANS: B
   OL = \(\{(925-550)/550\}/\{(2.25-1.5)/1.5\} = 1.36\)

21. Find the break even point given the following information: sale price per unit = $50, variable cost per unit = $35; fixed costs = $50,000.
   a. 2,298
   b. 3,000
   c. 3,333
   d. 4,000

   ANS: C
   BEP = \(50,000/(50-35) = 3,333\)
22. Find the break even point given the following information: total costs: $135,000; variable costs per unit = $10; sale price per unit = $25; sales = 10,000 units.
   a. 3,000
   b. 2,333
   c. 1,667
   d. 1,886

   ANS: B
   fixed costs = 135,000 - 10(10,000) = 35,000
   BEP = 35,000/(25 - 10) = 2,333

23. What is the best case scenario break even point for Bavarian Sausage?
   a. 572
   b. 1,125
   c. 5,000
   d. 2,526

   ANS: A
   4,000/(10 - 3) = 572

24. What is Bavarian Sausage’s breakeven point in the most likely scenario?
   a. 572
   b. 1,125
   c. 5,000
   d. 2,526

   ANS: B
   4,500/(7 - 3) = 1,125

25. What is Bavarian Sausage’s breakeven point in the worst case scenario?
   a. 572
   b. 1,125
   c. 5,000
   d. 2,526
26. If each of Bavarian Sausage's three scenarios is equally likely, what is the expected breakeven point?
   a. 5,000
   b. 2,233
   c. 572
   d. 1,125

   ANS: D
   \[ \frac{4,500}{7-3} = 1,125 \]

27. By how much would Bavarian Sausage’s breakeven point change in the best case scenario if variable cost increase by $2?
   a. increase by 228
   b. decrease by 228
   c. remain unchanged
   d. increase by 95

   ANS: A
   old: \( \frac{4,000}{10-3} = 572 \)
   new: \( \frac{4,000}{10-5} = 800 \)
   change: 800 - 572 = +228

28. By how much would Bavarian Sausage’s breakeven point change in the most likely scenario if the price/unit turns out to be only $6?
   a. decrease by 375
   b. remain unchanged
   c. increase by 375
   d. decrease by 228

   ANS: C
   old: \( \frac{4,500}{4} = 1,125 \)
   new: \( \frac{4,500}{3} = 1,500 \)
   change: 1,500 - 1,125 = +375

29. What is the percentage change in Bavarian Sausage’s breakeven point in the worst case scenario if it turns out that they can charge $5 per unit?
   a. increase by 50%
   b. decrease by 50%
   c. increase by 100%
   d. decrease by 100%

   ANS: B
   old: \( \frac{5,000}{4-3} = 5,000 \)
   new: \( \frac{5,000}{5-3} = 2,500 \)
% change: -2,500/5,000 = -.50

DIF: M       REF: 10.2 A Closer Look at Risk       NAR: Bavarian Sausage Scenario

30. How much would Bavarian Sausage have to charge per unit in the most likely scenario to break even if they expected to be able to sell 1,000 units (everything else being equal)?
   a. $7
   b. $7.50
   c. $8.50
   d. $6.50

   ANS: B
   1,000 = 4,500/(price-3)
   price = $7.50

DIF: M       REF: 10.2 A Closer Look at Risk       NAR: Bavarian Sausage Scenario

31. A company can sell its product for $6 per unit. The variable costs for each unit are $2, while the fixed costs of operation are $1200. What is the break-even point for this product?
   a. 200 units
   b. 300 units
   c. 450 units
   d. 550 units

   ANS: B
   = $1200 / ($6-$2) = 300 units

DIF: E       REF: 10.2 A Closer Look at Risk

32. Hollywood Productions has a $4 contribution margin for the new DVD they are releasing to the general public. The DVD sells for $20. If the fixed costs to produce the DVD were $500,000, how many units must be sold for Hollywood Productions to break even?
   a. 25,000 units
   b. 31,250 units
   c. 75,000 units
   d. 125,000 units

   ANS: D
   = $500,000 / $4 = 125,000

DIF: E       REF: 10.2 A Closer Look at Risk

NARRBEGIN: Running Shoes, Inc.

