Exam #1 Review Answers

1. Given the following probability distribution, calculate the expected return, variance and standard deviation for Security J.

<table>
<thead>
<tr>
<th>State</th>
<th>Prob</th>
<th>E(R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.2</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>0.6</td>
<td>15%</td>
</tr>
<tr>
<td>3</td>
<td>0.2</td>
<td>20%</td>
</tr>
</tbody>
</table>

Expected return = 0.2*10% + 0.6*15% + 0.2*20% = 15%
Variance = 0.2*(10%-15%)^2 + 0.6*(15%-15%)^2 + 0.2*(20%-15%)^2

2. Why does the cost of debt increase as the D/E ratio increases?

The expected cost of bankruptcy increase, increasing the risk to bondholders.

3. If the stock market is semi-strong efficient, which of the following statements is most correct?

a. All stocks should have the same expected returns; however, they may have different realized returns.

b. In equilibrium, stocks and bonds should have the same expected returns.

c. Investors can outperform the market if they have access to information which has not yet been publicly revealed.

d. If the stock market has been performing strongly over the past several months, stock prices are more likely to decline than increase over the next several months.

e. None of the statements above is correct.

4. The Security Market Line (SML) measures:

The return for systematic risk
5. Currently, you are invested in only one stock, German Luxury Sedans Corp. Having heard about the benefits of diversification you’d like to split you portfolio evenly between German Luxury Sedans Co. and another firm. After much consideration, you’ve narrowed your investment choices to Cannes Yachts, Inc. and American Movie Theaters. Assume the firm names represent the core business. Which choice is better given your goal? Briefly state why.

American Movie Theaters – non-luxury good

6. The Parker Company’s stock has a beta of 1.2. The risk-free rate is presently 5 percent and the market risk premium is 4%.

a. Calculate the required rate of return.

\[ 5\% + 1.2 \times 4\% = 9.8\% \]

b. If the risk-free rate rises to 6 percent, what will be the new required return?

\[ 6\% + 1.2 \times 4\% = 10.8\% \]

c. If investors interpret the increase in the risk-free rate to mean tighter money and therefore become pessimistic, the SML will shift. Calculate the new required return if the slope of the SML is now 0.05.

\[ 6\% + 1.2 \times 5\% = 12\% \]

7. For investment I, \( \beta_I = 1 \) and \( r_I = 11\% \), what is \( r_M \) (the return on the market)? If other information is required to solve this, list what is needed.

The return on the market is 11%.

8. What are the expected return, variance, and standard deviation for a portfolio with an investment of $10000 in Technology and $10000 in Manufacturing?

<table>
<thead>
<tr>
<th>State</th>
<th>Prob.</th>
<th>Tech</th>
<th>Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth</td>
<td>.25</td>
<td>16%</td>
<td>12%</td>
</tr>
<tr>
<td>Normal</td>
<td>.50</td>
<td>12%</td>
<td>6%</td>
</tr>
<tr>
<td>Recession</td>
<td>.25</td>
<td>4%</td>
<td>6%</td>
</tr>
</tbody>
</table>

\[ R \text{ in growth} = .5(16\%) + .5(12\%) = 14\% \]

\[ R \text{ in normal} = .5(12\%) + .5(6\%) = 9\% \]

\[ R \text{ in recession} = .5(4\%) + .5(6\%) = 5\% \]

Portfolio return = \(.25(14\%) + .5(9\%) + .25(5\%) = 9.25\% \)

Variance = \(.25(14\%-9.25\%)^2 + .5(9\%-9.25\%)^2 + .25(5\%-9.25\%)^2 = \)

Standard deviation = square root of the variance
9. The stock of Italian Merchants has a beta of 1.34 and an expected return of 14.29 percent. The risk-free rate of return is 3.7 percent. What is the expected market risk premium?

\[ E(r) = 0.1429 = 0.037 + 1.34 \times (RP); \quad RP = 7.9\% \]

10. The reward to risk ratio is constant across securities because

a. Insider trading is illegal
b. WACC
c. Government regulation
d. Buying and selling market pressures

11. Should we accept or reject negative NPV projects? Are there any exceptions?

Generally, we reject negative NPV projects. However, there may be reputation concerns or other factors that are not reflected in the cash flows but will affect shareholder wealth.

12. True or false: Scenario analysis assures a firm that the actual results of a project will lie within the range of returns as computed under the best and the worst case scenarios. Briefly explain why.

False. Scenario analysis only provides a reasonable range of expected outcomes.

