

FN 201 Business Finance
Final Exercise 2-2014

Question 1 (25 Points)

HENGHENG Company has two bond issues outstanding. Both bonds pay \$100 annual interest plus \$1,000 at maturity. Bond M has a maturity of 15 years, and Bond N has a maturity of 5 year.

1.1 Draw an investment time line and find that if both bond M and bond N are sold at par, what are yields to maturity (YTM) of each bond? (5 Points)

1.2 What will be the value of these bonds when the going YTM or rate of interest is at 5%, 8%, and 12%? Show the derivation and put the final answers into below table. (10 Points)

	Bond M's Value (Price)	Bond N's Value (Price)
5%		
8%		
12%		

1.3 Show percent changes in bond value when the interest rate is going up (compared with the values when interest rate is 5%). Then, explain why the value of longer-term bond fluctuate more when interest rates change than does the shorter-term bond? (10 Points)

Question 2 (25 Points)

Winnie Corp. is a leading company in automobile industry. According to market research, the company's beta is 1.4 when the risk-free rate is 5.6% and the market risk premium is 6%. Winnie has current return on equity (ROE) at 17.5% and pays out 60% of its earnings as dividends. Its dividend paid last year (D_0) was \$2. One investor is considering to invest in this company, but has no background in common stock valuation. Please help this investor by answering the following questions.

2.1 According to above information, what are the investor's require rate of return and the expected dividend growth rate? (5 Points)

2.2 An investor intends to hold Winnie's stock for **only 3 years** and expects to sell at price \$26.22 at the end of year 3. Assume that expected dividend growth rate follows (2.1), what would be a proper stock price for the investor? Should the investor buy if Winnie's current market stock price is \$25? Why? (10 Points)

2.3 As a leading company in the industry, Winnie has decided to invest R&D project to improve the operating performance. If the project is successfully completed, this will let Winnie to have earnings and dividends growing at a rate of 50% [$D_1 = D_0(1 + g) = D_0(1.50)$] this year and 25% the following two years, after which growth would return to 9%. If it is believed that the project would be successful, what is the value per share of Winnie's common stock? (10 Points)

Question 3 (25 Points)

Mr. Benny has a portfolio investment with current expected return at 8.5% and variance at 110 (or 10.4881 standard deviation). He was suggested by two trading companies to include one more stock into his portfolio - Company A introduced stock X, while Company B suggested stock Y. Below table provides additional information on stock X and Y, and the correlation with Benny's current portfolio.

	Company A: Stock X	Company B: Stock Y
Expected Return	10%	15%
Variance	140	180
Standard Deviation	11.8322	13.4164

Correlation between Benny's current portfolio return and stock X is 0.75, while the correlation with stock Y is 0.50.

Due to budget constraint, Benny can afford either stock X or stock Y. His new portfolio would have 40% weighting on new stock and the other 60% is allocated for the combination of old stocks. As a financial planner, please help Benny to decide which stock to be chosen into his current portfolio investment by answering the following.

3.1 Calculate expected return and measure risk (i.e. from variance and standard deviation) that associated with the new portfolio if Benny decides to pick **stock X** into his current portfolio. (10 Points)

3.2 Calculate expected return and measure risk (i.e. from variance and standard deviation) that associated with the new portfolio if Benny decides to pick **stock Y** into his current portfolio. (10 Points)

3.3 With the findings from (3.1) and (3.2), which stock would you recommend Mr. Benny to include into his current portfolio? Why? (Note that only one stock will be selected). (5 Points)

Question 4 (35 Points)

Win Hom Production has **book value** balance sheet as shown below:

Current assets	\$30,000,000	Long-term debt	30,000,000
Fixed assets	<u>50,000,000</u>	Common stock	<u>50,000,000</u>
		(1 million shares)	
Total Assets	<u>80,000,000</u>	Total Claims	<u>80,000,000</u>

Under this capital structure, the long-term debt consists of 30,000 bonds, each with a par value of \$1,000, an annual coupon interest rate of 12%, and a 20-year maturity with 15% yield to maturity (YTM). The company has a dividend yield of 4%, an expected constant growth rate of 8%, and the market price of common stock at \$60 per share. The company's marginal tax rate is 40%.

