FINA 395: Theory of Finance II

Final Examination

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Instructions:

- When you are asked to stop writing at the end of the exam, please do not continue. If you have not written your name / ID, please wait until the invigilator is free to check your work and then complete the information.
- Write your name and student ID in at least one place on the question sheet. Make sure that you return the question sheet and the formula sheet with your exam. There could be a penalty of up to 20% for a failure to turn in your formula sheet or the question sheet.
- You are allowed to use a scientific / financial calculator. If the calculator is programmable, the memory should be cleared prior to the exam. You are not allowed to save any stored text in the calculator memory.
- You will be able to obtain partial credit for problems in Section B. You must show the details of your calculations / reasoning to receive such partial credit.
- **Answer all questions of Section A on the scantron sheet and all questions of Section B on the answer sheet**.
- Read the questions carefully and plan your time well.
- Good luck!

Section A: Total 30 points. All questions are worth 2.5 points each. Please answer all questions.

1. Given the following information, leverage will add how much value to the unlevered firm per dollar of debt?

Corporate tax rate: 34%

Personal tax rate on income from bonds: 50%

Personal tax rate on income from stocks: 10%

A.) -$0.255

B.) -$0.188.

C.) $0.340.

D.) $0.633.

E.) -$0.050.

2. The value of common stock today depends on:

A.) the expected future holding period and the discount rate.

B.) the expected future dividends and the capital gains.

C.) the expected future dividends, capital gains, and the discount rate.

D.) the expected future holding period and capital gains.

E.) the expected future earnings and the expected future holding period.

3. A firm has zero debt in its capital structure. Its overall cost of capital is 9%. The firm is considering a new capital structure with 40% debt. The interest rate on the debt would be 3%. Assuming that the corporate tax rate is 34%, its cost of equity capital with the new capital structure would be?

A.) 10.32%.

B.) 11.66%.

C.) 11.20%.

D.) 13.95%.

E.) 11.00%.

4. The synergy of an acquisition between Firm A and Firm B can be determined by:

A.) subtracting the change in cost from the change in revenue.

B.) subtracting the change in taxes from the change in revenue.

C.) subtracting the change in capital requirements from the change in revenues.

D.) discounting the change in the cash flows of the combined firm by the risk adjusted discount rate.

E.) discounting the change in the revenues of the combined firm by the risk adjusted discount rate.

5. The pecking-order theory:

A) relies on firm managers and investors to have symmetrical information.

B) advocates using internal financing prior to external financing.

C) suggests that higher-risk securities should be issued prior to lower-risk securities.

D) implies that equity should be issued prior to debt.

E) recommends that firms minimize their financial slack at all times.

6. The management team of ABC Inc. has discovered a profitable business opportunity that will enable them to invest an incremental $1 per share every year starting one year from now and earn a 20% return on that investment in perpetuity. If the discount rate is 12%, the (per share) net present value of these growth opportunities is:

A.) 10.00

B.) 9.44

C.) 8.12

D.) 5.56

E.) 4.76

7. An investor is more likely to prefer a high dividend payout if a firm:

A.) has high floatation costs.

B.) has few, if any, positive net present value projects.

C.) has lower tax rates than the investor.

D.) has a stock price that is increasing rapidly.

E.) offers high capital gains which are taxed at a favorable rate.

8. A firm has a debt-to-equity ratio of 1.5. Its cost of equity is 16%, and its cost of debt is 8%. If there are no taxes or other imperfections, what would be its cost of equity if the debt-to-equity ratio were 0?

A.) 8%.

B.) 9.4%.

C.) 10.6%.

D.) 11.2%.

E.) 12%.

9. Assuming everything else is constant, when a stock goes ex-rights its price should:

A.) decrease since the investor who purchases the shares is losing an option.

B.) increase since the corporation no longer has the right to force the stockholder to convert.

C.) remain the same since an efficient market would anticipate this change.

D.) increase since the investor who purchases the shares is gaining an option.

E.) double down, since this procedure is similar to a stock split.

10. You analyze whether mergers and acquisitions create value for the shareholders of acquiring companies on a given market. For that purpose you have obtained estimates of abnormal returns for five acquirer stocks on the day of acquisition announcement

JCT	BMO	RBC	MOT	BBD
-0.0171	0.0154	-0.0285	-0.0406	-0.0068

You also know that the abnormal returns have been calculated using the market model. The standard errors of corresponding market model regressions for the stocks are:

JCT	BMO	RBC	MOT	BBD
0.0151	0.0129	0.0155	0.0236	0.0173

You obtain the test statistic equal to_____A1_____and conclude that the effect is_____A2_____at the 5% significance level and the mergers are___A3___for the shareholders of the acquiring firms.