Running Shoes, Inc.

Running Shoes, Inc. has 2 million shares of stock outstanding. The stock currently sells for $12.50 per share. The firm’s debt is publicly traded and was recently quoted at 90% of face value. It has a total face value of $10 million, and it is currently priced to yield 8%. The risk free rate is 2% and the market risk premium is 8%. You’ve estimated that the firm has a beta of 1.20. The corporate tax rate is 40%.

NARREND

33. Refer to Running Shoes, Inc. What is the cost of equity?
   a. 9.20%
   b. 9.60%
   c. 10.40%
d. 11.60%

ANS: D
= 2% + 1.20 * 8% = 11.60%

DIF: E  REF:  10.1 Choosing the Right Discount Rate
NAR: Running Shoes, Inc.

34. What is the percentage of equity used by Running Shoes, Inc.?
   a. 74.63%
   b. 73.53%
   c. 72.46%
   d. 68.97%

ANS: B
DEBT:
FV = $10 million
MV = 90% * $10 million = $9 million

EQUITY:
MV = 2 million * $12.50 = $25 million
% equity = $25 / $34 = .7353

DIF: M  REF:  10.1 Choosing the Right Discount Rate
NAR: Running Shoes, Inc.

35. What is the WACC for Running Shoes, Inc.?
   a. 7.97%
   b. 9.15%
   c. 9.58%
   d. 9.80%

ANS: D
DEBT:
FV = $10 million
MV = 90% * $10 million = $9 million
Cost of debt = 8%

EQUITY:
MV = 2 million * $12.50 = $25 million
Cost of equity = 2% + 1.20 * 8% = 11.60%
% equity = $25 / $34 = .7353

WACC = ($9/$34)*8%*(1-.40) + ($25/$34)*11.60% = 9.80%

DIF: H  REF:  10.1 Choosing the Right Discount Rate
NAR: Running Shoes, Inc.

36. A firm has a capital structure of 25% debt and 75% equity. Debt can be issued at a return of 9%, while the cost of equity for the firm is 12%. The firm is considering a $50 million expansion of their production facility. The project has the same risk as the firm overall and will earn $10 million per year for 7 years. What is the NPV of the expansion if the tax rate facing the firm is 40%?
   a. -$1.9 million
   b. -$1.4 million
37. A firm has a capital structure of 40% debt and 60% equity. Debt can be issued at a return of 10%, while the cost of equity for the firm is 15%. The firm is considering a $50 million expansion of their production facility. The project has the same risk as the firm overall and will earn $12 million per year for 6 years. What is the NPV of the expansion if the tax rate facing the firm is 40%?
   a. -$0.4 million
   b. -$0.2 million
   c. $0 million
   d. $0.2 million

   ANS: D
   WACC = .40*10%*(1-.4) + .60*15% = 11.40%
   N = 6, I = 11.40%, PV = ?, PMT = $12, FV = $0
   PV = $50.19
   NPV = $50.19 - $50 = $0.19 - $0.2 million

   DIF: M        REF: 10.1 Choosing the Right Discount Rate

38. Consider the following financial leverage information for ABC Corporation. The debt pays 10% annually in interest and the tax rate is 40%. For what EBIT will the EPS be equal for either capital structure?

<table>
<thead>
<tr>
<th>Total Assets</th>
<th>All Equity Firm</th>
<th>50% Debt/ 50% Equity Firm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity</td>
<td>$500,000</td>
<td>$500,000</td>
</tr>
<tr>
<td># of shares</td>
<td>100,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Debt</td>
<td>$0</td>
<td>$250,000</td>
</tr>
<tr>
<td>Interest payment</td>
<td>$0</td>
<td>$25,000</td>
</tr>
</tbody>
</table>

   a. $25,000
   b. $50,000
   c. $75,000
   d. $90,000

   ANS: B
   EPS = Net Income / # of shares;
   
   EPS = (EBIT - INTEREST) * (1-T) / # of shares
   
   (EBIT - $0) * .60 / 100,000 = (EBIT - $25000) *.60 / 50,000
   
   EBIT = $50,000
39. The operating leverage for ABC Corporation is currently 125%. Given the information below, what was the growth rate in sales for 2004?

