Guanghua School of Management Final Exam
Fall Semester, 2020-2021

Course: Corporate Finance (Course Number: E2833431)
Instructor: Jiangmin Xu
Exam Date: January 19, 8:30am to 10:30am Length: 2 hours

Student Name: **Student ID:**

Format: Closed book. Please write all your answers on the exam paper.

INSTRUCTIONS

You have 2 hours to complete this exam. This exam is strictly closed book and closed notes, except for one sheet of A4-sized paper with your notes/formulas written on both sides.

You are NOT allowed to use any electronic devices such as cell phones, PDAs, laptops, MP3 players, iPods, iPads etc. during the exam. Calculators are allowed, but you must NOT use any calculator-related apps on your electronic devices.

There are **15 questions** for a total of **100 points.** Use your time wisely.

To ensure fairness, you are requested to stop writing promptly at the end of the exam.

Please do not turn over this cover page, until requested.

1. (5%)

You are considering implementing a new system for your firm. The new system will cost a capex of $3 million today (year 0), but it will decrease the amount of inventory you have to keep starting right now (year 0). The current inventory requirement each year is 8% of next year's revenue. The new system, however, will reduce your inventory requirement each year to 6% of next year's revenue. There are no other effects from the new system. Suppose that the revenue is 20 million in year 1, and then it will grow at rate of 5% every year forever. Assuming that the tax rate is 0, the discount rate is 11%, what is the NPV of the new system? (Round your answer to 1 decimal place in terms of million.)

2. (5%)

A bond that pays coupon annually has face value of $1000 and annual coupon rate of 6% (its first coupon will be paid one year from now), its maturity date is 3 years from now and its yield-to-maturity is 4%. Using duration concept, what is the percent change in the price of the bond if its yield-to-maturity increases to 5%? (Your answer should be in percentages and round your answer to 2 decimal places.)

3. (5%)
There are two firms of A and B. Firm A's free cash flow (FCF) in year 0 right now is 100 million, while firm B's FCF in year 0 is 120 million. Firm A's FCF is expected to grow at 3% per year forever, while Firm B's FCF is expected to grow at 5% per year forever. The after-tax WACC is 12% for both firms.

Firm A is considering merging with Firm B. The merger will happen at the end of year 1. The after-tax WACC for the combined firm is 12%. The problem is that, the merger will deliver a growth synergy, but the synergy might not happen. Specifically, if the synergy is successfully implemented, the combined firm's FCF will grow at 6% each year forever (so after year 1, the combined firm's FCF grows at 6% each year forever). However, if the synergy fails to materialize, the combined firm's FCF will only grow at 2.5% each year forever. You know based on historical data that such synergies will succeed with a probability of 50%, but will fail with a probability of 50%. What is the expected enterprise value of the combined firm in year 0? (Round your answer to 1 decimal place in terms of million.)

4. (10%)

Your company is considering buying a delivery truck. If your company buys the truck, it costs $30,000 (capex) in year 0, which is depreciated over 5 years using the straight-line method. Starting in year 6, your company has to pay a maintenance cost (counted as SGA cost) of $3000 a year. The truck can be used for 8 years (i.e. years 1 through 8), and it can be sold at the end of year 8 for $20,000 (i.e. the sale creates a revenue in year 8). Assume that your company faces a tax rate of 35%, and the discount rate is 8%. What is the net present value of buying this truck to use for 8 years? (Round your answer to the nearest integer.)

5. (5%)

Coke has an earnings per share (EPS) of $1.55 this year (year 0) and a total payout rate of 75%. The risk-free rate is 3%, market risk premium is 4.5% and Coke's equity Beta is 0.58. In the next year (year 1), Coke's EPS will be 10% higher than its EPS this year. After next year, the earnings of Coke will grow at the constant rate of 4% a year. Coke's total payout rate does not change and is always 75%. Using the total payout model, what should be Coke's intrinsic stock price right now (at year 0)? (Round your answer to 1 decimal place)

6. (5%)

Garden Corp expects to have free cash flow in the next year (year 1) of $3 million, and its free cash flow will grow at a constant rate of 5% per year thereafter forever. Garden Corp has an equity cost of capital of 10% and a debt cost of capital of 6%, and it pays a corporate tax rate of 33%. If Garden Corp maintains a debt-equity ratio of 2.1, what is the present value of its interest tax shield? (Your answer should be in millions and round your answer to the nearest integer.)

7. (5%)

Assume that your company currently has 100 million shares outstanding with a market price of $30 per share and no debt. Your company has very stable earnings, and pays a 40% tax rate. Your company now plans to borrow $500 million on a permanent basis (permanent debt). Debt is fairly priced. After this borrowing, what will the value of the equity become? (Your answer should be in millions and round your answer to the nearest integer.)

8. (5%)
In the optimal leverage (trade-off) theory, what is the free cash flow hypothesis? And according to this hypothesis, how does leverage increase firm value?

