**INSTITUTE OF ACTUARIES OF AUSTRALIA**

**INVESTMENTS COURSE 1** **OCTOBER 2005 EXAMINATIONS**

**QUESTION 1** **(12 marks)**

As the adviser to the investment committee of a major Australian insurer, you assist in developing economic forecasts to determine asset allocation. You have been asked to explain the overall objectives of the Reserve Bank of Australia (RBA). Of particular interest to the committee is the independence between the RBA's policies and the Government's fiscal policies.

(a) List the main objectives of the RBA. (3 marks)

(b) Describe the main activities the RBA undertakes in achieving its objectives. (3 marks)

(c) Explain how the RBA's operations affect short and long term interest rates in Australia. (4 marks)

(d) Discuss how the RBA's independence from the Government might assist in achieving its objectives. (2 marks)

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**QUESTION 2** **(14 marks)**

You are the fixed interest analyst of a reputable Australian funds manager and have been asked to explain your firm's approach to the management of its portfolio of Commonwealth Government Securities (CGS).

To illustrate your response, you have provided the following table of yields, which shows the movement over a 3 year period from a normal yield curve to an inverted yield curve.

| | Yields % pa | | | |
|---|---|---|---|---|
| | cash | 3 year | 5 year | 10 year |
| 30/06/2002 | 4.72 | 5.61 | 5.78 | 5.99 |
| 30/09/2002 | 4.75 | 4.95 | 5.11 | 5.34 |
| 31/12/2002 | 4.75 | 4.55 | 4.79 | 5.16 |
| 31/03/2003 | 4.75 | 4.64 | 4.90 | 5.33 |
| **30/06/2003** | **4.75** | **4.47** | **4.71** | **5.01** |
| 30/09/2003 | 4.75 | 5.04 | 5.21 | 5.38 |
| 31/12/2003 | 5.23 | 5.39 | 5.55 | 5.60 |
| 31/03/2004 | 5.25 | 5.15 | 5.33 | 5.49 |
| 30/06/2004 | 5.25 | 5.43 | 5.67 | 5.87 |
| 30/09/2004 | 5.25 | 5.24 | 5.35 | 5.47 |
| 31/12/2004 | 5.25 | 5.10 | 5.22 | 5.33 |
| 31/03/2005 | 5.49 | 5.62 | 5.67 | 5.67 |
| **30/06/2005** | **5.50** | **5.10** | **5.10** | **5.11** |

(a) Discuss possible reasons for the shape of and movement in the yield curve. (5 marks)

(b) Explain *in detail* the meaning of a zero coupon yield curve and how you would derive it from the yield curve at any particular time. (4 marks)

(c) Explain how, with the benefit of foresight, you would structure a CGS portfolio as at 30 June 2003, given the movements of the yield curve that occur subsequently. You should show the calculations required to support your explanation. (5 marks)

**QUESTION 3** **(19 marks)**

You are the asset consultant to a large Government funds management operation. You have been requested to review one of the operation's international equity managers, MULTIFACT, who has provided the following information on its investment philosophy and approach.

Investment Philosophy: MULTIFACT uses a rigorous "*Enhanced Value*" approach which methodically exploits characteristics such as low P/E and low P/B ratios and other pricing anomalies in world equity markets. This approach was originally developed based on strong empirical evidence indicating that value investing in the global markets results in superior returns over the long term.

Market inefficiencies exploited: Many of the stock selection factors that MULTIFACT uses derive their efficiency from certain behavioural characteristics of investors that cause inefficiencies in markets. Tendencies toward overreaction, overconfidence, extrapolation, agency effects and other behavioural issues play a role in how investors make decisions.

Value Added:

| Source of Value Added | Expected Contribution to Performance (%) |
|---|---|
| Long Term Country Allocation | 0 |
| Shifts in Country Allocation | 25 |
| Industry Allocation | 5 |
| Currency Allocation | 5 |
| Individual Security Selection | 65 |
| TOTAL | 100% |

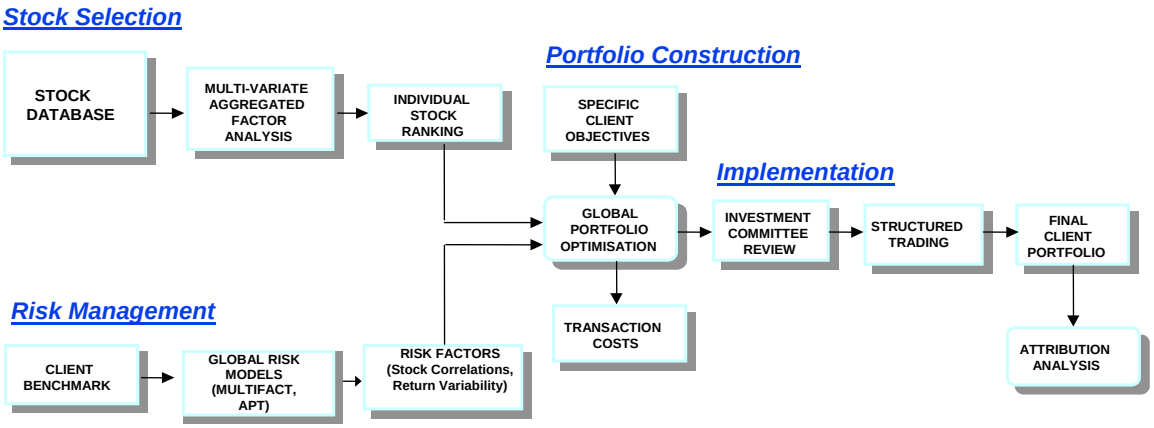
Country allocation: MULTIFACT's process does target a particular country allocation. Country allocation is the result of the bottom-up stock selection process.