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003 EBIT</td>
<td>$12 million</td>
</tr>
<tr>
<td>2004 EBIT</td>
<td>$15 million</td>
</tr>
<tr>
<td>2003 Sales</td>
<td>$30 million</td>
</tr>
<tr>
<td>2004 Sales</td>
<td>$?? million</td>
</tr>
</tbody>
</table>

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

ANS: A

\[
\frac{\$3}{\$12}/\left(\frac{\$X}{\$30}\right) = 1.25
\]

\[
X = \$6
\]

\[
\frac{\$6}{\$30} = 0.20
\]

40. The EBIT for ABC Corporation for 2003 and 2004 is shown below. Sales grew at a rate of 10% for 2004. If 2003 sales were $25 million, what is the operating leverage for ABC?

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003 EBIT</td>
<td>$10 million</td>
</tr>
<tr>
<td>2004 EBIT</td>
<td>$12.50 million</td>
</tr>
<tr>
<td>2003 Sales</td>
<td>$25 million</td>
</tr>
<tr>
<td>2004 Sales</td>
<td>$?? million</td>
</tr>
</tbody>
</table>

a. 200%
b. 225%
c. 250%
d. 275%

ANS: C

2004 sales = $25 * (1.10) = $27.50

Oper leverage = \((\frac{\$2.5}{\$10})/\left(\frac{\$2.5}{\$25}\right)\) = 2.50

41. A project under consideration for a firm has several possible outcomes shown in the table below. Given the assumptions below, what is the expected NPV for the project?

<table>
<thead>
<tr>
<th>Project Outcome</th>
<th>Chance of Outcome</th>
<th>NPV of Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOOD</td>
<td>40%</td>
<td>$20.00</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>35%</td>
<td>$2.00</td>
</tr>
<tr>
<td>BAD</td>
<td>25%</td>
<td>($30.00)</td>
</tr>
</tbody>
</table>
42. A project under consideration for a firm has several possible outcomes shown in the table below. Given the assumptions below, what is the expected NPV for the project?

<table>
<thead>
<tr>
<th>Project</th>
<th>Chance of</th>
<th>NPV of</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome</td>
<td>Outcome</td>
<td>Outcome</td>
</tr>
<tr>
<td>GOOD</td>
<td>25%</td>
<td>$25.00</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>50%</td>
<td>$6.00</td>
</tr>
<tr>
<td>BAD</td>
<td>25%</td>
<td>($40.00)</td>
</tr>
</tbody>
</table>

a. -$9.00  
b. -$3.00  
c. -$0.75  
d. $1.20

ANS: C  
= .25 * $25 + .50 * $6 + .25 * (-40) = -$0.75

DIF: E  REF: 10.2 A Closer Look at Risk

43. A firm is considering investing $10 million today to start a new product line. The future of the project is unclear however and depends on the state of the economy. The project will last 5 years. The yearly cash flows for the project are shown below for the different states of the economy. What is the expected NPV for the project if the cost of capital is 12%?

<table>
<thead>
<tr>
<th>Project</th>
<th>Chance of</th>
<th>Yearly Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome</td>
<td>Outcome</td>
<td></td>
</tr>
<tr>
<td>GOOD</td>
<td>25%</td>
<td>$8.00</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>50%</td>
<td>$3.00</td>
</tr>
<tr>
<td>BAD</td>
<td>25%</td>
<td>($2.00)</td>
</tr>
</tbody>
</table>

a. -$2.23 million  
b. -$1.15 million  
c. -$0.75 million  
d. $0.81 million

ANS: D  
NPV of Each Outcome:
GOOD: N = 5, i=12%, PV=?, PMT=$8, PMT=$8...PV = $30.33, NPV = $18.84  
AVERAGE: N = 5, i=12%, PV=?, PMT=$3, PMT=$3...PV = $11.37, NPV = $0.81  
GOOD: N = 5, i=12%, PV=?, PMT=-$2, PMT=-$2...PV = -$7.58, NPV = -$17.21

EXP. NPV = .25*18.84 + .50*0.81 + .25*(-17.21) = $0.81

DIF: M  REF: 10.2 A Closer Look at Risk
44. A firm is considering investing $10 million today to start a new product line. The future of the project is unclear however and depends on the state of the economy. The project will last 4 years. The yearly cash flows for the project are shown below for the different states of the economy. What is the expected NPV for the project if the cost of capital is 15%?

