

國立中山大學 104 學年度轉學考招生考試試題

科目名稱：統計學【財管系三年級】

題號：743004

※本科目依簡章規定「不可以」使用計算機(問答申論題)

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注意：(i) 請依照題號，依序作答。

(ii) 如果算到小數點第三位仍無法除盡，請四捨五入至小數點第三位。

1. (本大題滿分為 38 分) We consider the following regression model:

$$Y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \varepsilon_i,$$

where the dependent variable is the price to earnings ratio (P/E) of firm i 's common stock, x_{1i} is the earnings per share (EPS), x_{2i} is the dividend yield, and ε_i is the error term. We assume that the error terms are normally distributed with a zero mean and identical variance. The sample size is 20. By using the ordinary least squares method and the statistics software, we derive Table 1 as follows:

Table 1

ANOVA					
	Degree of freedom	SS	MS	F	P-value
Regression	(A)	(B)	487.76	(C)	0.016
Residual	(D)	(E)	91.193		
Total	(F)	(G)			
Coefficients					
	Standard Error	t Stat	P-value		
Intercept	(??)	5.767	5.187	0.000	
EPS (x_1)	(H)	1.634	-3.258	0.005	
Yield (x_2)	(??)	1.798	0.806	0.431	

- (1) Please derive the values for (A)-(H). [NOTE: Please neglect the cells with (??) in this question.] (8 points)
- (2) What is the value of the coefficient of determination R^2 ? What does R^2 mean? (8 points)
- (3) Please provide the financial implication of "0.016 (the P-value)" in the ANOVA table of Table 1. [NOTE: First, you have to write the null hypothesis and the alternative hypothesis and explain why you reject or do not reject the null hypothesis. Then, you have to explain the financial implication.] (8 points)
- (4) Is β_1 significantly different from zero? Why? What is its financial implication? Use the 0.05 significance level. [NOTE: First, you have to write the null hypothesis and the alternative hypothesis and explain why you reject or do not reject the null hypothesis. Then, you have to explain the financial implication.] (8 points)
- (5) Please develop two regression models to test whether the CEO's experience of studying abroad affects the P/E ratio. [NOTE: You have to clearly define the variables.] (6 points)

2. (本大題滿分為 30 分) Explain the following terms with one example each. For each question, you will not get any points if you do not provide any example.

- (6) Point estimation. (6 points)
- (7) Unbiased estimator. (6 points)
- (8) Consistent estimator. (6 points)
- (9) Completely randomized design. (6 points)
- (10) Multicollinearity. (6 points)

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3. (本大題滿分為 32 分) 統計學為各大學財管系或財金系的必修課目，請問：

(11) 相關係數如何應用在建構資產投資組合？(8 分)

(12) 請寫出二項分配的機率質點函數；另外，二項分配如何運用在財務領域？(8 分)

(13) 假設兩母體皆為常態分配，在什麼情境下，可檢定兩獨立母體變異數是否相等？此時檢定統計量呈什麼分配？請標示自由度。(8 分)

(14) 迴歸分析如何運用於估計系統風險？(8 分)

[特別注意：本大題的各小題，請一定要鎖定於財務領域的直接應用，若你的答案與財務應用無關，或者與財務應用無直接關係，該小題以零分計算。另外，若有使用任何符號，請清楚定義之。]

背面有題

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Part I: 選擇題 (每題 2.5 分, 20 題, 共 50 分) 單選(選出最正確者)

1. Which one of the following is a source of cash?

- A. increase in accounts receivable
- B. decrease in common stock
- C. decrease in long-term debt
- D. increase in accounts payable
- E. increase in inventory

2. Which of the following questions are addressed by financial managers?

- I. Should the firm acquire new equipment?
 - II. Should customers be given 30 or 45 days to pay for their credit purchases?
 - III. Should the firm borrow more money?
 - IV. How should a product be marketed?
- A. I and IV only
 - B. II and III only
 - C. I, II, and III only
 - D. II, III, and IV only
 - E. I, II, III, and IV

3. Your grandmother has promised to give you \$5,000 when you graduate from college. She is expecting you to graduate two years from now. What happens to the present value of this gift if you delay your graduation by one year and graduate three years from now?

