國立東華大學管理學院 109 第 1 學期 財務管理 期中考試

✧ **計算題務必寫出過程、使用千分位符號(,)以及小數點標示清楚。**

✧ **滿分 120 分**

1. (5分) 請寫出：「我承諾此次考試絕對遵守考場規則。」

2. (15分) 代理問題。
   (1). (3分) 誰是公司的所有權人？
   (2). (3分) What does the phrase ***limited liability*** mean in a corporate context?
   (3). (3分) 為什麼公司 (股份有限公司) 可能會有代理問題？ (本題沒寫對倒扣5分)
   (4). (6分) 當敵意接管發生後，目標公司的可能抵抗策略有哪些（至少寫出三個策略，並簡述這些策略的意義）？

解答

(1) 股東。

(2) 股東的責任有限，以出資額為限。

(3) 公司的所有權與經營權分離 (本題答錯倒扣 5 分)

(4) （寫出三個策略，並簡述這些策略的意義）

目標公司的抵抗：①事前防禦策略：驅鯊條款 (shark repellent)、毒藥丸 (poison pills) ②事後防禦策略：說服股東、改變資本結構 (發行新股或買回庫藏股、大量舉債)、法律手段、焦土策略 (scorched earth policy)、賣掉皇冠鑽石、增加大量與經營無關的資產、反購併 (counter tender offer)、尋找白馬騎士 (white knight)、白衣護衛 (white squire)、黃金降落傘 (golden parachute)、中止協議 (standstill agreement)、綠色郵件 (green mail)。

3. (10分) 假如Orange公司目前需要向外籌措資金來支應新的投資方案，決定使用舉債的方式。請利用**「代理問題」**理論詳細說明市場投資人對於公司選擇這種融資方式的可能反應。

解答

因為舉債要付本金和利息，如果公司無法支付將會倒閉，經理人很可能失去工作，因此舉債可以讓經理人較不會浪費公司的自由現金流量，較不會因為資金太多而有代理問題 (譬如特權消費過度投資建立王國等等)

4. (10分) In July 2012, Citigroup (C) had a market-to-book ratio of 0.43, a reflection of investors' assessment that many of Citigroup's assets (such as mortgage securities) were worth far less than their book value. At the same time, the average market-to-book ratio for major U.S. banks and financial firms was 1.2, and for all large U.S. firms it was 2.3. In contrast, Pepsico (PEP) had a market-to-book ratio of 4.8, and IBM had a market-to-book ratio of 10.7.
   (1). (5 分) 請說明 market-to-book ratio 的定義和用途。
   (2). (5 分) 如果你是證券分析師，根據上述資訊，你會如何評價 Citigroup 股票？

解答

(1)

$$\text{Market-to-Book Ratio} = \frac{\text{Market Value of Equity}}{\text{Book Value of Equity}} \qquad (2.3)$$

The market-to-book ratio for most successful firms substantially exceeds 1, indicating that the value of the firm's assets when put to use exceeds their historical cost. Variations in this ratio reflect differences in fundamental firm characteristics as well as the value added by management.

(2)

注意重點要寫到同業的比較： MB 大於1 越大越好，Citigroup 是金融股，本身MB 小於1 且同業是1.2。其他大公司皆遠高於Citigroup MB，因此Citigroup 的績效不好。

(10分) 財務報表分析。

(1). (6 分) 何謂 EPS (定義)？請說明 stock options 和 convertible bonds 可能如何稀釋 EPS？

(2). (4 分) 請說明總資產週轉率的定義，並解釋總資產週轉率為何可以用來解釋公司營運的效率性？

解答

(有寫到重點即可)

(1)

EPS = 稅後淨利除以流通在外股數。

stock options

convertible bonds

$$\text{EPS} = \frac{\text{Net Income}}{\text{Shares Outstanding}} = \frac{\$2.0 \text{ Million}}{3.6 \text{ Million Shares}} = \$0.556 \text{ per Share} \qquad (2.5)$$

Although Global has only 3.6 million shares outstanding as of the end of 2018, the number of shares outstanding may grow if Global compensates its employees or executives with **stock options** that give the holder the right to buy a certain number of shares by a specific date at a specific price. If the options are "exercised," the company issues new stock and the number of shares outstanding will grow. The number of shares may also grow if the firm issues **convertible bonds**, a form of debt that can be converted to shares. Because there will be more total shares to divide the same earnings, this growth in the number of shares is referred to as **dilution**. Firms disclose the potential for dilution by reporting **diluted EPS**, which represents earnings per share for the company calculated as though, for example, in-the-money stock options or other stock-based compensation had been exercised or dilutive convertible debt had been converted. For example, in 2017, Global awarded 200,000 shares of restricted stock to its key executives. While these are currently unvested, they will ultimately increase the number of shares outstanding, so Global's diluted EPS is \$2 million/3.8 million shares = \$0.526.[7]

(2)

總資產週轉率=銷貨收入除以總資產

每單位資產能創造多少銷貨收入，因為能解釋公司營運(使用資產) 的效率性

5. (10分) Suppose you receive $100 at the end of each year for the next three years.

(1). (3分) If the interest rate is 7%, what is the present value of these cash flows?

(2). (3 分) What is the future value in three years of the present value you computed in (1)?

(3). (4 分) Suppose you deposit the cash flows in a bank account that pays 7% interest per year. What is the balance in the account at the end of each of the next three years (after your deposit is made)? How does the final bank balance compare with your answer in (2)?

