TSE
Toulouse School of Economics
École d'économie de Toulouse

UNIVERSITÉ TOULOUSE 1 CAPITOLE

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Session 1

Semestre 2

Master 1 Economics & Econometrics & Statistics

Epreuve : Corporate Finance

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CORPORATE FINANCE

Exam - Duration: 1h30

PART I: Questions (No need to justify the multiple choice questions.)

1. Considering agency problem, what are the bright sides of debt? State two of them. For each of them, explain in one sentence the reason. **(2 points)**

2. Both the pecking order theory and the market timing theory are based on the following agency problem: **(1 point)**
   - ☐ Adverse selection – information asymmetries between firm's insiders (manager/board members) and outside investors.
   - ☐ Moral hazard – conflict of interests between shareholders and debtholders.
   - ☐ Moral hazard – conflict of interests between shareholders and manager.
   - ☐ All the above.

3. In a MM1 world, investors can undo the firm's financial decision by adjusting their own portfolio through financial markets. **(1 point)**
   - ☐ True
   - ☐ False

4. In a MM2 world with risk-free debt, **(1 point)**
   - ☐ All else equal, WACC of a leveraged firm is higher than that of an unleveraged firm.
   - ☐ All else equal, WACC of a leveraged firm is the same as that of an unleveraged firm.
   - ☐ All else equal, WACC of a leveraged firm is lower than that of an unleveraged firm.

5. Which of the following statements is correct? **(1 point)**
   - ☐ The option to expand increases PV.
   - ☐ High abandonment value decreases PV.
   - ☐ If a project has positive NPV, the firm should always invest immediately.

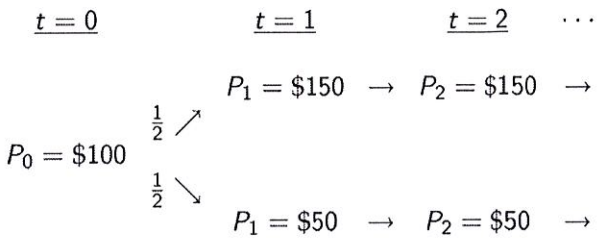
6. Comment on the statement: "I like the IRR rule. I can use it to rank mutually-exclusive projects without having to specify a discount rate." Is it correct or not? Why? **(2 points)**

7. What types of firms need to estimate industry asset betas? How would such a firm make the estimate? Briefly describe the process and provide the key formula. (Assume risk-free debt and no taxes.) **(2 points)**

PART II: Exercises:

Exercise 1: Real Options (4 points)

Consider building a widget factory that will produce one widget per year forever. Price of a widget now is \$100, but next year it will go up to \$150 or go down to \$50, and then remain fixed (in expectation):



Cost of factory is \$800, and it only takes a week to build. The discount rate is 10%.

a. Calculate the NPV if we invest now. **(1 point)**
b. Calculate the NPV if we wait one year and make the decision after observing the new price P_1. (Hint: Will we invest if P_1=\$150? Will we invest if P_1=\$50?) **(2 points)**
c. Should we invest now or later? Calculate the value of the timing option. **(1 point)**

Exercise 2: Risk-shifting (6 points)

Suppose a firm wants to invest in a new project and has raised enough cash. There are 3 possible outcomes: high cash flow (CF) \$100 m, medium CF \$60 m, and low CF \$20 m. If the entrepreneur manages the project in a cautious way, the probability distribution for high, medium and low CF is (0.1, 0.8, 0.1); if he chooses a reckless way, the distribution is (0.3, 0.2, 0.5). The entrepreneur is protected by limited liability. Both the entrepreneur and investors are risk-neutral and extremely patient (zero discount rate).

a. Which way is efficient? **(1 point)**
b. If the firm is all equity financed and the entrepreneur holds 50% of the firm, which way will the entrepreneur choose? **(1 point)**
c. If the firm has issued a standard debt with face value D=\$50 m, which way will the entrepreneur choose? **(1 point)**
d. Derive the upper bound of debt level D that will make the entrepreneur choose the efficient way. (Write down the incentive compatibility constraint.) **(1 point)**

Suppose the firm has issued a convertible bond C=\$50 m instead of a standard debt. The convertible bond holder can choose whether to convert the bond into equity, **after observing the realized CF and before the payoffs are given to all parties**. If convertible bond holder chooses not to convert, his payoff is exactly the same as if he holds a standard debt contract with face value \$50 m. If the bondholder chooses to convert it into equity, he obtains 80% of the firm's equity, leaving the entrepreneur with 20% of the equity, and the firm has no debt obligation anymore.

e. After the CF is realized and observed, under what CF (high, medium or low) will the bondholder choose to convert? **(0.5 point)**
f. Given the bondholder's converting decision, what is the payoff of the entrepreneur under high, medium and low CF, respectively? Which way will the entrepreneur choose? Comment on the result. **(1.5 points)**