A.) A1: -0.90; A2: insignificant; A3: wealth neutral.

B.) A1: -2.01; A2: significant; A3: wealth destroying.

C.) A1: 1.56; A2: insignificant; A3: wealth neutral.

D.) A1: 2.01; A2: significant; A3: wealth creating.

E.) A1: -1.56; A2: insignificant; A3: wealth destroying.

11. The Perfect Foresight Marketing Research firm has promised payments to their bondholders that total $100. The company believes that there is a 85% chance that the cash flow will be sufficient to meet these claims. However, there is a 15% chance that cash flows will fall short, in which case total earnings are expected to be $65. If the bonds sell in the market for $84, what is an estimate of the bankruptcy costs for Perfect Foresight? Assume a cost of debt of 10%.

A.) $15.66

B.) $12.34

C.) $16.77

D.) $ 5.31

E.) $14.20

12. An investment project is most likely to be accepted by the payback period rule and not accepted by the NPV rule if the project has:

A.) a large initial investment with moderate positive cash flows over a very long period of time.

B.) a very large negative cash flow at the termination of the project.

C.) most of the cash flow at the beginning of the project.

D.) All projects approved by the payback period rule will be accepted by the NPV rule.

E.) The payback period rule and the NPV rule cannot be used to evaluate the same type of projects.

Section B: Total 70 points

Please answer all questions.

13. The Prophet Inc. is analyzing a proposed project. The project requires an initial investment of $20,000. The company expects to sell 3,750 units each year. The expected variable cost per unit is $9.5 and the expected fixed costs are $16,500 per year. Cost estimates are considered accurate within a range of 5% plus or minus. The depreciation expense is $5,000. The sale price is estimated at $18 a unit. The expected lifetime of the project is 5 years, the applicable discount rate is 10%. Due to favorable legislation for the duration of the project Prophet does not have to pay any taxes. The company calculates the project's NPV based on the expected case scenario. But it is also interested in the sensitivities of the NPV to forecast errors at the expected case scenario level.

a.) What is the percentage change in NPV in response to the variable costs per unit increase of 1%? Please, provide necessary calculations.

b.) Is the sensitivity to the sales volume (in units) higher in absolute value than to the variable costs per unit? Please, provide necessary calculations.

c.) What is the break-even sales volume? Please, provide necessary calculations. You can assume that both variable and fixed costs as well as price and discount rate are unaffected by the sales volume, if it helps.

d.) Describe two other measures of risk of investment projects, which also capture possible misspecification of the economic environment.

16 points

14. In a Modigliani-Miller world with corporate taxes (but without individual taxation and bankruptcy costs):

a.) show that the WACC can be written as

$$r_{WACC} = r_0 \times \left(1 - T_c \times \frac{B}{B + S_L}\right)$$

b.) what is the optimal debt to assets ratio?

c.) If one also considered differential personal taxation of dividend and interest income, would your answer to the question in b.)

change?……12 points

15. Great Lakes Corp.'s economists estimate that a good business environment and a bad business environment are equally likely for the coming year. The managers of Great Lakes must choose between two mutually exclusive projects. The two projects have the same systematic risk but different volatilities. You have the following information pertaining to the two projects:

Economy	Probability	Low-volatility project payoff	High volatility project payoff
Bad	0.50	$3,600	$2,800
Good	0.50	$4,000	$4,300

Assume that the project Great Lakes chooses will be the firm's only activity and that the project (and Great Lakes Corp. as a corporation) will close one year from today. Great Lakes must make a $3,700 payment to bondholders at the end of the year.

a.) Which of the two strategies maximizes the expected value of the firm? Please, provide necessary calculations

b.) Which project would Great Lakes' stockholders prefer? Please, provide necessary calculations and explain your answer.

c.) Suppose bondholders are fully aware that stockholders might choose to maximize equity value rather than total firm value and opt for the high-volatility project. To minimize this agency cost, the firm's bondholders decide to use a bond covenant to stipulate that the bondholders can demand a higher payment if Great Lakes' chooses to take on the high-volatility project. What payment to bondholders would make stockholders indifferent between the two projects?

d.) Which other shareholders' actions can be restricted by loan covenants? Name at least two such actions, treated in the course.

