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

# REPORT OF THE BOARD OF EXAMINERS ON THE EXAMINATIONS HELD IN

April 2002

## Subject 401 — UK Fellowship Investment

## Paper One

**Introduction**

The attached subject report has been written by the Principal Examiner with the aim of helping candidates. The examiners are mindful that a number of interpretations may be drawn from the syllabus and Core Reading. The questions and comments are based around Core Reading as the interpretation of the syllabus to which the examiners are working. They have however given credit for any alternative approach or interpretation which they consider to be reasonable.

The report does not attempt to offer a specimen solution for each question — that is, a solution that a well prepared candidate might have produced in the time allowed. For most questions substantially more detail is given than would normally be necessary to obtain a clear pass. There can also be valid alternatives which would gain equal marks.

K Forman
Chairman of the Board of Examiners

25 June 2002

# EXAMINERS' COMMENTS

**General Observations:** We were disappointed that candidates failed to read properly a number of the questions and use the information given. As in past years we would emphasise that there are no 'tricks' to questions and information given is there for a reason. Answers require to be specific to the question set and not a ramble through the candidate's knowledge of the subject. However, in many cases candidates fail to make obvious points that are relevant to the answer because they are rambling.

**Q1** Bookwork that was well answered.

**Q2** This was a good example of the general observation. All but a few candidates talked about index selection in general rather than relating it to the specific. Consequently the average mark for this question was poor.

**Q3** Generally well answered.

**Q4** A poorly answered question with candidates not covering many of the obvious issues that would need to be thought about.

**Q5** Standard of answer varied widely, suggesting that candidates either understood options or did not.

**Q6** Generally well answered.

**Q7** Straightforward and generally well answered.

**Q8** This was another example of the general observation. Instead of accepting the investment policy as fact and creating an appropriate benchmark, a number of candidates argued for different policies.

**Q9** Most candidates made a reasonable attempt at this.

**1** (a) Exempt from income tax and capital gains tax on their investments
They can reclaim from the Inland Revenue any income taxes deducted at source on interest…
…but not the tax credit attaching to dividend payments.
In the case of overseas investment income, withholding tax deducted in the host country cannot be recovered.

(b) Pay corporation tax at the special rate of 20% on unfranked investment income less management expenses.
Franked investment income is not subject to further corporation tax.
Exempt from capital gains tax.

(c) Pay corporation tax at a rate of 30% on unfranked income.
Management charges…
…and interest charges can be offset against such income
Net franked investment income is not subject to further corporation tax.
Approved investment trusts are exempt from capital gains tax.

**2** **Benchmark**

Choice of benchmark is crucial for an SRI fund.
The most important decision is whether to have a standard investment index as a benchmark…
…such as FTSE World or MSCI World…
…or one of the relatively recently launched…
…specialist SRI indices as a benchmark…
…such as FTSE4GOOD or Dow Jones Sustainability. A customised benchmark would also be possible although more difficult to explain.

The possible advantages for a standard index benchmark are:

- by choosing to be measured against a standard market benchmark, it demonstrates fund manager belief that investors will not sacrifice performance by choosing an SRI fund
- allows fund manager larger opportunity set for investment, since SRI universe based on SRI index benchmark likely to be smaller

The possible disadvantages for a standard index benchmark are:

- fund manager will need to do extra layers of SRI screening of all stocks in the standard index benchmark that is effectively already done by the creation of an SRI index containing stocks already screened as being suitable
- fund manager will have to define own version of what "SRI" means
- greater risk that stocks will be bought which do not meet SRI criteria because own screening process not thorough enough when researching stocks
- considerable research function required to cover stocks in standard index which are based outside of UK — it can be argued that SRI perhaps needs "extra" research in order to effectively screen…

…..although many non-SRI fund mangers would argue that research to the level required to spot SRI issues is essential for them also, since these issues can often affect stock price

The possible advantages for a specialist SRI index benchmark are:

- ready made definition of "SRI"
- there is little evidence to suggest how SRI indices perform relative to their standard index counterparts — SRI index benchmark may outperform standard market index

The possible disadvantages for a specialist SRI index benchmark are:

- there is little evidence to suggest how SRI indices perform relative to their standard index counterparts — SRI index benchmark may underperform standard market index

The following are acceptable as benchmarks:

- a global equity benchmark that represents the investable universe
- a competitor benchmark

**3** (i) Contract size
Delivery dates
Quality of the product
Method of packaging
Package size
Delivery site
Method of resolving disputes about quality
Sometimes variation may be permitted in…
…quality…
…method of packaging…
…delivery site…
and so a discounted price must be allowed for.