4.1 Calculate Win Hom's **market value** capital structure. (10 Points)

4.2 Find the component after-tax costs of debt and cost of common stock. Then, calculate weighted average cost of capital (WACC) under the current market capital structure. (10 Points)

4.3 If Win Hom Production plans to raise \$40 million capital for new projects, in order to maintain the present market capital structure, how much of the new investment must be financed by common equity? What could be the reason why Win Hom wants to maintain the current capital structure? (5 Points)

4.4 (10 Points) **Qualitatively speaking**, what will happen to the WACC if:

- (1) There is not enough internal cash flow and Win Hom must issue new shares of stock with the flotation cost?
- (2) The new projects of Win Hom are more risky?

Question 5 (30 Points)

Minnie Ltd. is trying to determine its optimal capital structure, which now consists of only debt and common equity. In order to get information how much debt would cost at different levels, the company consulted with investment bankers and got the following table:

Long-term debt fraction (W_D)	Equity fraction (W_E)	Before-tax cost of debt (R_D)
0	100%	7%
20%	80%	8%
40%	60%	10%
60%	40%	12%
80%	20%	15%

* The company does not currently use preferred stock in its capital structure, and it does not plan to do so in the future.

Minnie uses the CAPM to estimate its cost of common equity, R_S . The company estimates that the risk-free rate is 5%; the market risk premium is 6%, and the company's tax rate is 40%. Elliott estimates that if it had no debt, its "unlevered" beta, b_U , would be 1.20.

5.1 Without numerical calculation, what would be criteria when the company wants to decide its optimal capital structure? (5 Points)

5.2 Given the above information, what is the weighted average cost of capital (WACC) when company has no debt? (5 Points)

5.3 What would be the weighted average cost of capital (WACC) under different levels of debt (starting from 20%)? Determine at which level debt should be financed? Why? (20 Points)

Question 6 (20 Points)

David's broker has shown him two bonds selling at par. Both have the same par value of \$2,000 and pay 10.00% coupon annually. The difference is that bond X has a maturity of 5 years, while bond Y has a maturity of 20 years.

6.1 Draw an investment time line for each bond, find yields to maturity (YTM) of each bond? (5 Points)

6.2 The broker expects that yield to maturity of bond X and Y would increase to 12.00% and 13.50%, respectively, at the end of this year. Calculate current yields, expected prices, and percent change in price of the two bonds. (10 Points)

6.3 If David wants to minimize interest rate risk, which bond should he purchase? Why? (5 Points)

Question 7 (25 Points)

AROI Inc. is in the agricultural business. The company could maintain its return on equity at 15% and keep paying dividend 40% of its earnings. One investor is considering to invest in this company with required rate of return 15%. Please help this investor by answering the following questions.

7.1 What is the company expected dividend growth rate? **(5 points)**

7.2 An investor intends to hold AROI Inc.'s stock for **only 3 years** and expects to sell at price \$26.50 at the end of year 3. Assume that last year AROI paid its dividend \$2 per share ($D_0 = \2) and expected dividend growth rate is from (7.1), what would be a proper stock price for the investor? **(10 points)**

7.3 AROI Inc. has an R&D project which is expected to complete in the next two years. If the project is successful, this will lead earnings and dividends to grow at a rate of 40% at the end of year 3, 20% at the end of year 4, after which growth would return to 10%. Given dividend paid last year at \$2 per share, what is the appropriate value of AROI Inc.'s common stock under this scenario? **(10 points)**

Question 8 (25 Points)

Tony has a portfolio investment consisting of stock A and B. Now, he is considering to include stock C into his portfolio. Given the information below, please help Tony decide whether he should include stock C into his current portfolio by answering the following questions.