9. (5%)

You are told that the market portfolio has a standard deviation of the return of 35%. Suppose company ABC has a standard deviation of the return of 40% and a correlation of the return with the market of 0.8. The company has a market capitalization of $50 billion, an enterprise value of $70 billion, and no cash. The debt of the company has a beta of 0.3.

Suppose equity holders plan to do a new investment of $10 million with similar risk to the rest of the firm. What is the minimum NPV such that this new investment has to generate so that it will benefit equity holders? (Your answer should be in millions and round your answer to 1 decimal place.)

10. (10%)
A firm's free cash flows (FCFs) are given as follows:

	Year 0	Year 1	Year 2	Year 3	Year 4
FCF (millions)	–3500	5500	5000	2500	1000

After year 4, the FCF will grow at 3% every year forever. Currently the firm is an all-equity firm without leverage. There is no cash. The risk free rate is 2%, market risk premium is 5%, and the firm's equity beta is 1.5. Now the firm uses leverage to change its capital structure. Because of the possibility of financial distress, the leverage affects the FCFs and changes them to the following:

	Year 0	Year 1	Year 2	Year 3	Year 4
FCF (millions)	–3500	4000	3000	2000	800

With leverage, after year 4, the FCF will grow at 2.5% every year forever. The firm's cash flows are unrelated to the state of the economy (risk is diversifiable), so the cost of capital (i.e., the appropriate discount rate) stays the same as before without leverage. What is the present value of the financial distress costs? (Your answer should be in millions and round your answer to 2 decimal places)

11. (10%)

Company NF's market value of debt is 25 million. The tax rate for NF is 35%. NF's cost of debt is 5% and its cost of equity is 12%. NF has 5 million shares outstanding and the market price of its stock is 25 per share. The company has cash of 10 million. Its free cash flow (FCF) in the current year (year 0) is 10 million. The FCF is assumed to grow at 2.5% forever.

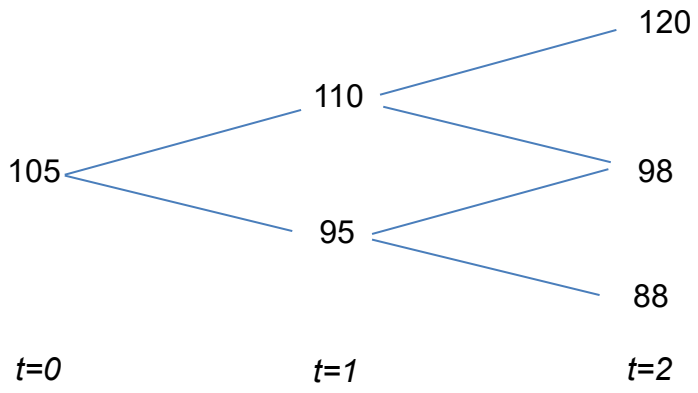
Another company, called HT, is going to acquire NF and has entered into a stock swap merger agreement with NF whereby the value of the synergy from the merger would be 40% of NF's **intrinsic equity value** (not market equity value). If HT's premerger stock price per share is 50, and NF's premerger stock price per share is the same as its current market price of 25 per share, what is the maximum exchange ratio that HT could offer in this stock swap and still generate a positive NPV? (Round your answer to 3 decimal places.)

12. (10%)
The following is the cash flow profile of a project (in millions) of your company. The project runs from year 0 to year 4. The tax rate is 40%.

Year	0	1	2	3	4
EBIT	5	20	20	20	20
Interest Expense	0	1.84	1.42	0.98	0.51
Pre-tax income	5	18.16	18.58	19.02	19.49
Depreciation	0	6	6	6	6
Capex	24	0	0	0	0
Increase in NWC	0	0	0	0	0
Net Borrowing	30.62	-6.92	-7.39	-7.89	-8.43

The project has the same risk as your company's equity. Specifically, your company's equity has a beta of 2. The risk-free rate is 3%, and market risk premium is 6%. What is the present value of this project using the **Flow-to-Equity** valuation method? (Your answer should be in millions and round your answer to 2 decimal places.)

13. (10%)
Consider the following binomial tree for a stock (price). Assume the risk-free interest rate r = 2.5% over any one period. The stock does not pay any dividend.



What is the price of an **American put** option with strike price K=100 at t=0? (Round your answer to 1 decimal place.)

14. (5%)

Consider a European Call on a company's stock with the strike price of $30 in the following two-period binomial model (the call expires in period 2). The current stock price of the company (at period 0, today) is $25 per share. In period 1, the stock price could become either $35 or $22. If the stock price is $35, then in period 2 it can change to $40 or $31. If the stock price is $22, then in period 2 it drops to $18 or rises to $32. The company does not pay dividends, and the risk-free rate over any one period is 4%. What is the price of the European call right now at period 0? (Round your answer to 1 decimal place.)

15. (5%)
Explain what are the two types of seasoned equity offerings, and what is the **one** key advantage that one type has while the other type does not?