<table>
<thead>
<tr>
<th>Project Outcome</th>
<th>Chance of Outcome</th>
<th>Yearly Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOOD</td>
<td>25%</td>
<td>$7.00</td>
</tr>
<tr>
<td>BAD</td>
<td>75%</td>
<td>-$2.50</td>
</tr>
</tbody>
</table>

- $17.14 million
- $12.13 million
- $10.36 million
- $4.25 million

ANS: C

NPV of Each Outcome:
GOOD: N = 4, I=15%, PV=?, PMT=$7 ...PV = $19.98, NPV = $9.98
BAD: N = 4, I=15%, PV=?, PMT=-$2.50 ...PV = -$7.14, NPV = -$17.14

EXP. NPV = .25*9.98 + .75*(-17.14) = -$10.36

DIF: M

45. Which answer describes an analysis of what happens to NPV estimates when we change the values of one variable at a time?

a. Forecasting simulation
b. Monte Carlo simulation
c. Sensitivity analysis
d. Scenario analysis

ANS: C

DIF: E

46. Which approach estimates NPV by taking a distribution of values for each of the model’s assumptions?

a. Forecasting simulation
b. Monte Carlo simulation
c. Sensitivity analysis
d. Scenario analysis

ANS: B

DIF: E

47. Which approach estimates NPV by changing the value of several assumptions at once to represent possible outcomes of the project?

a. Forecasting simulation
b. Monte Carlo simulation
c. Sensitivity analysis
d. Scenario analysis

ANS: D

DIF: E

REF: 10.2 A Closer Look at Risk
48. As a young entrepreneur, you are considering opening a new restaurant in your hometown. You plan on operating the restaurant for four years and then either expand the business or close the restaurant and move onto something else. An economist has estimated the value of your option to expand at $300,000 in today’s dollars. Given the estimates below, what is the project value of the new restaurant business if cash flows are discounted at 12%?

<table>
<thead>
<tr>
<th>YEAR</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash flow</td>
<td>-$200,000</td>
<td>$25,000</td>
<td>25,000</td>
<td>25,000</td>
<td>25,000</td>
</tr>
</tbody>
</table>

a. -$124,066  
b. $75,933  
c. $175,933  
d. $275,933

ANS: C
PV of $25,000:  
N = 4, I = 12%, PV = ?, PMT = $25,000  
PV = $75,933

NPV = $75,933 - $200,000 + $300,000

DIF: M  
REF: 10.3 Real Options

49. A firm has estimated the NPV of a new product release as -$100,000. However, if the product is a failure, the firm estimates it can sell off the equipment to help cash flow. An analyst estimates the value of abandoning the product release at $125,000. The cost of capital for the firm is 10%. What is the project value for the firm?

a. -$100,000  
b. $10,000  
c. $25,000  
d. $225,000

ANS: C  
DIF: E  
REF: 10.3 Real Options

50. A firm has a capital structure containing 40 percent debt, 10 percent preferred stock, and 50 percent common stock equity. The firm’s debt has a yield to maturity of 9.50 percent. Its preferred stock’s annual dividend is $7.50 and the preferred stock’s current market price is $50.00 per share. The firm’s common stock has a beta of 0.90 and the risk-free rate and the market return are currently 4.0 percent and 13.5 percent, respectively. The firm is subject to a 40 percent marginal tax rate. The market value of debt is $100 million. How many shares of preferred stock should be outstanding for the capital structure to be correct?