13. Which one of the following is an example of an incremental cash flow?

a. the annual salary of the company president which is a contractual obligation
b. the rent on a warehouse which is currently being utilized
c. the rent on some new machinery that is required for an upcoming project
d. the property taxes on the currently owned warehouse which has been sitting idle but is going to be utilized for a new project
e. the insurance on a company-owned building which will be utilized for a new project

14. Which of the following statements is most correct?

a. CAPM estimates a discount rate than is interchangeable with the discount rate
b. The CAPM approach is typically used to estimate a firm’s cost of preferred stock.
c. CAPM depends on all securities having the same reward-to-risk ratio.
d. The statements above are all false.

15. What is the cost of equity if \( \beta_L = 1.2, \beta_U = 1.0, r_f = 3\%, \) and \( r_M = 9\%? \)

\[ r_e = 3\% + 1.2 \times (6\%) = 10.2\% \]
16. Glacier Pure Water Inc. has a capital structure of 40 percent debt, 10 percent preferred stock, and 50 percent common equity. The firm’s YTM is 6 percent and both the risk free rate and the risk premium are 5.5%. The firm’s preferred stock has a cost of 12.5% and the tax rate is 20%. The common stock currently sells for $40 per share. The beta is 2 and investors expect the dividend to grow indefinitely at a constant rate of 10 percent per year.

What is the firm’s cost of newly issued common stock?
\[ R_e = 0.055 + 2 \times 0.055 = 16.5\% \]

What is the firm's weighted average cost of capital?
\[ WACC = 0.06 \times 0.4 \times (1 - 0.2) + 0.165 \times 0.5 + 0.125 \times 1 \]

17. What is the net present value of a project that has an initial cash outflow of $34,900 and the following cash inflows? The required return is 15.35 percent.

<table>
<thead>
<tr>
<th>Year</th>
<th>E(cash flow)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$12,500</td>
</tr>
<tr>
<td>2</td>
<td>$19,700</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>$10,400</td>
</tr>
</tbody>
</table>

A. -$3,383.25  
B. -$2,784.62  
C. -$2,481.53  
D. $52,311.08  
E. $66,416.75

18. Your firm would like to invest in an international telecommunications infrastructure project. There are two options for you to consider: the first has a higher NPV and higher IRR but a 25 year payback period, the second has a lower (but still positive) NPV and lower IRR with a 5 year payback. Does the politically stability of the investment’s location matter for your decision?

Yes. For project with particularly time-sensitive uncertainty, such as in political unstable regions or the health-care industry, payback often is the preferred capital budgeting decision method.

19. The optimal capital structure will tend to include more debt for firms with:

a. the most skilled labor.  
b. the lowest marginal tax rate.  
c. substantial tax shields from other sources.  
d. lower probability of financial distress.  
e. less taxable income.
20. What is an equity beta?

The equity beta is the levered beta and it measure the combined project and financial risk to equityholders.

21. You currently have 30,000 shares trading at $10/share and $100,000 in debt with a 10% cost of debt. You are considering issuing an additional $100,000 in debt to repurchase shares. How many shares would you repurchase? What is the breakeven EBIT at which shareholders are indifferent between the current and proposed capital structure?

Repurchase 10,000 shares
Breakeven EBIT = $40,000

22. Sally’s has debt of $12,000 and equity of $18,000. The cost of debt is 8 percent and the cost of equity is 13 percent. The tax rate is 34 percent. What is the firm’s weighted average cost of capital?

\[
\left[\frac{18k}{12k + 18k} \times .13\right] + \left[\frac{12k}{12k + 18k} \times .08 \times (1 - .34)\right] = .09912 = 9.91\%
\]

23. Big Bill’s Yachts has a debt-equity ratio of .75. The cost of debt is 8 percent and the unlevered cost of capital is 13 percent. What is the cost of equity if the tax rate is 35 percent?

\[
R_E = .13 + (.13 - .08) \times .75 \times (1 - .35) = .15438 = 15.44\%
\]

24. The Winter Wear Company has expected earnings before interest and taxes of $2,100, an unlevered cost of capital of 14% and a tax rate of 34%. The company also has $2,800 of debt that carries a 7% coupon. The YTM is also 7%. What is the value of this firm?

\[
V_U = \left[\frac{2,100 \times (1 - .34)}{.14}\right] = 9,900; \quad V_L = 9,900 + (.34 \times 2,800) = 10,852
\]

25. Walter’s Distributors have a cost of equity of 13.84 percent and an unlevered cost of capital of 12%. The company has $5,000 in debt that is selling at par value. The levered value of the firm is $12,000 and the tax rate is 34%. What is the cost of debt?

\[
V_E = 12,000 - 5,000 = 7,000; \quad .1384 = .12 + (.12 - R_D) \times (5,000 \div 7,000) \times (1 - .34); \quad .0184 = .056571 - .471429R_D; \quad R_D = .08097 = 8.10\%
\]

26. If a company uses the same discount rate for evaluating all projects, which outcome 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.**
27. Describe the value of a firm as debt increases - in a perfect market (without taxes and distress), with taxes, and with both taxes and distress.