State of Economy	Probability	Rate of Return if State Occurs		
		Stock A	Stock B	Stock C
Boom	0.20	30.00	45.00	33.00
Good	0.40	12.00	10.00	15.00
Poor	0.30	1.00	-15.00	-5.00
Bust	0.10	-6.00	-3.00	-9.00
Expected Return		10.50	8.20	10.20
Variance		745.00	446	219
Standard Deviation		27.29	21.12	14.81

8.1 Tony's portfolio is invested 30% in stock A and 70% in stock B. Suppose that correlation coefficient of stock A and B returns is equal 0.65, what are the expected return of the portfolio and risk as measured by variance and standard deviation? **(10 points)**

8.2 In case Tony includes stock C, his new portfolio would have 40% weighting on new stock and the other 60% is allocated for the combination of old stocks. Given the correlation between current portfolio return and stock C is 0.75, what are Tony's new expected return, variance, and standard deviation of new portfolio? **(10 points)**

8.3 Using appropriate criteria, decide if stock C should be invested? Why? **(5 points)**

Question 9 (30 Points)

MAMAMIA reported its total market value as January 1 at \$80 million. During the year, the company plans to raise and invest \$30 million in new projects. The firm's present market value capital structure, shown below, is considered to be optimal. There is no short-term debt.

Debt	\$30,000,000
Common equity	50,000,000
Total capital	\$80,000,000

New bonds will have a 9% coupon rate, and they will be sold at par. MAMAMIA's current EPS is \$6.50. It was \$4.42 five years ago. The company pays out 40% of its earnings as dividends, and the stock sells for \$36.

9.1 What are the historical growth rate in earnings of MAMAMIA and next expected dividend per share, assuming the past growth rate will continue? Given this information, what is cost of equity? **(10 points)**

9.2 Calculate weighted average cost of capital (WACC) under the current market capital structure. **(5 points)**

9.3 In order to maintain the present capital structure, how much of the new investment must be financed by common equity? What could be the reason why MAMAMIA wants to maintain the current capital structure? **(5 points)**

9.4 **(10 points)** *Qualitatively speaking*, what will happen to the WACC if:

- (1) There is not enough internal cash flow and MAMAMIA must issue new shares of stock with the flotation cost?
- (2) The new projects of MAMAMIA are more risky?

Question 10 (30 Points)

Beckman Company has a total market value of \$100 million, consisting of 50% debt and 50% equity. The company's EBIT is \$13.24 million, and its tax rate is 40%. Beckman can change its capital structure either by increasing its debt to 70% (based on market values) or decreasing it to 30%. If it decides to **increase** its use of leverage, it must call its old bonds and issue new ones with a 12% coupon. If it decides to **decrease** its leverage, it will call its old bonds and replace them with new 8% coupon bonds.

The company will sell or repurchase stock at the new equilibrium price to complete the capital structure change. The firm pays out all earnings as dividends; hence its stock is a zero-growth stock. The beta on its common stock at the current level of debt is 1.5, the risk-free rate is 6%, and the market risk premium is 4%

10.1 Without numerical calculation, what would be criteria when the company wants to decide its optimal capital structure? **(5 points)**

10.2 What is Beckman Company's unlevered beta? And what will be the new beta and new cost of equity under different debt levels (e.g. 30% and 70%)? **(10 points)**

10.3 What is the firm's WACC and total corporate value under each capital structure – one is to increase debt to 70%, and the other one is to decrease debt to 30%? **(10 points)**

10.4 Determine at which level debt should be financed? Why? **(5 points)**

Question 11 (25 Points)

Tony is a risk-averse investor. He plans to invest in fixed income securities. One investment company shows him two bonds – Bond X and Y. Both pay 9% coupon interest rate with \$1,000 par value. The difference is that bond X has 25 years to maturity, while bond Y has 7 years to maturity.

11.1 Draw an investment time line for each bond. If Tony's required rate of return is at 12%, how much should he pay for bond X and Y? **(5 points)**

11.2 From bond prices in **(11.1)**, calculate Current Yield and Capital Gain/Loss Yield of each bond. Explain how these yields are related to each other. **(5 points)**

11.3 What will be the value of these two bonds when the going YTM or rate of interest become 15%? Calculate percentage change in price, compared with prices at 12% required rate of return, and fill in below table **(10 points)**

YTM	Bond X		Bond Y	
	Price	Change (%)	Price	Change (%)
12%				
15%				

11.4 Which bond should you recommend Tony to purchase? Why? **(5 points)**

Question 12 (25 Points)

Storico Co. just paid a dividend of \$2.75 per share. The company will increase its dividend by 20 percent next year and will then reduce its dividend growth rate by 5 percentage points per year until it reaches the industry average of 5 percent dividend growth, after which the company will keep a constant growth rate forever. According to market research, the company's beta is 1.4 when the risk-free rate is 5.6% and the market risk premium is 6%.

