**Faculty of Actuaries** **Institute of Actuaries**

# EXAMINATIONS

20 April 2004 (am)

## Subject 301 — Investment and Asset Management

*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 all 9 questions, beginning your answer to each question on a separate sheet.*

*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 Actuarial Tables and your own electronic calculator.*

**1** You are an institutional asset manager domiciled in a developed country.

(i) State with reasons the risk factors you would consider before investing in a Government Bond issued by your country. [6]

(ii) State with reasons what additional risk factors you would consider when investing in emerging market debt. [6]
[Total 12]

**2** A portfolio comprises the following assets:

- European equities to the value of €750m.
- European bonds to the value of €650m.
- Cash (including margin account) to the value of €150m.
- 350 short contracts of Dec 04 UK FTSE100 Index Future currently priced at 4225.
- 150 long contracts of Dec 04 UK Long Gilt Future currently priced at 106.11.

Calculate the effective fixed income, equity and cash proportions of the fund. [4]

**3** You work in the investment team of a life insurer which holds a large portfolio of investments. As part of a diversified property portfolio, you own an industrial unit with office space. The property is occupied by a single corporate tenant.

As part of the rent review process, the tenant has asked for a rent reduction suggesting 80% of the current rent should be paid.

(i) Describe the key features of industrial and office properties. [4]

(ii) Discuss four different options you have, commenting on the financial viability for each of the options. [8]
[Total 12]

**4** (i) Describe how the principle of the actuarial control cycle applies to the investment management of a fund. [3]

(ii) Describe the different levels of monitoring you would put in place in order to ensure the arrangements remained appropriate. [3]
[Total 6]

**5** (i) Describe what is meant by an Over the Counter (OTC) option. [2]

(ii) Describe the different ways in which a futures exchange could manage its credit exposure. [8]
[Total 10]

**6** (i) Describe briefly the method by which weighted arithmetic capital indices are constructed. [2]

(ii) Comment on why the current practice of index construction has moved to reflect the level of "free float" of shares available for purchase. [2]

(iii) Outline two other methods of constructing indices. [4]

[Total 8]

**7** Outline the issues you would need to consider in developing an investment strategy for each of the following investors:

(a) Contributions to a personal pension plan fund.

(b) The reserves of a general insurance company.

(c) The reserves of a large multi-national pharmaceutical company that has just raised a large sum through a rights issue for future product research and development.

(d) The $70 million investment portfolio of a wealthy family.

(e) A charity.

[15]

**8** A researcher has compiled a data set showing the annual returns (inclusive of dividends) of the stock market in a developed country for each calendar year starting in 1903 and ending in 2002 (both the calendar years 1903 and 2002 are included in the data set). The range of returns for the overlapping 20-year periods in the data set runs from 4.5% to 15.6%. It has been suggested that you can use this data to forecast future 20-year returns.

(i) Comment on the difference between the numerous overlapping and five non-overlapping periods as forecasts of future returns from the equity market for 20-year periods. [1]

(ii) Comment on using the non-overlapping 20-year periods to test the statement "Equities always give a positive return in the long term" where 20 years is regarded as "long term". [3]

(iii) Outline the main factors that influence equity returns. [3]

(iv) The researcher has discovered that this market has delivered higher returns with lower volatility than all of the other major developed markets in the world over the period from the start of 1903 to the end of 2002. Discuss the implications of this finding of the researcher for the statement in part (ii) again assuming that 20 years is regarded as the "long term". [8]

[Total 15]

**9** The trustees of a charity whose assets have a market value of £1 billion have directed that 60% of the fund be invested in equities tracking the FTSE Actuaries All Share Index and 40% be invested in bonds tracking the FTSE Actuaries All Stocks Bonds Index (the benchmark indices).

During 2003, the fund manager believed that equities would perform better than debt as growth prospects for the UK economy were improving. Hence at the start of the year he placed £800 million in equities and the balance of £200 million in short bonds. He reinvested dividends and coupons in the respective sector as soon as they were received. New money was invested in the ratio of 80:20 for equities and debt. The following data has been provided.

| | *FUND VALUE* | | *Net contribution received from* |
|---|---|---|---|
| *Date* | *Equities* | *Short Bonds* | *charity at the beginning of the quarter* |
| 1/1/03 | 800 | 200 | +200 |
| 31/3/03 | 885 | 230 | +180 |
| 30/6/03 | 1,030 | 245 | –100 |
| 30/9/03 | 1,000 | 230 | –150 |
| 1/1/04 | 1,150 | 275 | |

| | *Benchmark Returns (% per quarter)* | | |
|---|---|---|---|
| *Return* | *Equities (income reinvested)* | *Bonds all stocks* | *Bonds <5 years* |
| Q1 | 10.0 | –9.0 | –5.0 |
| Q2 | –2.0 | –15.0 | –8.0 |
| Q3 | 5.7 | –3.0 | +2.0 |
| Q4 | 3.5 | 2.0 | +6.0 |

(i) Calculate money weighted and time weighted rates of return for the overall fund in 2003 stating any assumptions that are made. [4]

(ii) For each quarter allocate the difference between the fund’s rate of return and the return on the benchmark between:

(a) that which is attributable to stock selection;
(b) that which is attributable to asset allocation; and
(c) that which is attributable to bond duration selection. [11]

(iii) Give brief comments on the performance of the fund manager. [3]

[Total 18]

## END OF PAPER