

國立台灣科技大學九十六學年度碩士班招生試題

系所組別：財務金融研究所碩士班

科目：財務管理

[總分 100 分]

1. In one year the economy could be in one of three possible states: bust, normal or boom with corresponding probabilities of 0.25, 0.5 and 0.25. The returns on a common stock A and the market portfolio M conditional on the state of the economy are presented in the table below.

State	R_A	R_M	Probability
Bust	-0.05	0.03	0.25
Normal	0.10	0.08	0.50
Boom	0.25	0.13	0.25

- Find the expected returns of security A and the Market portfolio? (6%)
 - Find the variances and standard deviations of security A and the Market portfolio? (6%)
 - Find the covariance between the returns of security A and the Market portfolio and calculate their Betas? (6%)
 - Assuming CAPM is correct, what is the risk – free rate over the period? (6%)
 - What are the risk premiums of the risk free security, the market portfolio and security A? How could you explain them intuitively? (6%)
2. In a rational capital market, any systematic difference in the expected (average) returns of two securities must be a result of different exposure of the securities to economic risks. Suppose that all such risks are captured by a two-factor model. Their risk premia are 3% and 6%, for factor 1 and 2, respectively. The T-bill rate is 4%. Consider the following two securities:

$$E(r_A) = r_f + 0.2(F_1 - r_f) + 1.2(F_2 - r_f)$$

$$E(r_B) = r_f + 0.8(F_1 - r_f) - 0.4(F_2 - r_f)$$

- What are the expected returns of the securities? What are the expected returns of the factors? (8%)

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- (b) You decide to invest \$1,000 in security A and \$3,000 in security B. What is the expected return of the portfolio? Using the above APT – relation, what are the factor loadings (sensitivities) of the portfolio to both factors? When would you like to construct such a portfolio – illustrate with a real-world example? (12%)
3. NTUST Co. currently has EBIT of \$20,000 and is all-equity financed. EBIT is expected to stay at this level permanently. The firm pays corporate taxes equal to 35 percent of taxable income. The discount rate for the firm's projects is 10 percent.
- (a) What is the market value of the firm? (5%)
- (b) Now assume the firm issues \$40,000 of debt paying interest of 6 percent per year, using the proceeds to retire equity. The debt is expected to be permanent. What will happen to the total value of the firm (debt plus equity)? (5%)
- (c) Recalculate your answer to (b) under the following assumptions. The debt issue raises the probability of bankruptcy. The firm has a 30 percent chance of going bankrupt after 3 years. If it does go bankrupt, it will incur bankruptcy costs of \$200,000. The discount rate is 10 percent. Should the firm issue the debt? (10%)
4. The following table shows the sensitivities of two equity funds to a modified Fama-French three factors model.

Factor	Alpha	RMRF	SMB	HML	Momentum
Fund A	0.12%	0.8	0.6	-0.1	0.3
Fund B	0.13%	1.2	0.1	-0.09	-0.1

Alpha: The coefficient of the constant term in the regression

RMRF: Return on market portfolio minus the risk-free rate

SMB: Return on small firm stocks minus return on large firm stock

HML: Return on high book-to-market-ratio stocks minus return on low book-to-market-ratio stocks

Momentum: Return on the highest 30 percent last-period winner-stocks minus return on the lowest 30 percent last-period loser-stocks

Based on the above information, please analyze the investment philosophy of the managers of these two funds? (10%)

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5. Company C has the following capital structure, which is considered to be optimal:

Debt	35%
Preferred stock	15%
Common stock	50%
Total capital	100%

Company C's expected net income this year is \$17,142.86, the dividend payout ratio is 30 percent, the corporate tax rate is 40 percent, and investors expect earnings and dividends to grow at a constant rate of 9 percent in the future. Company C paid a dividend of \$3.6 per share last year, and its current stock price is \$60 per share. The Treasury bonds yield is 11 percent, the expected rate of return of the market portfolio is 14 percent, and Company C's beta is 1.51. In addition, the following terms would be applied to new security offerings:

Common stock: New common stock would have a flotation cost of 10 percent

Preferred stock: New preferred stock could be sold to the public at a price of \$100 per share, with a dividend of \$11. Flotation costs of \$5 per share would be incurred.

Debt: Debt could be sold at an interest rate of 12 percent.

- Find the costs of debt, preferred stock, retained earnings, and new common stock. (10%)
- How much new capital should be raised to maintain the optimal capital structure in the next year before Company C must issue new equity? (5%)
- What is the WACC when Company C meets its equity requirement with retained earnings? With new common stock? (5%)