- A. remains constant
- B. increases
- C. decreases
- D. becomes negative
- E. cannot be determined from the information provided

4. Which one of the following statements correctly states a relationship?

- A. Time and present values are inversely related, all else held constant.
- B. Interest rates and time are positively related, all else held constant.
- C. An increase in the discount rate increases the present value, given positive rates.
- D. An increase in time increases the future value given a zero rate of interest.
- E. Time and future value are inversely related, all else held constant.

5. The two-stage dividend growth model evaluates the current price of a stock based on the assumption a stock will:

- A. pay an increasing dividend for a period of time and then cease paying dividends altogether.
- B. grow at a fixed rate for a period of time after which it will grow at a different rate indefinitely.
- C. pay a constant dividend for the first two quarters of each year and then increase the dividend the last two quarters of each year.
- D. increase the dividend amount every other year.
- E. pay increasing dividends for a fixed period of time, cease paying dividends for a period of time, and then commence paying increasing dividends for an indefinite period of time.

6. Which of the following statements related to the internal rate of return (IRR) are correct?

- I. The IRR method is tedious to compute without the use of either a financial calculator or a computer.
- II. The IRR that causes the net present value of the differences between two project's cash flows to equal zero is called the crossover rate.
- III. The IRR tends to be used more than net present value simply because its results are easier to comprehend.
- IV. Both the timing and the amount of a project's cash flows affect the value of the project's IRR.

- A. I and II only
- B. III and IV only
- C. I, II, and III only
- D. II, III, and IV only
- E. I, II, III, and IV

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7. Dexter Smith & Co. is replacing a machine simply because it has worn out. The new machine will not affect either sales or operating costs and will not have any salvage value at the end of its 5-year life. The firm has a 34 percent tax rate, uses straight-line depreciation over an asset's life, and has a positive net income. Given this, which one of the following statements is correct?
- A. As a project, the new machine has a net present value equal to minus one times the machine's purchase price.
 - B. The new machine will have a zero rate of return.
 - C. The new machine will generate positive operating cash flows, at least in the first few years of its life.
 - D. The new machine will create a cash outflow when the firm disposes of it at the end of its life.
 - E. The new machine creates erosion effects.
8. Depreciation:
- A. is a noncash expense which increases the net income.
 - B. increases the net fixed assets as shown on the balance sheet.
 - C. reduces both the net fixed assets and the costs of a firm.
 - D. reduces both taxes and net income.
 - E. decreases net fixed assets, net income, and operating cash flows.
9. Forecasting risk is defined as the possibility that:
- A. some proposed projects will be rejected.
 - B. some proposed projects will be temporarily delayed.
 - C. incorrect decisions will be made due to erroneous cash flow projections.
 - D. some projects will be mutually exclusive.
 - E. tax rates could change over the life of a project.
10. Which one of the following is the relationship between the percentage change in operating cash flow and the percentage change in quantity sold?
- A. degree of sensitivity
 - B. degree of operating leverage
 - C. accounting break-even
 - D. cash break-even
 - E. contribution margin
11. Which one of the following is represented by the slope of the security market line?
- A. reward-to-risk ratio
 - B. market standard deviation
 - C. beta coefficient
 - D. risk-free interest rate
 - E. market risk premium
12. The weighted average cost of capital for a firm may be dependent upon the firm's:
- I. rate of growth.
 - II. debt-equity ratio.
 - III. preferred dividend payment.
 - IV. retention ratio.
- A. I and III only
 - B. II and IV only
 - C. I, II, and IV only
 - D. I, III, and IV only
 - E. I, II, III, and IV
13. What is a seasoned equity offering?
- A. an offering of shares by shareholders for repurchase by the issuer
 - B. shares of stock that have been recommended for purchase by the SEC
 - C. equity securities held by a firm's founder that are being offered for sale to the general public
 - D. sale of newly issued equity shares by a firm that is currently publicly owned
 - E. a set number of equity shares that are issued and offered to the public annually