a. 125,000 shares  
b. 250,000 shares  
c. 500,000 shares  
d. 625,000 shares

ANS: C  
debt = 40 % of total value  
$100 = .40 * Firm value

Firm value = $100/0.40 = $250
Preferred market value = .10 * $250 = $25 million

MV = # of shares * price = $25 million = X * $50
51. A firm has a capital structure containing 40 percent debt, 10 percent preferred stock, and 50 percent common stock equity. The firm’s debt has a yield to maturity of 9.50 percent. Its preferred stock’s annual dividend is $7.50 and the preferred stock’s current market price is $50.00 per share. The firm’s common stock has a beta of 0.90 and the risk-free rate and the market return are currently 4.0 percent and 13.5 percent, respectively. The firm is subject to a 40 percent marginal tax rate. What is the WACC for the firm?
   a. 8.75%
   b. 8.93%
   c. 9.16%
   d. 10.06%

   ANS: D
   Cost of preferred = $7.50 / $50.00 = 15%
   WACC = .40 * 9.50% * (1-.40) + .10*15% + .50*(4%+0.90*(13.5%-4%))

DIF: M   REF: 10.1 Choosing the Right Discount Rate

52. A firm has a capital structure of 40% debt and 60% equity. The firm has bonds outstanding with a face value of $20 million. The bonds pay, on average, an 8% annual coupon and have an average maturity length of 7 years. The market value of the bonds is 110% of face value and the tax rate facing the firm is 40%. The firm has common stock with a beta of 1.25. The risk free rate on Treasury bonds is 2%, while the market risk premium is 8%. What is the WACC for the firm?
   a. 8.69%
   b. 9.13%
   c. 9.68%
   d. 11.15%

   ANS: B
   COST OF DEBT:
   N= 7, I = ?, PV = - $1000 * 1.10, PMT = $80, FV = $1000
   r = YTM = 6.20%
   COST OF EQUITY
   = 2% + 1.25 * 8% = 12%
   WACC = .40*6.20%*(1-.40) + .60*12% = 8.69%

DIF: M   REF: 10.1 Choosing the Right Discount Rate

53. A firm has a capital structure of 40% debt and 60% equity. The firm has bonds outstanding with a face value of $20 million. The bonds pay, on average, an 8% annual coupon and have an average maturity length of 7 years. The market value of the bonds is 110% of face value and the tax rate facing the firm is 40%. The firm has common stock with a beta of 1.25. The risk free rate on Treasury bonds is 2%, while the market risk premium is 8%. A project requires an investment of $10,000 today and will pay $2,500 annually for six years. What is the NPV of the project?
   a. $825
   b. $1,320
   c. $1,460
   d. $1,540

   ANS: B
COST OF DEBT:
N= 7, I = ?, PV = - $1000 * 1.10, PMT = $80, FV = $1000
r = YTM = 6.20%

COST OF EQUITY
= 2% + 1.25 * 8% = 12%

WACC = .40*6.20% *(1-.40) + .60*12% = 8.69%

54. Which statement is FALSE regarding WACC and its components?
   a. The cost of debt is usually less than the cost of equity.
   b. The WACC should be used as the discount rate for all projects that the firm considers.
   c. For an all-equity firm, the cost of equity equals the WACC.
   d. The WACC may increase if the firm seeks external financing for a project.
   ANS: B

55. Which statement is true about a firm that earns ZERO economic profit?
   a. The firm is competing in a non-competitive environment.
   b. The market must have high entry barriers to other firms.
   c. The NPV of projects the firm considers equals zero.
   d. The accounting income for projects equals zero.
   ANS: C

56. A project’s discount rate
   a. must be lower than the cost of funds for the firm’s current list of projects.
   b. must be high enough to compensate investors for the project’s risk.
   c. must be higher than the cost of funds for the firm’s current list of projects.
   d. none of the above.
   ANS: B

