Guanghua School of Management Midterm Exam

Fall Semester, 2020-2021

Course: Corporate Finance (Course Number: E2833431)
Instructor: Jiangmin Xu
Exam Date: November 17, 10:10am to 12:10pm 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 one side only.

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

There are **13 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%) A machine has a life time of 5 years (from year 1 to year 5). The machine is expected to produce a free cash flow of $1000 in year 1, then the cash flow will grow at a rate of 8% for two years, until year 3. After that, the cash flow will grow at a rate of 6% for two years, until year 5. Assume the appropriate discount rate is 10%. Today is year 0. What is the present value of the machine at today? (Your answer should be rounded to one decimal place)

2. (5%) Today is year 0, and you are considering the following choice. You can buy a warehouse today, and the cost of purchasing the warehouse today is $500,000. Instead, you can rent a warehouse forever, and the renting cost (which starts next year) is $20,000 in year 1, then it grows at a constant rate *g* forever. If the annual interest rate (discount rate) is 8%, what should be the growth rate *g* such that the renting choice is equivalent to the buying choice (equivalent in the present value sense)?

3. (5%) ABC Corporation has issued a corporate bond today with a three-year maturity and a face value of $100, and an annual coupon rate of 5%. Investors believe there is a 20% chance that ABC will default on the bond. If ABC defaults, investors expect to receive a cash flow of $73.5 on the maturity date. Today is year 0. You are given that the right discount rate to use for the bond's cash flows is equal to 12%. What is the price of this bond? (Your answer should be rounded to one decimal place)

4. (10%) A bond has face value of $100 and annual coupon rate of 6% (its first coupon will be paid one year from now), its maturity is 2 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 5.3%? (Your answer should be in percentages and rounded to two decimal place)

5. (10%) Yields (yield-to-maturity) of risk-free zero-coupon bonds with face values of $100 and maturities of 1 to 4 years are summarized below:

Maturity (years)	1	2	3	4
Yield	1.00%	1.50%	2.25%	3.25%

There is a 4-year maturity, risk-free coupon bond with an annual coupon rate of 6% (paying coupons annually) and a face value of $1000. What should be the price of the coupon bond?

6. (5%) Consider the following free cash flows of a project that lasts for two years. The project pays a cash flow of $1500 in year 0, $500 in year 1, and a negative cash flow of $−3000 in year 2. Assume that the appropriate discount rate is 10%. What is the NPV, and the internal rate of return (IRR), of this project? (Round your answer of NPV to one decimal place. Your answer of IRR should be a positive percentage number in two decimal places)

7. (10%) Consider a portfolio consisting of the following three stocks: AAA, BBB and CCC

	Portfolio weight	Standard deviation of stock return	Correlation with the market portfolio
AAA	0.2	16%	0.5
BBB	0.4	30%	0.8
CCC	0.4	25%	0.3

The standard deviation of the market portfolio return is 20% and the market portfolio has an expected return of 8%. The risk-free rate is 3%. According to CAPM, what is the expected return of this portfolio? (Your answer should be in percentages and rounded to two decimal place)

8. (10%) Halliford Corporation expects to have earnings per share in year 1 of $2 per share. Halliford plans to retain 90% of its earnings in year 1 and year 2. For year 3 and year 4, the firm will retain 80% of its earnings. From year 5 forward, it will retain a constant 25% of its earnings. Each year, retained earnings will be used for new investment with an expected return of 20% per year. Any earnings that are not retained will be paid out as dividends. Assume Halliford's total number of shares outstanding remains constant and all earnings growth comes from the investment of retained earnings. If Halliford's equity cost of capital is 12%, what price would you estimate for Halliford stock, using dividend discount model? (Round your final answer to **one** decimal place)

9. (5%) Today is year 0. The company ABC plans to pay $2.50 per share in dividends in year 1. After that, the dividends are expected to grow by 3% per year forever. The expected market return is 8%, and the risk-free rate is 2%. ABC has a beta of 1.2. Estimate the price of the ABC stock at today using the dividend discount model (DDM)? (Round your answer to one decimal place)