12.1 Draw an investment time line presenting dividend payment plan of Storico. **(5 points)**

12.2 If one investor intends to hold Storico's stock for only 2 years and expects to sell at \$55 at the end of year 2, what will be a proper stock price for the investor? What should be appropriate investment strategy (i.e. to buy, sell, or hold) if Storico's current market stock price is \$45? Why? **(10 points)**

12.3 An investor has a long-term investment plan in Storico in that he has no plan to sell in a short period of time. According to the above information, what is the value per share of Storico's common stock? And what should be appropriate investment strategy (i.e. to buy, sell, or hold) if Storico's current market stock price is \$45? Why? **(10 points)**

Question 13 (30 Points)

Winnie has a portfolio investment with expected portfolio return at 9% and variance at 110 or 10.4881 standard deviation. Now, he is considering to include ONE stock into his current portfolio. He contracted two investment companies and got the following suggestions – Company A introduced stock X for Winnie, and Company B convinced him to invest in stock Y. Winnie formed below table presenting return and variance of stock X and Y to make his own analysis:

	Company A: Stock X	Company B: Stock Y
Expected Return	12%	18%
Variance	145	175
Standard Deviation	12.0416	13.2288

Correlation between Winnie's current portfolio return and stock X is 0.75, while the correlation with stock Y is 0.90.

Due to Winnie's plan to invest in only one stock, he intends to allocate 40% for new stock investment and the other 60% for the combination of old stocks. As a financial planner, please help Winnie to obtain appropriate investment strategy.

13.1 Calculate expected return and measure risk (i.e. from variance and standard deviation) that associated with the new portfolio if Winnie decides to pick stock X into his current portfolio. **(10 points)**

13.2 Calculate expected return and measure risk (i.e. from variance and standard deviation) that associated with the new portfolio if Winnie decides to pick **stock Y** into his current portfolio. **(10 points)**

13.3 With the findings from **(13.1)** and **(13.2)**, which stock would you recommend Winnie to include into current portfolio? Why? (Note that only one stock will be selected). **(10 points)**

Question 14 (30 Points)

iPhone Co. Ltd. reported its capital structure as follows:

- 8.5 million shares of common stocks selling at \$34 in the market;
- 200,000 shares of preferred stocks with selling price of \$83 a share (it was estimated 7% return per annum); and
- 85,000 shares of 15-year corporate bonds with 8.5% coupon interest rate sold at par or \$1,000.

The company uses the CAPM to estimate its cost of common equity. It estimates that the risk-free rate is 5%; the market risk premium from 6-month T-bills is 6%, and from 6-year Government Bond is 9%; company's beta is 1.20; and the company's tax rate is 35%.

14.1 Find the component after-tax costs of debt, preferred stock, and common stock. **(5 points)**

14.2 Calculate market value of iPhone's capital structure and percentage of each source of capital. **(10 points)**

14.3 iPhone considers to have a new production base in China in order to lower costs from local production and increase revenues from international market. If this new project has the same risk level as company's other projects, what will be an appropriate *discount rate* for project analysis given the same percentages of each source of capital? **(5 points)**

14.4 **(10 points)** *Qualitatively speaking*, what will happen to the WACC of iPhone if:

- (1) iPhone issues new shares of common stock with higher flotation cost?
- (2) The new project is granted considerably lower tax rate?

Question 15 (30 Points)

OMG Corp. is planning for restructuring of its capital structure, which currently consists of 50% of common equity and 50% of debt. It has 1 million shares of common stocks outstanding. The company will sell or repurchase stock at the new equilibrium price to complete the capital structure change. For long-term debt use, it is considering the following choices at different desired levels:

- The company can **increase** its leverage to 70% by calling its old bonds and issuing new ones with a 12% cost of debt; or
- The company can **decrease** its use of leverage to 30% by calling its old bonds and replacing them with new 8% coupon bonds.