57. Nalcoa Corp. is financing a project that is in the same industry as its current portfolio of projects. If Nalcoa has a beta of 1.5 and the expected market risk premium is 8% while the risk-free rate is 5% then what is the weighted average cost of capital for Nalcoa if it is, and plans to continue to be an all equity financed firm?
   a. 9.5%
   b. 13.0%
   c. 17.0%
   d. there is not enough information to calculate the WACC
   ANS: C
   Cost of equity: 5% + 1.5(8%) = 17%
   WACC: 17%(1) + Kd(1-Tc)(0) = 17%

58. Operating leverage measures
   a. the effect of variable costs on the responsiveness of the firm’s earnings before interest and taxes to changes in the level of sales.
   b. the effect of fixed operating costs on the responsiveness of the firm’s earnings before
interest and taxes to changes in the level of gross income.
c. the effect of fixed operating costs on the responsiveness of the firm’s earnings before interest and taxes to changes in the level of sales.
d. none of the above.

ANS: C    DIF: M    REF: 10.1 Choosing the Right Discount Rate

59. Purple Bell Butter Company increased its sales by $2,000 over that of the previous years’s figure of $50,000. Consequently, Purple Bell’s earnings before interest and taxes increased from $3,000 to $3,300 during the same period. Calculate Purple Bell’s operating leverage.

a. 25
b. 4
c. 2.5
d. none of the above

ANS: C
Operational Leverage = \[\text{Change in EBIT/EBIT} / \text{Change in sales/Sales}\] =

\[\frac{300}{3,300} / \frac{2,000}{50,000} = 2.5\]

DIF: M    REF: 10.1 Choosing the Right Discount Rate

60. A high degree of operating leverage suggests that

a. a small percentage increase in sales leads to a large percentage increase in earnings before interest and taxes.
b. a small percentage increase in sales leads to an identical percentage increase in earnings before interest and taxes.
c. a large percentage increase in sales leads to a small percentage increase in earnings before interest and taxes.
d. none of the above.

ANS: A

DIF: E    REF: 10.1 Choosing the Right Discount Rate

61. Which of the following industries would you expect to have the highest degree of operating leverage?

a. financial consulting
b. investment banking
c. electrical utility
d. internet publishing

ANS: C
Electrical utility firms should have the largest percentage of fixed costs which would make them have the highest degree of operating leverage.

DIF: M    REF: 10.1 Choosing the Right Discount Rate

62. A firm’s weighted average cost of capital is

a. the cost of capital applicable to all new forms of capital that the firm may raise in the future.
b. the simple weighted average of the current required rates of return on debt and equity.
c. the higher of either equity or debt capital that the firm is currently utilizing in its capital structure.
d. none of the above.

ANS: B

DIF: M    REF: 10.1 Choosing the Right Discount Rate
63. Which of the following is not required for a firm to utilize its current weighted average cost of capital to evaluate a future project?
   a. the firm will not alter its capital structure
   b. the future project is very similar to the firm’s existing assets
   c. the future project has an expected life that is similar to its existing project lives
   d. neither a nor b is required

   ANS: C  DIF: M  REF: 10.1 Choosing the Right Discount Rate

64. CapCo has a capital structure that is composed of $10 million of debt and $30 million of common equity. If CapCo is in the 30% marginal tax rate, what is its WACC if the yield to investors on CapCo debt is 8% and the cost of CapCo common equity is 12%?
   a. 8.3%
   b. 10.4%
   c. 11.0%
   d. none of the above

   ANS: B  WACC = \[\frac{10}{10 + 30}\][.08][1-.3] + \[\frac{30}{10 + 30}\][.12] = .104
   DIF: M  REF: 10.1 Choosing the Right Discount Rate

65. WidgetMaker has discovered that its fixed costs are $100,000 per month. If WidgetMaker sells its widgets for $35 per unit based upon a cost of $15 per unit to manufacture (variable costs) then how many widgets per year must WidgetMaker sell in order to break-even?
   a. 5,000
   b. 34,286
   c. 60,000
   d. None of the above

   ANS: C  Yearly units = 12 \[\frac{100,000}{(35-15)}\] = 60,000
   DIF: M  REF: 10.2 A Closer Look at Risk