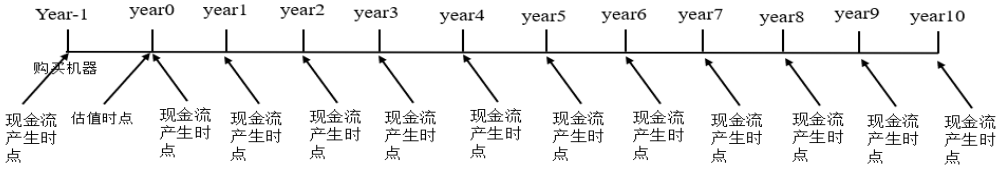
10. (10%) Today is year 0. The company XOM is expected to have an earnings per share (EPS) of $2.00 in year 1. It has a constant total payout rate of 70% every year. XOM has an equity cost of capital of 9%. After next year (year 1), the earnings of XOM will grow at the constant rate of 2% a year. The company is considering a new business strategy, which would increase the growth rate of the EPS after year 1 from a constant 2% a year to 4% a year, but it will decrease the total payout rate from 70% to 50% every year. The equity cost of capital of XOM does not change and is always 9%.

What is the change on the stock price of XOM at year 0 if the new business strategy is implemented, using the total payout model?

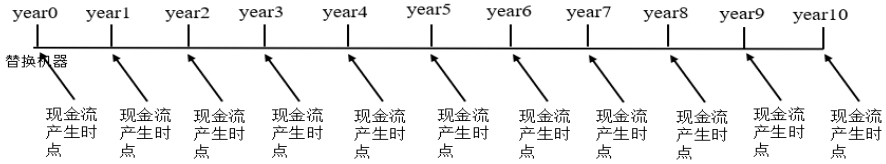
11. (5%) The company NAV has 100 million shares outstanding with a price of $36 per share. In addition, NAV has issued bonds with a total current market value of $900 million. Suppose NAV's cost of equity is 12%, and its cost of debt is 4%. What is NAV's after-tax WACC if the tax rate for WMT is 33%? (Your answer should be in percentages and in three decimal places)

12. (15%) One year ago, your company purchased a machine used in manufacturing for a cost of $121,000. You have learned that a new machine is available that offers many advantages; you can purchase it for a capex of $160,000 today (year 0). It will be depreciated on a straight-line basis over 10 years (so depreciation $16,000 per year), after which it has no (salvage/resale) value. If you buy the new machine today, it will start producing cash flows next year in year 1, and you expect that the new machine will produce an EBIT of $60,000 per year for the next 10 years (from year 1 to year 10). The current machine is expected to produce an EBIT of $30,000 per year. The current machine is being depreciated on a straight-line basis over a useful life of 11 years, after which it will have no (salvage/resale) value, so depreciation expense for the current machine is $11,000 per year. All other expenses of the two machines are identical. The market value today of the current machine is $117,000, so if you replace it with the new machine, you can sell the current machine today for a revenue of $117,000. However, if you replace the current machine today, you lose all types of cash flow produced by the current machine today, which also means that there is no depreciation either. Your company's tax rate is 40%, and the cost of capital for this type of equipment is 8%. What is the **incremental** net present value of replacing the current machine with the new machine, using the net present value (discounted free cash flow) method? (For this, we do **not** consider the cost of $121,000 that occurred one year ago as that cost was **not** paid by you, it does not affect your NPV calculation for **today**. Round your final answer to the nearest integer.)

现有机器的时间线



新机器的时间线



(Extra page for answering Question 12)

13. (5%)

(1) Outline how you would go from EBIT (earnings before interest and tax) to (unlevered) free cash flows, and how a change in the net working capital is calculated? (2%)

(2) Modigliani-Miller Theorem says that the more debt a company uses relative to equity in its capital structure, the lower the cost of capital the company will have. Is this correct or false? Explain. (3%)