

## EXAMINATIONS

April 1997

### Subject E — Investment and Asset Management

#### *Paper Two*

*Time allowed: Three hours*

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

1. *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.*
2. *You must not start writing your answers in the booklet until instructed to do so by the supervisor.*
3. *Write your surname in full, the initials of your other names and your Candidate's Number on the front of the answer booklet.*
4. *Mark allocations are shown in brackets.*
5. *Attempt all 5 questions, beginning your answer to each question on a separate sheet.*

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

*Hand in BOTH your answer booklet and this question paper.*

*In addition to this paper you should have available Actuarial Tables and an electronic calculator.*

- 1 Pension fund trustees have selected a segregated fund management company to invest £100 million of their assets. The money allocated is to be invested in a balanced fund consisting of UK equities and UK bonds. The pension fund trustees have set a fund benchmark weighting of 60% UK equities and 40% UK bonds with rebalancing at the end of every quarter. Benchmark indices for UK equities and UK bonds have been agreed. At the fund management company, responsibilities are allocated as follows; an asset allocator decides on the balance of the fund between UK bonds and UK equities, while the management of the equities and bonds are given to two other managers.

Fund values (£ million) over the year are as follows:

	<i>End of Q1</i>	<i>End of Q2</i>	<i>End of Q3</i>	<i>End of Q4</i>
UK Equities	96.000	102.080	63.220	66.065
UK Bonds	20.000	24.360	56.898	48.047

For the first two quarters the asset allocator invested the fund in the ratio of 80% equities to 20% bonds and for the final two quarters invested in the ratio of 50% equities to 50% bonds.

No net new money came into or out of the fund and at the end of each quarter the fund was rebalanced to reflect the asset allocator's choices.

The performance of the designated benchmark indices were as follows:

	<i>Q1</i>	<i>Q2</i>	<i>Q3</i>	<i>Q4</i>
UK Equities	+10%	+5%	+0%	+0%
UK Bonds	+10%	+10%	+0%	-10%

You have been appointed by the pension fund trustees to measure the performance of the fund in relation to its benchmark and to assess the performances of each of the asset allocator, the UK equity fund manager and the UK bond manager.

- (i) Calculate the performance of this fund relative to the stated benchmark. [5]
- (ii) Calculate the individual contributions to performance from the asset allocator and from each of the two fund managers. [9]
- (iii) Comment on the respective performances of each of the asset allocator and the other 2 managers and specify the limitations of the analysis. [6]
- (iv) No account of fund risk has been considered in the above performance attribution. State with formulae three different risk adjusted fund measures. [3]
- [Total 23]

- 2** A large long established company in the UK has a final salary pension fund with assets of around £1,000 million which is fully invested in quoted securities in the following proportions:

UK Equities — 80%

Overseas Equities (Japan, US, Continental Europe) — 10%

British Government Stocks — 10%

- (i) Discuss in detail the investigations you would carry out on the assets and liabilities to determine the appropriateness of the current investment strategy. [8]

A more typical investment allocation of UK pension fund assets would be:

UK Equities — 55%

Overseas Equities — 25%

British Government Stocks — 7%

Overseas Bonds — 5%

Property — 2%

Cash — 6%

- (ii) Comment briefly on the likely relative past performance and risk of the current asset mix when compared with the more typical allocation. [5]
- (iii) Explain methods by which a change in policy towards a more typical asset allocation structure might be implemented, and the costs involved in each method. [8]

[Total 21]

- 3** You are the investment manager of a maturing UK pension fund in which it is likely that outgo will exceed income over the next few years. The fund is currently fully invested in UK equities, UK property, overseas equities, fixed interest and index linked gilts.

- (i) Discuss briefly the current economic outlook and its possible effect on the prospects for each of the five asset classes over the next two years. [10]
- (ii) Suggest short-term and long-term changes in investment strategy you would put to the trustees to accommodate the net cash outflow which is in prospect. [10]

[Total 20]

4 You are the actuary to a well funded pension fund with market value of assets equal to £10 million. A valuation of liabilities, using a long term rate of interest of 9%, has just been completed. This has revealed that around 40% of the fund's liabilities are fixed in nature. You are now about to assess the value of the assets which are split 75% equities and 25% gilts. The equity portion currently yields 5% and the gilts portion yields 8%.

- (i) Explain briefly the obligations placed on the actuary by GN9 in respect of the valuation of the assets and liabilities of a pension fund. [2]
- (ii) Explain why valuing the assets using a simple market value approach may not be appropriate. [3]
- (iii) Explain an alternative method of valuing the assets which you consider more appropriate. Stating any assumptions, calculate a value based on the current portfolio. [4]
- (iv) The investment manager of the fund has become more bullish on the prospects for the equity market and proposes to switch a further 10% out of gilts. The trustees have asked you to comment on this proposal and on the effect that such a switch would have on the fund's ability to meet its emerging liabilities.

Discuss the points you would make in response to the trustees, mentioning any other asset valuation methods which may be appropriate, and explain how the asset values might compare with the values calculated earlier. [7]

[Total 16]

**5** You are a consultant to a large investment fund which currently has \$100 million invested in US equities. As a result of a recent asset allocation meeting, the decision has been taken to invest a further \$300 million in US equities by selling the corresponding amount of UK equities. The asset allocation team has emphasised the need for the switch to go ahead as soon as possible.

- (i) Describe the practical problems of carrying out such a switch without the use of derivatives. [4]
- (ii) Explain how this switching process can be made easier by the use of derivatives. [4]

You decide to buy US equity exposure by buying the S&P500 June futures contract. You know that you have sufficient cash to cover the margin position. The unit of trading is \$500 per index point and you have been quoted a price of 600 for the June contract.

- (iii) Calculate the number of contracts you would need to buy to gain the required US equity exposure. [2]

Prior to this new US equity investment, the fund had no holdings in the technology sector. Technology stocks constitute 12% of the S&P500 index.

- (iv) Calculate the exposure of the fund to Technology after the purchase of the futures. [1]
- (v) Discuss briefly methods by which you might attempt to eliminate the Technology weighting. [6]

The asset allocators of the fund are bullish on US stocks, but they are worried about the level of the dollar which they think may depreciate in the short-term against sterling. As a result they would like only one half of the fund exposed to the dollar.

- (vi) Explain how you might achieve this reduced exposure, including in your answers details of the problems that would have to be overcome. [3]

[Total 20]