(ii) Commodity futures and forward contracts are used for risk management by commodity producers who wish to reduce uncertainty in the future cash flows that they will receive for their product…
…and…
…commodity consumers who wish to reduce the uncertainty in the amount they will have to pay for their future supplies.

Such users of futures contracts are contracting to supply or to take delivery of a specified quantity of the commodity at some future date.
The reduction in uncertainty has a cost in reduced flexibility…
Particularly for consumers who are likely to be less certain of the amount raw materials they will require in the future…
…than producers are of the amount they will wish to sell.

Even such commercial users of commodity futures may not deliver, or take delivery of, the physical commodity.

They may, for example, be using the contracts to hedge against the movement in price of a related product — such as a product of different grade to that specified in the futures contract.

The requirement of producers to guarantee future prices is generally greater than the willingness of consumers to commit themselves to futures contacts…
…and therefore external capital is required to ensure market equilibrium. This will only be forthcoming if the price producers are prepared to pay for guaranteed future prices is high enough to provide a sufficient expected return for investors.

**4** The information required can be divided into three sections: information on the airfield, information on the operator and information on the plans the operator has to develop the airfield.

Airfield:

Are there any restrictions regarding night flying?
How long is runway?
What is the situation regarding the buildings on the airfield?
How close are other airfields?
What is the local transport system like?
Are there any restrictions on use e.g. does the airfield need to be able to be used by the military in times of war?
Who owns the surrounding land?
Is there a large residential area nearby?
What do local planning regulation permit?
Are there likely to be any environmental liabilities attaching to the site?

Operator:

How successful has the operator been?
How different will this operation be compared to others that the operator has undertaken?
Has the operator the depth of management to take on this airfield?
What is the current financial state of the operator e.g. how strong is the balance sheet and how profitable is the current business?
Have you had dealings with the operator previously?

Plans:

What commitment is the operator looking for from the venture capitalists?
How will the funding be structured e.g. loan capital, preference capital, equity?
When will the funds be required?
How many other institutions will be involved?
Who is the lead manager?
Does the project meet/exceed the venture capitalist's financial criteria?

What plans does the operator have for the airfield?
What is the competitive threat?
Are the forecasts reasonable based on the past performance of the operator and the current business plan?
How quickly will the returns to the venture capitalist fall if there is a downturn in the business i.e. how operationally geared is the operation?
What is the exit route for the venture capitalist e.g. flotation, trade sale etc. and how soon is the exit envisaged?
Will the returns to the venture capitalist be based solely on the new airfield or will they be more broadly based on the whole company's performance?
Will the venture capitalist have Board representation?
What is the maximum price the operator is prepared to bid?
What is the cost of bidding and who will bear these costs in the event the bid fails?
Are there any synergies with the operator's current operations?
If the venture fails what security will the venture capitalist have?
If the venture fails are there any alternative uses for the airfield?
What are the principle risks to the project?
What are the views of the potential customers/regulators and local planners?
The cost and extent of planned work on the airfield should be considered.

**5** (i) The analyst feels that the share price is partially discounting the company winning the contract.

Assuming that to be true it is likely that if the company wins the contract then the share price will rise, if, alternatively the company does not win the contract then the share price will fall.

A suitable option strategy needs to allow the fund to profit from either a rise or a fall in the share price.

Such a strategy is called a strangle.

In a strangle the fund buys a put and a call with the same expiration date and different strike prices.

The fund manager must ensure that the date of expiration is after the date when the contract will be announced.

The put would be bought with a strike price below the current price.

The call would be bought with a strike price above the current price.

If the company wins the contract then the share price will rise giving the fund a profit from the purchase of the call. The fund would incur a loss on the purchase of the put.

If the company did not win the contract then the share price would fall and the fund would profit from its purchase of the put but make a loss from its purchase of the call.

It is important when setting up the strangle to satisfy oneself that the expected profit will exceed the expected loss, this can be done by careful selection of both the strike price and the expiry date.

*This solution is the basic one. A written strangle would be acceptable although it does expose the strategy to more risk. A butterfly limits this risk and so would likewise be acceptable. Consequently reasoned answers using both these strategies were acceptable and given marks accordingly.*

(ii) In this case an option strategy is required that will produce a profit assuming the share price does not change in the next six months.

There are a number of potentially profitable strategies available to the fund manager. The simplest is the writing (or sale) of a put or a call.

When a put or a call is written or sold the writer receives a premium, assuming the share price doesn't move beyond the strike price, then the premium represents the profit on the trade.

If, in this case, a call were written at say a 10% premium to the current share price, then the fund manager would receive the premium from the purchaser of the call. If the share price rose by over 10% then the writer of the call may be called upon to deliver the shares to the purchaser of the call at the strike price of the option.

If the share price does rise above the share price then it is likely that the writer of the put will make a loss.

