

# EXAMINATION

18 April 2007 (am)

## Subject SA5 — Finance Specialist Applications

*Time allowed: Three hours*

### ***INSTRUCTIONS TO THE CANDIDATE***

1. *Enter all the candidate and examination details as requested on the front of your answer booklet.*
2. *You have 15 minutes at the start of the examination in which to read the questions. You are strongly encouraged to use this time for reading only, but notes may be made. You then have three hours to complete the paper.*
3. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
4. *Mark allocations are shown in brackets.*
5. *Attempt both questions, beginning your answer to each question on a separate sheet.*
6. *Candidates should show calculations where this is appropriate.*

### ***AT THE END OF THE EXAMINATION***

*Hand in BOTH your answer booklet, with any additional sheets firmly attached, and this question paper.*

*In addition to this paper you should have available the 2002 edition of the  
Formulae and Tables and your own electronic calculator.*

**1** The Modigliani and Miller proposition states that the market value of any firm is independent of its capital structure. In other words, it does not pay a firm to eliminate financial risk if shareholders can achieve the same result for the same or lower cost.

(i) Outline seven reasons why a firm may choose to hedge financial risk. [7]

Whisky is a popular drink which is typically aged for several years before being sold for consumption. It is relatively expensive and its price can be expected to rise in line with retail price inflation.

A large UK bank offers loans and other banking services to several Scottish whisky makers. For some years now the bank has been offering investors option contracts based on a standardised cask of whisky. The bank plans to approach a number of options exchanges for the purpose of introducing exchange traded whisky options.

(ii) Name and describe the operations of a suitable exchange in each of the USA, UK and Japan. [6]

A recently appointed Chief Financial Officer at a large specialist whisky maker has approached the bank seeking the bank's assistance in identifying and developing hedging strategies for the whisky maker's financial risks. The whisky maker's most recent balance sheet is given below.

<i>LIABILITIES in £m</i>		<i>ASSETS in £m</i>	
15 year fixed rate debt @ 8% p.a.	40	Stock in hand	70
5 year floating rate debt @ 6% p.a.	40	Property	10
Trade creditors	4	Fixed assets	5
Shareholders' funds	16	Trade debtors (see Note 1)	15
<b>TOTAL</b>	<b>100</b>	<b>TOTAL</b>	<b>100</b>

Note 1: £12m of the £15m of trade debtors is with respect to a single US based chain store. The whisky maker sells 80% of its whisky to the US and the chain store is the whisky maker's largest customer.

(iii) Discuss three of the largest financial risks facing the whisky maker. [9]

(iv) Construct and explain two hedging strategies involving forwards, futures, swaps and/or options for each of the three financial risks identified in item (iii) above. State any assumptions that you make. [12]

The Chief Financial Officer believes that the company could significantly increase its expected profits by speculating on the future price of whisky.

(v) Construct and explain three rational speculating trades that the whisky company might make involving forwards, futures, swaps and/or options. State any assumptions that you make. [9]

Pay-off diagrams are graphs showing the possible profits and losses from buying and/or selling options. They chart the profit and loss from trades on the  $y$ -axis against the value of the underlying asset on the  $x$ -axis.

(vi) For each of the following strategies:

- (a) name the strategy
- (b) sketch the pay-off diagram
- (c) state the trader's most likely reason for executing the strategy

- Buy one put option with a strike price of £1,050 at £73.70 and sell one put option with a strike price of £1,000 at £43. Both options have the same expiry date.
- Buy one call option with a strike price of £1,000 at £34 and buy two put options at £43 each with a strike price of £1,000. All options have the same expiry date.
- Buy one call option with a strike price of £950 at £60 and sell three call options with a strike price of £1,050 at £16.60 each. All options have the same expiry date.

[6]

(vii) (a) Define delta, gamma, and vega as used in the context of option trading.

- (b) Explain whether delta would be positive or negative for a short put trading position. A short put trading position means that the trader has sold a put option.

[5]

[Total 54]

**2** A life insurance company (the company) writes two types of product:

- A single premium investment bond. Bond charges are levied monthly and are equal to a fixed percentage of the funds invested. Premiums are invested in unit funds which are chosen by the bond holders from a list supplied by the company. The unit funds are priced daily by the company. Bond holders may cash in the value of their bond at any time for the full value of the units. The unit funds are managed by an external company.
- An immediate annuity contingent on the life of the annuitant plan holder. A charge is taken from every annuity payment. Premiums are invested in a mixture of gilts and corporate bonds by the company.

The company is open to new business.

The company is analysing the risks borne by its business and considering ways in which these risks can be managed.

- (i) (a) Identify the interest rate risks and market risks to which the company is exposed.
- (b) Discuss strategies that could be used to minimise these two risks.
- (c) Identify the costs to the company of adopting these strategies. [14]
- (ii) (a) Identify the principal credit risk carried by the company.
- (b) Describe how the structural approach could be used to measure this credit risk.
- (c) Discuss strategies that could be used to minimise the credit risks borne by the company and the implications of adopting those strategies. [13]
- (iii) (a) Define operational risk.
- (b) List six examples of operational risks borne by the company.
- (c) Describe the advanced measurement approach to quantifying operational risk and the situations in which it may be used. [10]
- (iv) (a) Describe the liquidity risks borne by the company.
- (b) Describe the techniques that may be used to control liquidity risk. [9]
- [Total 46]

**END OF PAPER**