

This paper is not to be removed from the Examination Halls

UNIVERSITY OF LONDON

279 0092 ZB

BSc degrees and Diplomas for Graduates in Economics, Management, Finance and the Social Sciences, the Diploma in Economics and Access Route for Students in the External Programme

Corporate Finance

Tuesday, 6 June 2006 : 2.30pm to 5.30pm

Candidates should answer **FOUR** of the following **EIGHT** questions: **ONE** from Section A, **ONE** from Section B and **TWO** further questions from either section. All questions carry equal marks.

A hand held calculator may be used when answering questions on this paper but it must not be pre-programmed or able to display graphics, text or algebraic equations. The make and type of machine must be stated clearly on the front cover of the answer book.

PLEASE TURN OVER

SECTION A

Answer **one** question from this section and **not more than** a further **two** questions. (You are reminded that four questions in total are to be attempted with at least one from Section B).

1. Portfolio Variance

You manage a large portfolio of Australian companies, composed of retail and telecommunications stocks. The retail stocks have an expected return of 5.7% and a standard deviation of 2.2%. The manufacturing stocks have an expected return of 9.5% and a standard deviation of 5.2%. The correlation coefficient between the two assets is -0.36 .

- (a) Derive the variance and return of the combined portfolio. **(4 marks)**
- (b) What are the weights in the mining and manufacturing firm portfolios that give the lowest variance of the combined portfolio? What is the return of this portfolio? **(8 marks)**
- (c) Draw the efficient frontier for the combination of these two assets if the correlation coefficient is (i) -1 , (ii) 0 , (iii) 0.5 or (iv) 1 .
(*You do not need to label exact values*) **(4 marks)**

A risk-free asset is now available and yields a modest 2.5%. Assume that the market portfolio's expected return is 6.5%.

- (d) What is the Capital Market Line (CML)? What is the market portfolio and who holds it in their portfolio? **(4 marks)**
- (e) What are the weights in the two stock types that give the market portfolio? **(2 marks)**
- (f) What is the slope of the CML? **(3 marks)**

PLEASE TURN OVER

2. **Bimodal options (put-call parity)**

Congratulations, you have been hired by one of the most prestigious Hedge funds in the UK: Queen's Hedge. Your job is to exploit mis-pricing by engaging in arbitrage.

- (a) In two sentences or less define the necessary attributes of a transaction that classify it as an arbitrage. **(3 marks)**

You observe a put option (P) trading at a price of £0.56 on a stock (S) that rises by 20% in a good state and falls 20% in a bad state. The probability of each state occurring is the same. The interest free rate is 5% p.a. and the exercise price (X) is £15. Assume the option is only exercised in a bad state.

- (b) What is the payoff of the option if the stock price today is S. What is the expected present value of this payoff? **(6 marks)**
- (c) What is the price of the stock today? (to one decimal place) **(6 marks)**
- (d) Given the price of the stock, can you infer the price of the call option (C) for the same exercise price? If yes, what is it? **(5 marks)**
- (e) Now assume that the market price of the call is £4.12. Explain how you would exploit mispricing by engaging in arbitrage [Draw a table with the stock (S), the exercise price (X) and the put (P)]. **(5 marks)**

3. Beta and CAPM

You are the project consultant for a large mutual fund. You are evaluating the performance of two portfolios: P(A) and P(B). You observe the returns of both portfolios for four periods. The risk-free rate is 2% per period. The information available is summarised in the table below:

	Returns (%)			
P(A)	-2%	5%	4%	12%
P(B)	-28%	28%	38%	-14%
R _m	-5%	6%	9%	13%

- (a) Calculate the average return and variance for the market portfolio, P(A) and P(B). **(6 marks)**

Hint:
$$Var(x) = \frac{1}{n} \sum_n (x_n - \bar{x})^2$$

- (b) What is the covariance of P(A) with the market portfolio? What is the covariance of P(B) with the market portfolio? Use your answers to calculate the β of each portfolio. **(8 marks)**

Hint:
$$Cov(x, y) = \frac{1}{n} \sum_n (x_n - \bar{x})(y_n - \bar{y})$$

- (c) What is the general form of the CAPM equation? What is the expected return of P(A) and P(B) according to the CAPM? **(6 marks)**
- (d) Comment on the observed average returns and those predicted by the CAPM. Provide two reasons for the observed differences? **(5 marks)**

