

EXAMINATION

June 2014 (am)

Subject F105 — Finance and Investment Fellowship Principles

Time allowed: Three hours

INSTRUCTIONS TO THE CANDIDATE

1. *Use the instructions and password provided at the examination center to log in.*
2. *Submit your answers in Word format only using the template provided.*
3. *Save your work regularly throughout the examination on the supplied computers' hard drive.*
4. *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.*
5. *You must not start typing your answers until instructed to do so by the supervisor.*
6. *Mark allocations are shown in brackets on exam papers.*
7. *Attempt all six (6) questions, beginning your answer to each question on a new page.*
8. *Candidates should show calculations where this is appropriate.*

Note: The Actuarial Society of South Africa will not be held responsible for loss of data where candidates have not followed instructions as set out above.

AT THE END OF THE EXAMINATION

Save your answers on the hard drive AND hand in this question paper.

<p><i>In addition to this paper you should have available the 2002 edition of the Formulae and Tables and your own electronic calculator from the approved list.</i></p>
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QUESTION 1

Describe the three main forms of technical analysis.

[6]

QUESTION 2

You are the owner of a recently established technology company that provides proprietary software to large companies. The software has been developed overseas and your company has the rights to market it locally. The demand for your product has exceeded your expectations, and you would now like to expand both your staff complement and product suite. You will, however, require a significant capital injection to fund the expansion. You have decided to use private debt as a means of funding.

- i. Outline the main characteristics of the technology sector [3]
- ii. Define private debt, and outline the advantages and disadvantages of using this form of debt compared with listed debt funding. [4]

A portfolio manager who is looking to invest a portion of his fund in unlisted investments is considering investing in this debt issue, which is priced to yield a gross redemption yield (GRY) of 8.2% p.a. (convertible half-yearly) with term to maturity of 5 years. He would also like to offset the credit risk by entering into a credit default swap (CDS) on the debt issue, priced at 2.2% p.a. (payable half-yearly). The 5 year risk free rate is 5.7% p.a. (convertible half-yearly).

- iii. Outline possible reasons why the yield on the debt plus CDS package exceeds the risk free yield. [2]
- iv. List the credit events that could trigger the default payment, and outline two ways to settle a claim under the CDS. [4]

In addition to private debt, you would also like to use private equity as a means to meeting your capital requirements.

- v. Discuss the implications to your business of obtaining funding through private equity. [7]

[Total 20]

PLEASE TURN OVER

QUESTION 3

A non-profit organisation has recently received a R50 million grant for the deployment of an education project which it hopes to roll out nationally in two years' time, with expenditure occurring over the ensuing five years (the roll-out period). Development costs prior to roll-out are being funded from another source, so the organisation has approached two consulting firms for advice on investment of the R50 million in order to meet its spending objectives during the roll-out period.

The first firm has developed an investment strategy based on the optimisation of return using Modern Portfolio Theory (MPT) as proposed by Markowitz, and has recommended a portfolio which is far more heavily weighted towards equities and property than the strategy proposed by the second firm, based on a stochastic asset-liability modelling exercise. Both firms received the same input from the organisation with regard to its risk preferences, and the management committee have approached you to help them understand the differences and to provide a comprehensive outline of the investment-related risks that they should consider.

- i. Outline the definition of risk consistent with MPT and describe the characteristics of the portfolio, in the context of MPT, proposed by the first firm. [3]
- ii. Outline the definition of risk consistent with stochastic asset-liability modelling, and describe the process of performing a stochastic asset-liability modelling exercise to derive an investment strategy. [5]
- iii. Outline reasons for the proposals differing so significantly from each other. [3]
- iv. Describe briefly the primary risks related to the investment portfolio that the organisation should consider. [4]

[Total 15]

PLEASE TURN OVER

QUESTION 4

You are the South African portfolio manager of a global fixed-interest portfolio owned by a large local pension fund. A junior analyst has commented that he cannot understand the reasons for the existence of both price and yield indices.

- i. Outline three uses of yield indices, and explain how they can be used in the management of your portfolio.

[2]

An important aspect of managing your portfolio is hedging currency risk on offshore positions.

- ii. Outline the limitations in using forward contracts for hedging currency risk.

[3]

One of the largest holdings in your portfolio is a 20-year, zero-coupon, US government bond. This bond will most likely need to be sold in 5 years' time to meet pension fund outflows. As you are now concerned about rises in US long-dated interest rates once the US Fed starts to taper off its quantitative easing policy, you are considering selling the bond forward in Rands to remove both interest rate and currency uncertainty. You are given the following information:

- US and SA risk free yields are 1% and 7% respectively (annual effective) at all terms
- The Rand is currently at R10:1\$

- iii. Calculate the 5-year Rand forward price of the bond per US\$100 nominal.

[5]

Instead of selling the bond forward, you ask your analyst for the price of a 5-year European put option per \$100 nominal (strike of \$85) of the bond. The relevant forward yield volatility is 15%.

- iv. Using the Black-Scholes formula, calculate the 5-year European put option price in Rands.

[10]

[Total 20]

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QUESTION 5

A US-based life office manages a portfolio of with-profits endowment policies. The assets backing this book of business include a US equity portfolio with a market value of \$80 million and a US Treasury bond portfolio with a market value of \$60 million. The beta of the US equity portfolio is 1.2, measured against the S&P500, and the modified duration of the US bond portfolio is 6 years.

The life office's Investment Committee is of the view that US equities are likely to underperform the global market over the next six months, and that interest rates are due to rise in this period. It wishes to adopt a strategy to alter the exposure of the portfolio accordingly, and must choose between either decreasing the equity beta to 0.8 or increasing it to 1.5, and decreasing the modified duration of the bond portfolio to 4 years or increasing it to 8 years. The current S&P500 index level is 1,750 and futures contracts are priced at \$250 per index point; it may be assumed that the beta of an index futures contract is equal to 1. Futures contracts are also available on a Treasury bond index with a modified duration of 5 years, and are priced at \$100,000 each.

- i. Describe the S&P500 index, and discuss its merits as a benchmark for US equity performance relative to the Dow Jones Industrial Average and the NASDAQ 100. [5]
- ii. Evaluate which of the choices the Investment Committee should make for each of the US equity and bond portfolios; hence, determine how many futures contracts should be entered into each case, and whether the life office should take a long or short position in each. [4]
- iii. Discuss the residual risks which are not eliminated, or are created, by this partial hedging strategy. [4]
- iv. Discuss the advantages of this approach relative to transactions in the cash market to achieve the desired short-term exposure alteration. [4]

[Total 17]

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QUESTION 6

- i. Describe the policy of quantitative easing. [4]
 - ii. Briefly explain the repurchase transactions system (repo system) that a central bank may use as a primary tool in monetary policy. [3]
 - iii. Explain how a central bank can use the repo system to aid quantitative easing. [5]
 - iv. Briefly describe the principal dangers of quantitative easing. [4]
 - v. Define and briefly outline the key features of prospect theory, as used in behavioural finance. [3]
 - vi. Use prospect theory to explain why governments would utilise quantitative easing. [3]
- [Total 22]

END OF PAPER