66. WidgetMaker has discovered that its fixed costs are $100,000 per month. If WidgetMaker sells its widgets for $35 per unit based upon a cost of $15 per unit to manufacture (variable costs) then what dollar sales per year must WidgetMaker sell in order to break-even?
   a. $175,000
   b. $1,200,000
   c. $2,100,000
   d. none of the above

   ANS: C  Yearly sales = 35\{12 \[\frac{100,000}{(35-15)}\]\} = 2,100,000
   DIF: H  REF: 10.2 A Closer Look at Risk

67. If a company decides to change one input at a time in its net present value analysis, in order to measure the NPV impact of such a change then the firm is performing
   a. a Monte carlo simulation.
   b. scenario analysis.
   c. a sensitivity analysis.
   d. none of the above
68. A firm prefers to assume a probability distribution concerning each of the major inputs for the net present value of a project and then randomly draw those inputs over and over again until a distribution is generated for the net present value of an entire project. The firm is performing
a. a Monte Carlo analysis on its projects.
b. sensitivity analysis on its projects.
c. a scenario analysis on its projects.
d. none of the above.
ANS: A  DIF: M  REF: 10.2 A Closer Look at Risk

69. You are given the opportunity to play a game of high stakes gambling. The game begins by you paying an entry fee of $35,000,000 followed by a fair coin toss. If the coin toss is “heads” then you have an 80% probability of receiving a perpetuity of $10,000,000 per year and a 20% probability of receiving a perpetuity of $1,000,000 per year. Assume that the proper discount rate for the perpetual cash flow is 10%. If the coin toss is “tails” you can continue to play but you will lose $50,000,000 with certainty. Alternatively, you can make a make an opt-out payment of $10,000,000 after a “tail” to prevent you from going down such a costly path. What is the present value of playing such a game?
   a. $1,000,000
   b. -$1,000,000
   c. -$39,000,000
   d. none of the above
ANS: C  DIF: M  REF: 10.2 A Closer Look at Risk

70. The right but not the obligation to produce oil from one of your existing oil wells can be described as
a. a real option.
b. a stock option.
c. an interest rate option.
d. a future.
ANS: A  DIF: E  REF: 10.2 A Closer Look at Risk

71. You are the owner of a natural gas well that can produce exactly (at today’s prices) $1,000,000 worth of gas per year for exactly 5 years. You also know (with certainty) that the correct discount rate for these revenues is 10%. An oil and gas production firm offers you $5,000,000 today for the natural gas well. What is the implied value of the real option to not produce or not to produce natural gas?
   a. $0
   b. $604,607
   c. $1,209,213
   d. $2,418,426
ANS: C  DIF: E  REF: 10.2 A Closer Look at Risk
72. The going rate for paying a CEO in the widget industry is $1,000,000 per year. You find that the CEO of MasterWidgets has a contract that pays him $1,200,000 per year for five years if he cannot work for any other firm (for any reason during the contractual period). What is the value of a real option for a CEO to not work for a firm other than MasterWidgets? Assume a discount rate of 10%.

a. $181,818
b. $200,000
c. $758,157
d. $1,000,000

ANS: C

Value of market rate: 1,000,000 PVIFA(10%,5) = 1,000,000 * 3.7907868 = 3,790,787

Value of contract: 1,200,000 PVIFA(10%,5) = 1,200,000 * 3.7907868 = 4,548,944

Value of option: 4,548,944 - 3,790,787 = 758,157

73. You are a professional football running back who is eligible to be a free agent. You are offered a two-year contract to play for your current team for $3,000,000. If you accept that contract, the firm retains your rights and you will not be able to play for another team at the conclusion of the contract. Otherwise, you can play for your current team for two years at a price of $2,000,000 but you have the ability to play for any team at the expiration of this agreement. What is the value of the option to pay for any team you like after two years? Assume a discount rate of 5%.

a. $5,578,231
b. $3,718,821
c. $1,859,410
d. none of the above

ANS: C

Retain rights contract: 3,000,000 * PVIFA(2,5%) = 3,000,000 * 1.8594104 = 5,578,231