OMG Corp. has EBIT at \$2,800,000 with marginal tax rate at 40%. At current capital structure, the company pays 10% before-tax cost of debt. The firm pays out all earnings as dividends; hence, its stock is a zero-growth stock. The beta on its common stock at the current level of debt is 1.15, the risk free rate is 4%, and average market return is at 12%.

15.1 Under this scenario, what would be criteria for OMG Corp. to decide whether its optimal capital structure should be at 70% or 30% debt level? **(5 points)**

15.2 At current capital structure, what is unlevered beta of the company? What are the current weighted average cost of capital (WACC), firm value, and equity value per share? **(10 points)**

15.3 What is the firm's WACC and total corporate value under each capital structure – one is to increase debt to 70%, and the other one is to decrease debt to 30%? Also, calculate firm value, and equity value per share under each scenario. **(10 points)**

15.4 Determine at which level debt should be financed? Why? **(5 points)**

Question 16 (20 Points)

16.1 What are key features of “convertible bonds” and “warrants”? How do they help company in selling its new bonds? **(10 points)**

16.2 What are possible impacts on company's capital structure when investors exercises convertible bonds and warrants? Explain and compare between them. **(10 points)**

Question 17 (30 Points)

Sweetie Icy Company is considering including two pieces of equipment, a machine and an overhead pulley system, in this year's capital budget. The projects are independent. The cash outlay for the machine is \$17,100 and that for the pulley system is \$22,430. The firm's cost of capital is 14%. After-tax cash flows, including depreciation, are as follows:

<u>Year</u>	<u>Machine</u>	<u>Pulley</u>
1	\$5,100	\$7,500
2	5,100	7,500
3	5,100	7,500
4	5,100	7,500
5	5,100	7,500

17.1 Calculate the Net Present Value (NPV) and the Internal Rate of Return (IRR) for each project, and indicate whether to accept or reject each project. And why? **(20 Points)**

17.2 Calculate the Regular Payback Period for each project. Explain the meaning and decide which project is more attractive. **(10 Points)**

Question 18 (25 Points)

Project A and B, of equal risk, are alternatives (or mutually exclusives projects) for expanding the Winnie Company's capacity. The cash flows for each project are shown in the following table.

	Project A	Project B
Initial Investment	\$80,000	\$50,000
Year	Cash Inflow	
1	\$15,000	\$15,000
2	15,000	15,000
3	25,000	15,000
4	25,000	15,000
5	30,000	15,000

As a financial analyst of the company, help Winnie make an investment decision on its project by answering the following questions.

18.1 Calculate the internal rate of return (IRR) to the nearest whole percent for each of the projects. Please provide all necessary information used in the calculation procedures. **(5 Points)**

18.2 If the company's cost of capital is 3%, calculate the net present value (NPV) for each project. **(5 Points)**

18.3 According to IRR and NPV values from (1.1) and (1.2), respectively, discuss any conflict in ranking that may exist between NPV and IRR. And which project will you recommend Winnies to invest? Why? **(10 Points)**

18.4 Explain possible reasons that lead to conflict in ranking between NPV and IRR in this case. **(5 Points)**

Question 19 (25 Points)

Winnie Inc. is considering two mutually exclusive projects of this year's capital budget. The firm's cost of capital is 4%. The cash outlay and after-tax cash flows received are as follows.

	Project A	Project B
Initial Investment	\$79,607.52	\$54,071.64
Year	Cash Inflow	
1	21,000	15,000
2	21,000	15,000
3	21,000	15,000
4	21,000	15,000
5	21,000	15,000

19.1 Calculate the Net Present Value (NPV) for each project. Which project will you recommend Winnie to invest? **(10 Points)**

19.2 Calculate the internal rate of return (IRR) to the nearest whole percent for each of the projects. Please provide all necessary information used for calculation. Which project will you recommend Winnie to invest? **(10 Points)**

19.3 Does conflict exist from using NPV and IRR when making decision? If so, which project will you choose? Why? **(5 Points)**