**In a perfect market, firm value is unaffected by the level of debt. With taxes, the value increases with the level of debt. And with both taxes and distress, the benefits of debt (tax shields) are eventually outweighed by the costs of debt (potential distress) so the value initially rises and then decreases with higher level of debt.**

28. Griggs Inc. has debt with both a face and a market value of $3,000. This debt has a coupon rate of 7% and pays interest annually. The expected earnings before interest and taxes is $1,200, the tax rate is 34%, and the unlevered cost of capital is 12%. What is V_L? What is the firm’s cost of equity?

\[
V_U = [EBIT \times (1 - T_c)] + R_U = [1,200 \times (1 - .34)] + .12 = $6,600
\]

\[
V_L = V_U + (T_c \times D) = $6,600 + (.34 \times $3,000) = $7,620
\]

\[
VL = V_U + (T_c \times D) = $6,600 + (.34 \times $3,000) = $7,620
\]

\[
VL - V_D = V_E = $7,620 - $3,000 = $4,620
\]

\[
R_E = R_U + (R_U - R_D) \times D/E \times (1 - T_c) = .12 + (.12 - .07) \times ($3,000 + $4,620) \times (1 - .34) = .12 + .02143 = 14.14\%
\]

29. You have a health food store with has a D/E ratio of 2/3. A similar firm, Organic Oats, has a cost of equity of 16% and a D/E ratio of 4/3 while the local large grocery store, Big Box, has a cost of equity or 17% and a D/E if 5/3. The risk-free rate is 4% and the required rate of return on the market is 10%. Assume a tax rate of 25%. What is your cost of equity?

\[
16\% = 4\% + beta(10\% - 4\%) \sim 12\% = beta*6\% \sim beta=2
\]

\[
Unlev \ beta = 2/[1+(1-.25)*(4/3)] = 2/2 = 1
\]

\[
Relever = 1*[1+(1-.25)*(2/3)] = 1.5
\]

\[
Cost of equity = 4\% + 1.5*6\% = 13\%
\]

30. The optimal capital structure:

a. will be the same for all firms in the same industry.

b. will remain constant over time unless the firm does an acquisition.

c. **of a firm will vary over time as taxes and market conditions change.**

d. values operational decision more than potential tax shields

e. is unaffected by changes in the financial markets.

31. Kantishna Air is trying to decide whether to open a lodge in Denali National Park. The beta for Kantishna is 1.0. However, other national park backcountry lodges have betas averaging 3 with a debt to equity value of 2/3. Assume the tax rate is 25%. The Kantishna lodge will have a D/E ratio of 1/3 (so the D/V=1/4) and the cost of debt is 8%, the risk premium is 4%, and the risk free rate is 2%, what is the project’s weighted average cost of capital?

\[
\beta^U = \beta^L / (1 + (1-t)D/E) = 3/(1+(1-.25)(2/3)) = 3/(1+(3/4)(2/3)) = 3/1.5 = 2
\]

\[
\beta^L = \beta^U \times (1-(1-t))D/E = 2*[(1-(1-.25))D/E] = 2*(1+(3/4)(1/3)) = 2*1.25 = 2.5
\]

\[
E(R) = R_f \times \beta^L \times Market Risk Premium + 2% \times 2.5*4\% = 12\%
\]

\[
WACC = (1-.25)(1/4)8\% + (3/4)12\% = 10.5\%
\]
**Equations**

\[ FV = PV(1 + r)^t \]

\[ E(r) = \sum p_i E(r_i) \]

\[ r_c = r_{BF} + \beta (r_M - r_{BF}) \]

\[ r_e = r_U + (r_U - r_D) \left( \frac{D}{E} \right) (1 - T_c) \]

\[ V = D + E \]

\[ V_U = \frac{\text{After-tax EBIT}}{r_U} \]

\[ V_L = V_U + PV(\text{TaxShields}) \]

\[ PV = C / r \]

\[ Var = \sum w_i (r_i - E(r))^2 \]

\[ WACC = (1 - t) r_D \frac{D}{V} + r_e \frac{E}{V} + r_p \frac{P}{V} \]

\[ \beta^L = \beta^U (1 + (1 - t) \frac{D}{E}) \]

\[ PV(\text{TaxShield}) = T_c * D \]

\[ V_L = \frac{\text{After-tax EBIT}}{WACC} \]

\[ \frac{EBIT - r_d * D_{OLD}}{\# Shir_{OLD}} = \frac{EBIT - r_d * D_{NEW}}{\# Shir_{NEW}} \]