……12 points

16. The book and market value balance sheets for the Lobby Inc. are shown below. The firm has 600 shares outstanding.

Assets			Liabilities and owners' equity		
	Book value	Market value		Book value	Market value
Cash	$1,500	$1,500	Equity	$3,500	$1,500
Fixed assets	$3,000	$1000	Debt	$1,000	$1,000
Total	$4,500	$2,500	Total	$4,500	$2,500

Lobby has declared a dividend of $1.2 per share. The stock goes ex-dividend tomorrow. Individual dividend income is subject to a 20% tax. There is no tax on capital gains.

a) What is the price of the stock today?

b) What will be the stock price tomorrow? (Assume that there is no time difference between the ex-dividend and payment dates, individual taxes are paid at the time dividends are received)

c) Would your response regarding the stock price tomorrow change if the dividend had been replaced with a repurchase of shares that would result in a similar cash distribution? Explain.

d.) In the real world, despite a higher taxation of dividend income than of capital gains, firms often prefer dividend payments to share repurchases. Why?

……..10 points

17. Black Sands Inc. and Green Waters Co. went public on the same day. The Montreal Financial Times newspaper provided the following information about those IPOs: Black Sands shares were offered for $45 per share, the gross proceeds were $900 million, the stock traded at $43.75 at the end of the first trading day. Green Waters shares were offered at $70 per share, the company attracted $35 million in gross proceeds, and after the first trading day the journalists concluded that Green Waters left $4 million "on the table".

a.) How many shares did each company place?

b.) What was the underpricing of the Black Sands and Green Waters IPOs?

c.) Assume, you had $4000 to invest in these IPOs. Furthermore, you could have predicted the two first day return values correctly, but would not be able to tell which company would have which return. Assume further that the more underpriced IPO would be oversubscribed, and the other not. In case of oversubscription the shares are allotted on a pro-rata basis. Which oversubscription level would make you indifferent to investing in those IPOs and staying in cash?

d.) Why are in the real world underpriced IPOs often oversubscribed, whereas an ordinary investor often can not tell beforehand, which IPO is going to be underpriced? In which stocks does the oversubscription of underpriced IPOs happen more often?

e.) For which company, Black Sands Inc. or Green Waters Co., would the direct costs of issuing as a percentage of gross proceeds be higher and why?

15 points

18. Firms X and Y, both of which are 100% equity, are going to merge. Before the merger, Firm X (100 shares outstanding) is worth $15,000. Firm Y (50 shares outstanding) is worth $10,000. The combined firm is worth $30,000. Firm X will pay $11,500 in cash for Firm Y. What is the NPV of the merger to Firm X?

5 points

Formula sheet

1. Present value of annuity

$$PV = \frac{C}{r}\left[1 - \frac{1}{(1+r)^T}\right]$$

2. Present value of growing annuity

$$PV = \frac{C}{r-g}\left[1 - \left(\frac{1+g}{(1+r)}\right)^T\right]$$

3. Value of a Differential Growth Stock

$$P = \frac{Div_1}{r-g_1}\left[1 - \frac{(1+g_1)^N}{(1+r)^N}\right] + \frac{\left(\frac{\text{Div}_{N+1}}{r-g_2}\right)}{(1+r)^N}$$

4. Profitability index

$$\text{PI} = \frac{\text{Total PV of Future Cash Flows}}{\text{Initial Investment}}$$

5. Abnormal returns according to the market model

$$AR_{it} = R_{it} - \left(\alpha_i + \beta_i \cdot R_{mt}\right)$$

6. Critical value for the test statistic (test for non-zero abnormal returns) at the 5% significance level

1.96

7. Weighted average cost of capital in a world with corporate taxes (but without personal taxes)

$$r_{WACC} = \frac{B}{B+S_L} \times r_B \times (1-T_C) + \frac{S_L}{B+S_L} \times r_S$$

8. Return on equity in a world with corporate taxes (but without personal taxes; MMII with corporate taxes):

$$r_S = r_0 + \frac{B}{S} \times (1-T_C) \times (r_0 - r_B)$$

9. Value of the levered firm in the Miller model (MM with corporate and personal taxes)

$$V_L = V_U + \left[1 - \frac{(1-T_C)\times(1-T_S)}{1-T_B}\right] \times B$$

10. Value of the rights in rights offering , obtained from the ex-rights stock price M_e

$$R_e = (M_e - S) / N$$

11. Average cumulative abnormal return and the variance of the average cumulative abnormal return:

$$\overline{CAR}(\tau_1, \tau_2) = \frac{1}{N}\sum_{i=1}^{N} \widehat{CAR}_i$$

$$\text{var}\left[\overline{CAR}(\tau_1, \tau_2)\right] = \bar{\sigma}^2(\tau_1, \tau_2) = \frac{1}{N^2}\sum_{i=1}^{N} \sigma_i^2(\tau_1, \tau_2)$$