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14. Which of the following statements related to financial risk are correct?
I. Financial risk is the risk associated with the use of debt financing.
II. As financial risk increases so too does the cost of equity.
III. Financial risk is the risk that is inherent in a firm's operations.
IV. Financial risk is wholly dependent upon the financial policy of a firm.
- A. I and III only B. II and IV only
C. II and III only D. I, II, and III only
E. I, II, and IV only
15. The interest tax shield is a key reason why:
A. the required rate of return on assets rises when debt is added to the capital structure.
B. the net cost of debt to a firm is generally less than the cost of equity.
C. the value of an unlevered firm is equal to the value of a levered firm.
D. the cost of debt is equal to the cost of equity for a levered firm.
E. firms prefer equity financing over debt financing.
16. Stock splits can be used to:
A. adjust the market price of a stock such that it falls within a preferred trading range.
B. decrease the excess cash held by a firm thereby lowering agency costs.
C. increase both the number of shares outstanding and the market price per share.
D. increase the total equity of a firm.
E. adjust the debt-equity ratio.
17. The primary purpose of portfolio diversification is to:
A. increase returns and risks.
B. eliminate all risks.
C. eliminate asset-specific risk.
D. eliminate systematic risk.
E. lower both returns and risks.
18. Which one of the following statements is correct concerning the cash cycle?
A. Increasing the accounts payable period increases the cash cycle.
B. The longer the cash cycle, the more likely a firm will need external financing.
C. A positive cash cycle is preferable to a negative cash cycle.
D. The cash cycle can exceed the operating cycle if the payables period is equal to zero.
E. Offering early payment discounts to customers will tend to increase the cash cycle.
19. A \$1,000 face value bond can be redeemed early at the issuer's discretion for \$1,030, plus any accrued interest. The additional \$30 is called which one of the following?
A. dirty price B. redemption value
C. redemption discount D. original-issue discount
E. call premium
20. Money market securities have which of the following characteristics?
I. long maturities II. low default risk III. high degree of liquidity IV. high rates of return
- A. I and III only B. II and III only
C. I and IV only D. II, III, and IV only
E. I, II, III, and IV

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Part II 問答題 (20 分)

1. 近幾年，上市櫃公司經常實行庫藏股制度在市場上買回自己公司的股票，請站在公司的角度解釋實施庫藏股制度與發放現金股利有何異同？(10 分)
2. 請指出下列情況將會增加或者減少債券的到期收益率：(10 分)

(1)公司的債券評等下降	(2)債券附有償債基金條款
(3)債券附有可贖回條款	(4)債券為抵押擔保債券
(5)投資者風險趨避增加	

Part III 計算題(30 分)

1. NSYSU Foods

	2013	2014
Sales	\$5,000	6,000
Interest	300	400
Depreciation	200	300
Cash	100	150
Accounts receivables	1,000	1,200
Current liabilities	700	1,000
Inventory	1,500	1,500
Long-term debt	2,400	1,100
Net Fixed assets	4,000	4,000
Common Stocks	2,000	2,000
Taxes	600	700

What is the net working capital for 2014? (5 分)

2. Basketball player Jeremy Tsai contract in 2015. Recall that the contract called for \$10 million immediately and \$40 million in 2016. The remaining \$200 million was to be paid as \$50 million in 2017, \$50 million in 2018, \$100 million in 2019. 2 percent is supposed as the appropriate interest rate. In 2015, the contract was stated \$250 million value. Is the information right? Why? (5分)
3. NSYSU, Inc., is preparing to pay its first dividend. It is going to pay \$0.4, \$0.60, and \$1 a share over the next three years, respectively. After that, the company has stated that the annual dividend will be \$1.2 per share indefinitely. What is this stock worth to you per share if you demand a 10 percent rate of return on stocks of this type? (10分) (請劃出時間軸及列出算式)
4. Consider the following information on Stocks I and II:

State of Economy	Probability of State	Rate of Return if State Occurs	
	of Economy	Stock A	Stock B
Recession	0.06	0.15	-0.35
Normal	0.25	0.35	0.35
Irrational exuberance	0.69	0.43	0.45

The market risk premium is 5 percent, and the risk-free rate is 2 percent. The beta of stock I is _____ and the beta of stock II is _____. (請列出算式) (10 分)