Open rights contract: 2,000,000 * PVIFA(2,5%) = 2,000,000 * 1.8594104 = 3,718,821

Value of option: 5,578,231 - 3,718,821 = 1,859,410

74. You are considering the purchase of a business that produces net cash flows of $350,000 per year in perpetuity. In a perfectly competitive market, what should be the asking price for the business if the firm’s cost of capital is 15%?

a. $350,000
b. $3,050,000
c. $2,333,333
d. none of the above

ANS: C

350,000/.15 = 2,333,333
75. You are a gold producer and have noticed that the value of your business may increase even though the price of gold falls. Your explanation for this phenomenon is
   a. that the relationship between the value of future cash flows and interest rates is positive.
   b. that increased risk may increase the real option value of the firm.
   c. that cheaper gold prices are good for the economy and that must be good for the firm.
   d. none of the above

   ANS: B   DIF: M   REF: 10.4 Strategy and Capital Budgeting

76. You are an aerospace defense contractor and you routinely work projects for the U.S. Department of Defense that generate cash flows that by themselves, do not cover the cost of capital for the firm. One reason for this may be
   a. because you can make up negative NPV projects by taking on more volume.
   b. because the projects have an implicit option to work on non-defense related projects at a lower direct research cost than projects without defense related work.
   c. because there is a taxable exemption from doing patriotic work.
   d. none of the above.

   ANS: B   DIF: E   REF: 10.4 Strategy and Capital Budgeting

77. You are considering the purchase of production volume of 100,000 widgets per year. You can purchase either a single 100,000 widget per year machine that costs $1,000,000 or first buy a 50,000 per year machine and then if sales volume permits, purchase another machine later. If widget production volume costs the same per unit to produce, what should the cost of the 50,000 per year machine be (to you) if there is a real option to expand production?
   a. less than $500,000
   b. $500,000
   c. greater than $500,000
   d. it is impossible to tell from the information given

   ANS: C
   The real option should not be free and should therefore make the cost of the 50,000 per year machine greater than half the price of the 100,000 per year machine.

   DIF: H   REF: 10.2 A Closer Look at Risk

78. You are about to embark on a project that has an equal 50% probability of generating a $10,000 windfall or a loss of $4,000. However, an insurance company comes to you saying they will sell you an indemnification policy for the event that you incur the $4,000 loss. If the insurance company is basing their charge for the policy on real option analysis, what will they charge you for the policy?
   a. $1,000
   b. $2,000
   c. $4,000
   d. none of the above

   ANS: B
   No policy value: .5(10,000 - 4,000) = 3,000
   With policy value: .5(10,000) = 5,000
   Value of option to eliminate negative value: 5,000 - 3,000 = 2,000

   DIF: H   REF: 10.2 A Closer Look at Risk
79. Lunar Surf Boards has annual fixed costs of $5,000 with a variable cost of $10 per unit and a sales price of $20 per unit. Lunar expects to sell 1,000 units this year without much trouble. However, Lunar is concerned about the scenario that variable costs will increase 10% this year. If that happens, what will be Lunar’s earnings before interest and taxes?

a. $6,000  
b. $5,000  
c. $4,000  
d. none of the above

ANS: C

Current: 1,000 (20 - 10) - 5,000 = 5,000

VC increases from $10 to $11

Then: 1,000 (20 - 11) - 5,000 = 4,000

DIF:  

REF: 10.2 A Closer Look at Risk

80. Jupitor Surf Boards has annual fixed costs of $5,000 with a variable cost of $10 per unit and a sales price of $20 per unit. Jupitor expects to sell 1,000 units this year without much trouble. However, Jupitor is concerned about the scenario that all costs will increase 10% this year. If that happens, what will be Jupitor’s earnings before interest and taxes?

a. $6,000  
b. $5000  
c. $4,000  
d. $3,500

ANS: D

Current: 1,000 (20 - 10) - 5,000 = 5,000

VC increases from $10 to $11, FC increase from 5,000 to 5,500

Then: 1,000 (20 - 11) - 5,500 = 3,500

DIF:  

REF: 10.2 A Closer Look at Risk