Corporate Finance Exam

A. Multiple choice questions (15 points in total)

Choose the **best** answer.

1. Which of the following represents an investment activity?
   1. The firm buys a new piece of equipment
   2. The firm buys back shares of stock
   3. The firm pays dividends on common stock
   4. The firm retires some bonds before they were due to mature
   5. The firm issues bonds

**The best answer is A.**

1. Which of the following statements is most correct?
   1. An advantage of the sole proprietorship is unlimited liability.
   2. A disadvantage of a partnership is separation of decision-making and control.
   3. A disadvantage of a sole proprietorship is double taxation.
   4. A disadvantage of a sole proprietorship is limited life.
   5. An advantage of the partnership is easy access to capital.

**The best answer is D. The sole proprietorship’s life is limited to that of its owner.**

1. A cost incurred by the principal in an agency relationship to limit the actions of the agent is referred to as:
   1. Bonding cost
   2. Monitoring cost
   3. Residual loss
   4. Fiduciary cost
   5. Cost of working capital

**The best answer is B. Monitoring costs are borne by the principal to “watch” the agent.**

1. Which of the following is an internal source of financing for the firm?
   1. Current assets
   2. Retained earnings
   3. Depreciation
   4. Long-term debt

**The best answer is B. The only sources of financing listed below are B and D, but D is an external source of financing.**

1. Which of the following items is deductible by corporations in computing their taxable income?
   1. Interest paid
   2. Dividends paid to common shareholders
   3. Dividends paid to preferred shareholders
   4. b and c only
   5. a, b, and c are all deductible for corporations

**The best answer is A. Dividends paid are not deductible.**

1. Comparing the financial performance of Google, Inc. to a major group of competitors in the same industry is one example of a(n):
   1. Benchmarking analysis
   2. Trend analysis
   3. Peer group analysis
   4. Agency analysis

**The best answer is C.**

1. Beta is a measure of:
2. Firm-specific risk
3. Total risk
4. Systematic risk
5. Unsystematic risk
6. Diversifiable risk

**The best answer C. Beta measures systematic risk (which is the same as non-diversifiable or market risk).**

1. Which of the following statements is false?
2. The CAPM has one factor while the APT allows many factors
3. The CAPM assumes a positive relationship between expected return and risk.
4. The APT assumes a negative relationship between expected return and risk.
5. All of the above statements are true.

**The best answer is C. The APT also assumes a positive relationship between expected return and risk. It just uses different factors to account for this than those used in the traditional CAPM**

1. If an investor holds only stock in IBM Corporation the relevant measure of risk will be
2. Beta
3. Expected return
4. Standard deviation
5. Covariance
6. Correlation

**The best answer is C. The appropriate measure of risk when only one stock is holed is standard deviation. Beta is appropriate risk measure when holding more than one security. The others are not risk measures.**

1. The CAPM implicitly assumes that investors will not be compensated for \_\_\_\_\_\_\_\_ since it is diversifiable.
2. Systematic risk
3. Total risk
4. Market risk
5. Unsystematic risk

**The best answer D. The CAPM uses beta to indicate that investors will be compensated for market risk (same as systematic risk). They will not be compensated for total risk, but total risk does not fit the second half of the sentence. Some of total risk is diversifiable, but some is not. Therefore, the correct answer that suits the entire sentence is unsystematic risk (same as firm-specific or diversifiable risk).**

**B. Short answers (50 points in total)**

1. **(5 points)** A prestigious investment bank designed a new security that pays a quarterly interest of $10 permanently. What is the price of the security if the state annual interest rate is 12 percent, compounded quarterly?

Payment = $10 quarterly, r = 12%, quarterly. In this case, the “r” we have is not the periodic rate and that is what we need to use.

##### Use r = 12%/4 = 3%; PV = payment ÷r = $10/0.03 = $333.33

1. **(5 points)** What is the present value of end-of-year cash flows of $2,000 per year, with the first cash flow received two years from today and the last one 22 years from today? Use a discount rate of 8 percent.