PLEASE TURN OVER

4. **Fisher / NPV**

- (a) The Fisher separation theorem provides the basis for capital budgeting mechanisms. Draw the Fisher separation diagram and label it appropriately. Assume that the lending rate is equal to the borrowing rate. Derive the optimal actions (investment and financing) of an investor who only cares about future consumption. **(5 marks)**
- (b) Explain how the Fisher separation theorem justifies methods of project evaluation. **(6 marks)**
- (c) Describe market frictions that may lead to a breakdown in the Fisher separation theorem. **(4 marks)**

You are employed by General Product Ltd, the largest producer of toy tractors in the U.S. Your job is to choose between two machines used for the production of toy tractors. The discount rate is 7%. The costs are outlined below:

Cash flows £ ('000)					
Machine	c₀	c₁	c₂	c₃	c₄
A	-240	-120	-50	-25	-12
B	-120	-130	-140	-52	-45

- (d) Which machine would you choose based on the NPV rule? Justify your answer. **(4 marks)**
- (e) Would your answer change if the interest rate increased? [Do not provide numerical results, only intuition] **(6 marks)**

SECTION B

Answer **one** question from this section and **not more than** a further **two** questions. (You are reminded that four questions in total are to be attempted with at least one from Section A).

5. Market Efficiency

- (a) Define serial correlation in equity returns and provide empirical evidence on serial correlation in both short-term equity returns and long-term equity returns. **(7 marks)**
- (b) Provide and discuss empirical evidence on returns to investments in shares whose price is low relative to fundamentals such as earnings, dividends, the book value of equity, or cash-flows (as in Lakonishok, Shleifer, and Vishny, 1994). **(12 marks)**
- (c) How would Fama and French (1992) interpret the empirical evidence reported in (b)? **(6 marks)**

6. Agency Costs

- (a) Explain what the debt overhang problem is (following the lines of Myers 1977) make sure that you specify what the relevant conflict of interests is, what are the key necessary conditions for this problem to happen and what possible solutions could be used to tackle it. **(10 marks)**
- (b) Explain the 'risk shifting' or 'asset substitution' effect. Again make sure that you clarify which agents are in conflict and the necessary conditions for the problem to happen. **(10 marks)**
- (c) What could the firm do to avoid these problems? Argue your answer relating it to the levels of debt of the firm, the type of debt used, the rights of debtholders and shareholder. **(5 marks)**

PLEASE TURN OVER

7. Mergers and Acquisitions

- (a) Sirius has 20m shares outstanding that are currently selling at £10 per share. A raider believes that if she were to control 51% of the shares and implement some changes they would be worth £15 per share. The costs of mounting a takeover bid are £7.5m. She can accumulate 5% of the shares of the company before making a tender offer for an additional 46%. The stock market is efficient and shareholders behave rationally. Explain carefully whether the raider can make a profitable takeover bid. **(5 marks)**
- (b) Suppose that firm A wishes to takeover firm B. Details of the capital of the two companies are given in the following table:

	Firm A	Firm B
Share price	£20	£6
Number of shares	1m	0.5m
Market value of the firm	£20m	£3m

In addition, firm A expects to raise the value of firm B to £6m. There is symmetric information.

- i. Calculate the gain from the acquisition. **(3 marks)**
 - ii. Calculate the net gain of the acquisition to the shareholders of Firm A if A pays £8 per share in B. **(3 marks)**
 - iii. Calculate the net gain of the acquisition to the shareholders of Firm A if one share in A is exchanged for two shares in B. **(3 marks)**
 - iv. Explain why the cost of the offer with shares may be higher than the cost of the offer with cash. **(3 marks)**
- (c) Explain how the free-rider problem in takeover bids is affected by the ability to dilute minority shareholders and the ability to secretly accumulate blocks of stock in the target. **(8 marks)**

8. Capital Structure and Dividend Policy

Following the lines of the model by Ross (1977):

- (a) Explain how firms may use their capital structure to generate a signal that conveys credible information about their future expected returns. **(12 marks)**
- (b) In the Ross model, what is the 'ingredient' that precludes firms of a lower quality from behaving like firms of higher quality? **(6 marks)**
- (c) How would you generate a model of signalling through dividends that follows the same lines of the model by Ross? State the necessary conditions for this model and how signalling could be achieved. **(7 marks)**

END OF PAPER