If the writer of the put does not hold the underlying shares then this is referred to as "naked writing". If this were the case and the trade went against the writer then they would have to buy shares in the market and sell them to the purchaser at the strike price, the strike price being lower than the price they paid.

In the fund manager chose to write puts instead then the opposite would occur and they would lose money if the share price fell below the strike price.

(iii) A calendar spread is created when options used to create a spread have the same strike price but different expiration dates.

The spread can be created by selling a call option with a certain strike price and buying a longer maturity call option with the same strike price.

A calendar spread can involve either two calls or two puts.

The longer the maturity of an option the more expensive it is, a calendar spread therefore involves initial investment.

Assuming that the long-maturity option is sold when the short-maturity option expires the profit pattern given by a calendar spread is:

The investor makes a profit if the stock price at the expiration of the short-maturity option is close to the strike price of the short-maturity option. However, a loss is incurred when the stock price is significantly above or significantly below this strike price.

(iv) In a diagonal spread both the expiration date and the exercise price differ in the two options involved.

In a calendar spread the exercise price is the same for the two options, only the expiration date differs.

**6** (i) Mortgage backed securities result from the securitisation of a collection (book) of mortgages.

The lender of the mortgages transfers the rights to the income and capital repayments to the purchasers of the mortgage backed securities.

The purchaser pays the original lender an amount to receive these rights.

The original lender continues to service the loan, collecting capital and interest payments.

The lender passes these payments through to the current owner of the MBS.

The payments are received are passes through to every MBS holder pro-rata to their holding.

Hence the name pass through securities.

(ii) With a straightforward MBS the purchaser is at risk of early prepayment because individual householders can repay their mortgages at any time during the life of the mortgage.

Collateralized mortgage obligations (CMOs) are an attempt to manage the prepayment risk from a pool of mortgages by splitting the securities issued into different classes or tranches.

CMOs are therefore a subset of MBS.

Each tranche receives interest payments at the rate specified in the mortgages in the pool.

The capital repayments are directed at each tranche in turn until the tranche is paid off, then the repayments are directed at the next tranche.

CMOs may also include structures which define maximum and minimum rates of repayment in each class, further reducing the prepayment risk to the holder.

(iii) From part (ii) it can be seen that within an MBS there is an embedded call option which the investor has sold to the mortgage borrower.

The borrower may repay the mortgage early and the investor has no power to influence this decision.

The information required to calculate the value of the embedded call is:

The discount rate to be used.
The normal repayment dates of the mortgages.
The nominal rates of interest paid on the mortgages.
The current price of the MBS.
The amount borrowed under the mortgages.

Using this information the present value of the mortgages can be calculated assuming there is no call option.

The value so calculated can be compared with the current value of the MBS and the difference will represent the value of the call option.

"Cost of carry and time value" equate to discount rate and time to maturity (repayment dates of mortgages)

**7** The problems associated with the construction of a property index are:

No index can truly represent the property market as all properties are unique.
The valuation of property in subjective.
The valuation of the constituents is rarely carried out at the same time.
Portfolio based indices give different results based on the underlying portfolio used.
There are difficulties over catergorisation due to the heterogeneous nature of the property market.
Portfolio based indices react only slowly to rental growth.
Portfolio based indices are influenced by timings of cash flows.
Barometer indices do not fully reflect the movement of any portfolio of holdings.
Lack of information on transactions due to confidentiality or other restrictions on disclosure.

**8** The draft should include the following points:

There is no one index that suitable represents the benchmark.
A number of readily available indices should be used each one representing the exposure to a country.
The benchmarks chosen for each country should reflect the type of investments the Board wish the fund manager to make. E.g. if the Board do not expect investments to be made in smaller companies then the benchmarks should be those that exclude smaller companies.

The index for each country should:

Be readily available.
Calculated frequently.
Independently calculated with independent audit.
Calculated in real time.
Be representative of the investment universe e.g. based on free float.
The indices should be based on arithmetic averages.

Candidates should give examples of suitable indices for each market. The following are all suitable: FTSE 100, 350, Allshare; S&P 500; Toppix; Dax and CAC alternatively the appropriate part of the FTSE world series might be suggested.

Benchmarks used by other funds and re-balancing issues should not be awarded marks. The question is looking at tailoring a benchmark for a specific fund and so any like fund should have a similar benchmark to the one to be put forward. Re-balancing is an issue but it is likely to depend on the fund's policy and so is not relevant to the question asked.

**9** The following topics need to be covered:

Investment style
Performance, absolute and relative
Consistency of performance
Method/process
Personel, number, experience, turnover
Attitude to risk
Fiduciary/administration
Size, balance sheet strength, profitability