**This is an ordinary annuity. The total number of periods is 20.**

**PMT = $2,000; N = 20; I/Y = 8%; CPT PV PV = $19,636.2948**

To find PV of this cash flow now I discount it two periods back:

**FV = $19,636,29; N= 2; I/Y = 8%; CPT PV PV = $16,834.9578**

1. **(5 points)** Your employer has agreed to make 80 quarterly payments of $400 each into a trust account to fund your early retirement. The first payment will be made 3 months from now. At the end of 20 years (80 payments), you will be paid 10 equal annual payments, with the first payment to be made at the end of Year 20. The funds will be invested at 8%, quarterly *compounding*. This rate is not expected to change over time. How large will each of your 10 receipts be?

**This is a two-step problem. The first step is to solve for the future value of the payments that your employer is making. Since payments are quarterly and interest is quarterly, use the periodic rate.**

**PMT = $400; I/Y = 2%; N = 80; CPT FV FV = $77,508.78**

The second step is to use this FV as the PV of the payments you will be receiving annually. Since you are receiving annual payments, convert the period rate in this step to annual rate (EAR).

**EAR = (1 + 0.02)4 – 1 = 0.082432 = 8.2432%**

Also, since the first receipt will be at the end of Year 20 and the last payment by the employer was also at the end of Year 20, this is an annuity due. Change calculator to BEG:

**PV = $77,508.78; N = 10; I/Y = 8.2432; CPT PMT PMT = $10,788.78**

[Note: If you do not change calculator to BEG: You must discount the FV back one period.] PV = $77,508.78/1.082432 = $71,606.1425

**PV = $71,606.1425; N = 10; I/Y = 8.2432; CPT PMT PMT = $10,788.78**

1. **(5 points)**A bond is sold at $923.14 (below its par value of $1000). The bond has 15 years to maturity and investors require a 10-percent yield on the bond. What is the coupon rate for the bond if the coupon is paid semiannually?

PV = -923.14; N = 30 periods; I/Y = 5%; FV = 1,000

CPT PMT PMT = $45 or 4.5% of par value paid semiannually

Annual coupon payment = $45 x 2 = $90

1. **(5 points)**The current price of a 10-year, $1,000 par value bond is $1,158.91. Interest on this bond is paid every six months, and the nominal annual yield is 14 percent. Given these facts, what is the annual coupon payment on this bond?

**N = 20; PV = 1,158.91; FV = 1000; I/Y = 7%; CPT PMT PMT = $85**

Since the payments are semi-annual, multiply by two to get the annual payment.

**So, PMT = 85 x 2 = 170 which is 17% of par value.**

1. **(5 points)**You have just purchased a newly issued $1,000 five-year Vanguard Company bond at par. This five-year bond pays $60 in interest semiannually. You are also considering the purchase of another Vanguard Company bond that returns $30 in semiannual interest payments and has six years remaining before it matures. This bond has a face value of $1000. (a) What is the effective annual return on the five-year bond? Assume that the annual (coupon) rate you used in part (a) is the correct interest rate (YTM) for the bond with six years remaining before it matures. (b) What should you be willing to pay for that bond?

a) For the 5-year bond, since PV = FV, then coupon rate = yield. Coupon rate = (60 x 2) ÷ 1000 = 12% (annualized). Therefore, the annualized yield is 12%, but the question is about the effective yield. So, we use the EAR formula.

**EAR = (1 + r)t - 1 = (1 + 0.06)2 - 1 = 0.1236 = 12.36%**

Remember the “r” in the formula above stands for periodic rate and the “t” stands for the number of compounding periods in a year. The rate is 6% per semiannual period and there are 2 semiannual periods in a year.

b) The price you will be willing to pay is:

**PMT = 30; N = 6 x 2 = 12; FV = 1000; I/Y = 6; CPT PV PV = $748.48**

1. **(5 points)** What will be the nominal rate of return on a preferred stock with a $100 par value, a stated dividend of 8 percent of par, and a current market price of $140?