Currency: Currency forecasts are an implicit part of the stock valuation process. The currency return forecast model considers both local currency equity market return and the projected change in the market's currency versus the base currency of the investor. The framework incorporates short and long term interest rate differentials and price momentum in generating return forecasts.

Individual Security Selection: Much of the research process is computer-driven using the extensive and detailed information in MULTIFACT's proprietary stock and market database. Investment professionals review and discuss key outputs at their regular meetings to ensure that the valuation models continue to function optimally.

Portfolio construction: Portfolio management is based on an active, bottom-up investment process that begins with a market-by-market attractiveness ranking of all securities in the MULTIFACT database. Once this "combined ranking" has been derived, portfolio construction begins. A sophisticated portfolio optimiser is used, which takes into account the client benchmark, desired risk level, transaction costs, correlation among securities, client restrictions, and any other relevant factors. This then undergoes a detailed "quality control review" by the portfolio management team to ensure that all client goals have been met.

A diagram of the investment process:




(a) Explain the Efficient Markets Hypothesis and in what respects MULTIFACT's philosophy diverges from it. (3 marks)

(b) List the features of MULTIFACT's approach which support or contradict its claim to being a *value* manager. (7 marks)

(c) List the possible factors which determine the stock rankings in MULTIFACT's process for portfolio construction. (5 marks)

(d) Discuss what further information you would seek to confirm your recommendation for/against an investment with this manager. (4 marks)

**QUESTION 4** **(20 marks)**

You are the consulting actuary to a major Australian bank which proposes to introduce a capital guaranteed product for trustee investment. The product will have the following features:

- Assets will be invested passively in Australian equities and cash and associated derivatives.

- Dynamic asset allocation will be determined by the bank to replicate a call option on the equity assets, with a specified minimum return to the client (before management fees) over a specified period. This will be achieved by using a strategy based on the well known Black-Scholes no-arbitrage relationship for call options:

  $$C = \delta S + \varepsilon B$$

  where $C, S, B$ are the values of the options, equities and cash respectively, $\delta$ is the delta of the option and $\varepsilon$ is the amount invested in cash, calculated under a pre-determined option model. (Hint: If continuous rebalancing to this strategy can be guaranteed at all times, even if the option model is unrealistic, then it is certain that the option outcome will be provided.)

- Capital to support the capital guarantee will be provided by the bank, who will be remunerated by specified management fees.

You have been asked to advise on the assessment of capital and the pricing of the management fees.

(a) Explain why the investment strategy outlined above may be preferable to the purchase of an actual (over-the-counter) option. (2 marks)

(b) Explain why an asset model is required to price the product (that is, why a simple option formula will not work) and indicate what aspects of the product need to be specified in order for it to be modelled. (6 marks)

(c) Discuss the features the asset model must contain in order for you to assess the capital requirements of this new product. (5 marks)

(d) Describe the approach you would take to price this product and list the information you would need. (5 marks)

(e) Describe briefly how derivatives may be used to assist in implementing the investment strategy outlined above. (2 marks)

**QUESTION 5** **(16 marks)**

As the CFO of a large Australian corporate superannuation fund, you are attending an international conference on currency management.

The conference participants are evenly divided on the theoretical benefits of hedging foreign currency exposures (even after allowing for differences in their own exposures and their currencies). Some participants favour full hedging on the basis that failure to do so may lead to regret if currencies move adversely. Others favour no hedging on the basis that it will result only in costs if currencies do *not* move adversely. Others still take the middle road.

(a) Suggest reasons why there is such a diversity of views on currency hedging as a means of controlling risk. (4 marks)

(b) Given that currency hedging is to be adopted for your superannuation fund, describe briefly the main ways it can be achieved, and the benefits and limitations of each approach. (5 marks)

(c) Explain the main impacts of currency hedging. (4 marks)

(d) Discuss, with reasons, your views as to how the issue of currency management should be addressed. (3 marks)

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**QUESTION 6** **(19 marks)**

You act in an honorary capacity as the asset consultant to a charitable Australian endowment fund. The fund is supported by bequests to provide financial assistance to needy individuals. Significant distributions from the fund (up to 30% of its value) are made from time to time by the trustees. As a charity, the fund is exempt from tax but has access to imputation credits.

The fund is invested with professional managers in Australian listed equity, listed debt and listed property, for which the fund's strategic benchmark is 40%/50%/10% respectively. You advise on the selection of managers as well as on the asset allocation, which is adjusted every quarter with the help of derivatives. Performance is assessed quarterly.

You have recently received a letter from one of the trustees:

> "Dear consultant
>
> The recent performance of the fund has been troubling. Not once in the last two years has benchmark performance been achieved. I think it is time that we analyse the reasons for this situation.
>
> Is the present asset allocation to property reasonable for our purposes? The inclusion of listed property with Australian equities does nothing for diversification of the investments. I believe we should consider using direct property vehicles for their more stable income and capital values.
>
> And is our performance benchmark appropriate for our purposes? Is it in fact something we can achieve? Perhaps we have been too hard on ourselves in this regard.
>
> I look forward to your response.
>
> Yours sincerely…"

Draft your response, addressing the following points:

(a) What are the general purposes of performance benchmarks for both asset allocation and sector management. (4 marks)

(b) Suggest suitable benchmarks (at the fund and sector levels) and briefly outline what adjustments would need to be made to these benchmarks to measure the fund's performance. (5 marks)

(c) Using formulae (if necessary) provide an explanation of how you would measure performance against the benchmark, and how you would attribute it to manager selection and asset allocation. Discuss briefly whether there is any ambiguity in this attribution. (6 marks)

(d) What are the benefits and limitations of direct property versus listed property in the fund's asset allocation? (4 marks)

**END OF PAPER**

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