解答

(1). $PV = \frac{\$100}{1.07^1} + \frac{\$100}{1.07^2} + \frac{\$100}{1.07^3} = \$93.46 + \$87.34 + \$81.63 = \$262.43$

(2). $FV = \$262.43 \times 1.07^3 = \$321.49$

(3). Year 1: $100

Year 2: $100 \times 1.07 + 100 = \$207$

Year 3: $100 \times 1.07^2 + 100 \times 1.07 + 100 = \$321.49$

6. (10分) You are the lucky winner of the $30 million state lottery. You can take your prize money either as (a) 30 payments of $1 million per year (starting today), or (b) $15 million paid today. If the interest rate is 8%, which option should you take?

解答

Problem

You are the lucky winner of the $30 million state lottery. You can take your prize money either as (a) 30 payments of $1 million per year (starting today), or (b) $15 million paid today. If the interest rate is 8%, which option should you take?

Solution

Option (a) provides $30 million of prize money but paid annually. In this case, the cash flows are an annuity in which the first payment begins immediately, sometimes called an **annuity due**.[6]

Because the first payment is paid today, the last payment will occur in 29 years (for a total of 30 payments). We can compute the present value of the final 29 payments as a standard annuity of $1 million per year using the annuity formula:

$$PV(\text{29 yr annuity of \$1 million/yr}) = \$1 \text{ million} \times \frac{1}{.08}\left(1 - \frac{1}{1.08^{29}}\right)$$
$$= \$11.16 \text{ million today}$$

Adding the $1 million we receive upfront, this option has a present value of $12.16 million:

Therefore, the present value of option (a) is only $12.16 million, and so it is more valuable to take option (b) and receive $15 million upfront—even though we receive only half the total cash amount. The difference, of course, is due to the time value of money. To see that (b) really is better, if you have the $15 million today, you can use $1 million immediately and invest the remaining $14 million at an 8% interest rate. This strategy will give you $14 million × 8% = $1.12 million per year in perpetuity! Alternatively, you can spend $15 million − $11.16 million = $3.84 million today, and invest the remaining $11.16 million, which will still allow you to withdraw $1 million each year for the next 29 years before your account is depleted.

7. (10分) You are **25** years old and decide to start saving for your retirement. You plan to save $5000 at the end of each year (so the first deposit will be one year from now), and will make the last deposit when you retire at age **65**. Suppose you earn 9% per year on your retirement savings.

(1). (5 分) How much will you have saved for retirement?

(2). (5 分) How much will you have saved if you wait until age **30** to start saving (again, with your first deposit at the end of the year)?

解答

(1)

可用查表： 5000*FVIFA(9%, 40) = 5000*337.882 = 1,689,410

(2)

5000*FVIFA(9%, 35) = 5000*215.711 = 1,078,555

8. (10分) Suppose that over the next year the economy is equally likely to strengthen or weaken. The table here shows the no-arbitrage prices of securities A and B that we calculated.

		Cash Flow in One Year	
Security	Market Price Today	Weak Economy	Strong Economy
Security A	231	0	600
Security B	346	600	0

(1). (5 分) What are the payoffs of a portfolio of one share of security A and one share of security B?

(2). (5 分) What is the market price of this portfolio? What expected return will you earn from holding this portfolio?

解答

(1). $A+B$ pays $\$600$ in both cases (i.e., it its risk free).

(2). Market price $= 231+346 = 577$. Expected return is $\frac{(600-577)}{577} = 4.0\%$

無風險利率為 4%

9. (15分) Suppose security C has a payoff of $600 when the economy is weak and $1800 when the economy is strong. The risk-free interest rate is 4%.

(1). (3 分) Security C has the same payoffs as which portfolio of the securities A and B in problem 9?

(2). (3 分) What is the no-arbitrage price of security C?

(3). (3 分) What is the expected return of security C if both states are equally likely? What is its risk premium?

(4). (3 分) What is the difference between the return of security C when the economy is strong and when it is weak?

(5). (3 分) If security C had a risk premium of 10%, what arbitrage opportunity would be available?

解答

(1). $C = 3A + B$

(2). Price of $C = 3 \times 231 + 346 = 1039$

(3). Expected payoff is $\frac{600}{2} + \frac{1,800}{2} = 1,200$; Expected return $= \frac{1,200 - 1,039}{1,039} = 15.5\%$

Risk premium $= 15.5 - 4 = 11.5\%$

(4). Return when strong $= \frac{1,800 - 1,039}{1,039} = 73\%$; return when weak $= \frac{600 - 1039}{1039} = -42\%$

Difference $= 73 - (-42) = 115\%$

(5) . Price of C given 10% risk premium $= \frac{1,200}{1.14} = \$1,053$

Buy $3A + B$ for 1039, sell C for 1053, and earn a profit of $1,053 - 1,039 = \$14$.

10. (15分) Suppose a security with a risk-free cash flow of $1000 one year from now trades for $909 today.

(1). (5 分) If there are no arbitrage opportunities, then the current risk-free interest rate is closest to ?

(2). (5 分) Suppose this risk-free security is trading for the price $890 today and the risk-free interest rate is the value you computed in (1). How could we profit from this situation?

(3). (5 分) Suppose this risk-free security is trading for the price $920 today and the risk-free interest rate is the value you computed in (1). How could we profit from this situation?

解答

(1) Rf = (1000/909)-1 =10%

(2)

	Today	In One Year
Buy the security	-890	+1000
Borrow from the bank	+909	-1000
	+19 (套利利潤)	0

(3)

	Today	In One Year
Sell the security	+920	-1000
Invest at the bank	-909	+1000
	+11 (套利利潤)	0