**P = D ÷ k**

**D = 8% x 100 = $8**

**k = D ÷ P = 8 ÷ 140 = 0.0571 = 5.71%**

1. **(5 points)** A stock is trading at $80 per share. The stock is expected to have a year-end dividend of $4 per share which is expected to grow at some constant rate g throughout time. The stock’s required rate of return is 14 percent. If you are an analyst who believes in efficient markets, what would be your forecast of g?

**P0 = $80; D1 = $4; k = 14%**

**k = (D1÷ P0­) + g**

**g = k - (d1÷ P0­) = 0.14 - (4 ÷ 80­) = 0.14 - 0.05 = 0.09 = 9%**

1. **(10 points)**A common stock pays a current dividend of $2. The dividend is expected to grow at an 8 percent annual rate for the next three years; then it will grow at 4 percent in perpetuity. The appropriate discount rate is 12 percent. What is the price to this stock?

**D1 = 2.00 x (1.08) = 2.16;**

**D2 = 2.16 x (1.08) = 2.3328;**

**D3 = 2.3328 x (1.08) = 2.5194;**

**D4 = 2.5194 x (1.04) = 2.6202;**

**This is the new growth period, so we use 4% instead of 8%.**

**P3 = D4 ÷ (k - g) = 2.6202 ÷ (0.12 - 0.04) = $32.7525**

**To value the cash flows using the worksheet:**

CF0 = 0

CF1 = 2.16 this indicates dividend 1 is to be valued

CF2 = 2.3328 this indicates dividend 2 is to be valued

CF3 = 2.5194 + 32.7525 this indicates dividend 3 and the price that represents dividends 4 to infinity are to be valued

I = 12% use “k”, not “g” – growth rate!

#### **CPT NPV NPV = $28.89**

**C. Problem solving (35 points in total)**

1. **(10 points)** Based on the following information calculate the expected return and the standard deviation for the two stocks.

|  |  |  |  |
| --- | --- | --- | --- |
| State of  Economy | Probability of  State of Economy | Rate of Return on stock *A* | Rate of Return on stock *B* |
| Recession | 0.10 | 6% | -20% |
| Normal | 0.60 | 7% | 13% |
| Boom | 0.30 | 11% | 33% |

1. What is the expected return on stock *A* and stock *B*?
2. What is the variance and standard deviation for stock *A* and stock *B*?
3. What isof the standard deviation of an equally weighted portfolio of these two stocks if the correlation is 0.2?

**Solution:**

1. The expected return of an asset is the sum of the probability of each return occurring times the probability of that return occurring. So, the expected return of each stock asset is:

**E(RA) = .10(.06) + .60(.07) + .30(.11) = .0810 or 8.10%**

**E(RB) = .10(-.2) + .60(.13) + .30(.33) = .1570 or 15.70%**

1. To calculate the standard deviation, we first need to calculate the variance. To find the variance, we find the squared deviations from the expected return. We then multiply each possible squared deviation by its probability, and then add all of these up. The result is the variance. So, the variance and standard deviation of each stock are:

**σ2­A­= .10(.06 - .0810)^2 + .60(.07 - .0810)^2 + .30(.11 - .0810)^2 = .000369**

**σA= (.00037)^(1/2)= .01921 or 1.921%**

**σ**­2B= .10(.-2 - .1570)^2 + .60(.13 - .1570)^2 + .30(.33 - .1570)^2 = .022161

**σB­= (.02216)1/2 = .14886 or 14.89%**

1. To calculate the portfolio standard deviation, we first need to calculate the variance. To find the variance we use the formula based on the individual stocks’ variances and the covariance between the two stocks. So, the portfolio variance is:

**σp2 = wA2σA2 + wB2σB2 + 2wAwB σAσBρAB**

**σp2 = (0.5^2)(0.01923^2) + (0.5^2)(0.1489^2) + 2(0.5)(0.5)(0.2)( 0.0192)( 0.1489)**

**σp2 = 0.0059183**

1. **(8 points)** Security *A* has an expected return of 8 percent with a standard deviation of 1.5 percent. Security *B* has an expected return of 12 percent with a standard deviation of 2.4 percent. The two securities have a correlation coefficient of 0.20. If you invest 40 percent of your funds in Security *A* and 60 percent in Security *B*, the standard deviation of the portfolio will be (Note: change calculator to 6 decimals).

**Covariance σab = ρσa σb = 0.2(0.015)(0.024) = 0.000072**

**Portfolio σp2 = (0.4^2)(0.015^2) + (0.6^2)(0.024^2) + 2(0.4)(0.6)(0.000072) =**

**σp2 = 0.000036+ 0.000207 + 0.000035 = 0.000278**

**Portfolio standard deviation is σ = 0.016673 = 1.67%.**

1. **(10 points)** The market value of the shares of Microsoft Corporation is currently $24 million, and their beta is 1.4. Microsoft has a nominal (face value) $6 million of 8 percent coupon debt outstanding, which matures in 7 years (the par is $1000). These bonds have a beta of 0.1, and they currently yield 10 percent market interest. The expected market return is 14% and the risk-free rate of return is 5%
2. What is the total market value of the firm? (Note: MV is the sum of the equity and debt market values).
3. What is the weighted average beta of Microsoft’s assets? What is the required rate of return on Microsoft’s assets? (Hint: use CAPM equation with the computed average beta)

**Solution:**

1. Total Market value of firm = Market value of debt + Market value of

**Total MV = $5,415,780 + $24,000,000 = $29,415,780**

Where:

**Value of equity = $24,000,000**

**Value of debt = $902.63 × 6,000 = $5,415,780**

Number of bond outstanding = 6,000,000/1000 = 6,000

I have used the financial calculator to find the market price per bond:

**PMT = 80; N = 7; I/Y = 10%; FV = 1000 CPT PV = -$902.63**

1. Beta of assets = Beta of equity × (Equity/Value) + Beta of debt × (Debt/Value)

**Beta = 1.4** × **(24/29.415) + 0.1** × **(5.415/29.415) = 1.161**

**Required rate of return on firm’s assets = 5% + 1.161(14% - 5%) = 15.444%**

1. **(7 points)** Baxter Video Product’s sales are expected to increase by 20% from $5 million in 2010 to $6 million in 2011. Its assets totaled $3 million at the end of 2010. Baxter is already at full capacity, so its assets must grow at the same rate as projected sales. At the end of 2010, current liabilities were $1 million, consisting of $250,000 of accounts payable, $500,000 of notes payable, and $250,000 of accruals. The after-tax profit margin is forecasted to be 5%, and the forecasted dividend payout ratio is 70%.Use the AFN equation to forecast Baxter's additional funds needed for the coming year.

**Solution:**

AFN = (A0\*/S0)∆S – (L0\*/S0)∆S – (PM)(S1)(1 – Payout rate)

AFN =$1,000,000 – $1,000,000 – 0.05($6,000,000)(1 – 0.7) AFN = (0.6)($1,000,000) – (0.1)($1,000,000) – ($300,000)(1 - 0.7)

**AFN = $600,000 – $100,000 – $90,000**

AFN = **$410,000.**

**D. Bonus questions (4 points in total):**

1. **(2 points)**Who is the new provost from this academic year? **The best answer is D.**
2. Lucia Miree
3. Alex Aleksandrov
4. Michael Easton
5. Steve Sullivan
6. (2 points) Who will be teaching Corporate Finance class in Fall 2013 semester? The best answer is D.
7. Prof. Steve Sullivan
8. Prof. MiroslavMateev
9. Prof. Alf Eastergard
10. Visiting faculty