INSTITUTE OF ACTUARIES OF AUSTRALIA

C1 INVESTMENTS **MAY 2009 EXAMINATION**

Marking Guide

Level of difficulty

Question	Units	Knowledge & Understanding	Straight-forward Judgement	Complex Judgement	Total Marks
1a	1	4			4
1b	1	2			2
1c	1		4		4
1d	1			6	6
2a	3	3			3
2b	3		3		3
2c	3		3	2	5
2d	3			6	6
3a	3		3		3
3b	3	1	4½	3½	9
3c	3		2	1	3
4a	2, BM		3		3
4b	2, BM		4		4
4c	2, BM			6	6
4d	2, BM			3	3
4e	2, BM			4	4
5a	2	6			6
5b	2		4		4
5c	2			4	4
5d	2		4		4
5e	2		2		2
6a	1			6	6
6b	1	3	3		6
TOTAL		**19**	**39½**	**41½**	**100**

Note: Question 4 partly covers asset modelling and partly covers the investment implications of recent economic events. As such it involves “background material” (BM)

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Answer all six questions

QUESTION 1 **(16 Marks)**

The Efficient Market Hypothesis and Private Equity:

(a) Consider the three forms of the Efficient Market Hypothesis (EMH):

(i) What differentiates each form from the others?

(ii) What are the implications of each form of the EMH for investment analysis? (4 Marks)

(b) How does the Adaptive Markets Hypothesis differ from the EMH? (2 Marks)

(c) Briefly discuss what differentiates private equity from public equity and the potential attractions of private equity in the context of the EMH. (4 marks)

(d) You are advising an accumulation superannuation fund on its investment policy. You have been asked to consider the role of private equity within the fund's asset allocation which is currently 70% in listed growth assets and 30% in defensive assets.

(i) Discuss the merits and pitfalls of private equity as an asset class.

(ii) Why might you decide to have private equity as a separate asset class in the asset allocation and how might it change the existing asset allocation? (6 Marks)

Question 1 Solutions

(a)

The EMH is concerned with the speed and nature of what and how information is propagated and taken up in market prices for assets. What differentiates one form from another is the information set referred to. **½ mark**.

(i) The differences between the information sets for the three different versions of the EMH are summarized in the table below.

Form of EMH	Description
Weak	All information from past prices and returns is reflected in the current price
Semi-strong	All publicly available information (including that from past prices and returns) is reflected in the current price
Strong	All information, including private information (in addition to historical information and public information) is reflected in the current price

½ mark for each of the points in the above table
To a maximum of 2 marks for a (i).

(ii) The implications of the market being efficient, in terms of whether particular types of investment analysis will "add value," will also vary. This is summarized in the table below.

Form of EMH	Implications
Weak	Technical analysis will not add value
Semi-strong	Fundamental analysis will not add value
Strong	No analysis will add value

½ mark for each of the above points in the table

In many ways the EMH aligns with the rational expectations model of economic behavior. This model holds that, given access to relevant information and the absence of frictions that prevent such access, people will form expectations that are rationally and optimally consistent with the information and will be right on average. **½ mark**.
To a maximum of 2 marks for a (ii).

Award marks as suggested above to a total of 4 marks for part (a).

Not everyone believes the market is efficient. Efficiency is a relative rather than an absolute concept. The fact that there are many people who are well paid by financial institutions to carry out technical and fundamental analysis suggests these institutions don't believe the market is 100% efficient. There are laws against insider trading, suggesting the regulatory authorities don't believe the market is strong form efficient.

(b)

- The EMH as stated does not allow for differential conditions for various markets, for conditions to vary over time or for people to act inconsistently with rational expectations. **1 mark**

- The Adaptive Markets Hypothesis (AMH) allows for such variations and for market efficiency to vary over time depending on the levels and balance of supply and demand and for people to adjust to variations. **1 mark**

- Those who adapt most successfully will pave the way for others to emulate and adjust accordingly until conditions change again. **1 mark**

Total of 2 marks for part (b)

(c)

Differences between public equity and private equity:

- By definition private equity consists of unlisted or private assets (except for public-to-private transactions) and there is limited information disclosure via public announcements of transactions or industry reports of same and a relatively narrow dissemination of firm-specific information. **½ mark**

- This contrasts with public entities and the exchange's role in publishing continuous price information and enforcing disclosure of financial and other reports and matters that have price impact. Also, analysts produce reports and recommendation based on this information and their contact with the entities and these are readily available, and are supplemented by the financial press. **½ mark**

The attractiveness of private equity:

- There is potential for the market for private equity to be somewhat inefficient at all levels of the hypothesis and, therefore, opportunities for return not available in the listed market. **½ mark**
  - In terms of the various forms of the E.M. hypothesis:
    - Weak – There is likely to be very little pricing information available at the individual security level. **½ mark**
    - Semi-strong - Information would be available from statutory returns and fundamental analysis could be applied to this data, but the analyst would need to go looking for this information and it would require more effort and expense than for public entities. Industry insiders are likely to be more knowledgeable than other market participants. **1 mark**
    - Strong – Almost by definition, PE investors will receive inside information - via due diligence procedures; MBOs depend on current management etc. **½ mark**

- There is also the potential for diversification by investing in new products and services that may have substantial growth potential. New products, services and innovations are often started off by small private firms who later need additional equity capital for expansion of their business. **½ mark**

Award marks for points as indicated above to a total of 4 marks for this part of the question

For full marks, The answer should include differences between private and public equity, reasons why private equity may be attractive and discussion of private equity in the context of the emh.

(d) **Merits and pitfalls**

- Private equity has the potential to improve returns owing to its likely exploitation of market inefficiency as noted in (c) above. – a merit

- It also has the potential to improve risk-return efficiency to the extent that its returns are lowly or even negatively correlated with the returns on existing assets. To this extent it may offer diversification benefits. – a merit

- Note that, as an unlisted asset, private equity cannot be priced from freely available exchange values which reflect transactions or bid/offer spreads and must, therefore, be valued by other means, e.g. by a formula approach sensitive to market-consistent inputs, by market participants according to agreed valuation standards or by professional valuers. This can be a merit or a pitfall depending on the circumstances.

- Where this results in less frequent valuations and/or smoothed appraisal-based valuations there is likely to be some diminution in observed volatility. It is possible, therefore, that some observed diversification benefits may relate to differences in valuation approach rather than inherent asset class differences. – this is more a "feature" than a merit or pitfall

- It should also be noted that the risk of business failure may be regarded as a greater risk than return volatility for private equity. – this is a pitfall

- Valuations have shown an historic tendency to increase significantly as exit approaches. This poses an equity dilemma for fund trustees in that the funding of private equity investments may be provided by a different generation of membership than that which will enjoy its benefits. This is a potential pitfall.

- Private equity is less liquid than other listed investments. This is a pitfall.

- Depending on the size of the investment, the investor may have some influence over the management of the firm. This is more likely with private equity than public equity. This is a merit

- The firm is not subject to the ASX rules on disclosure of information. This can be either a positive or a negative depending on the circumstances.

½ mark per point for the above or other valid points,
to a **total of 3 marks** for discussing merits and pitfalls in part (d) (i).

The asset allocation

- The principal reason for considering the introduction of any new asset class into an existing asset allocation will be its ability to improve overall returns whilst staying within the fund's risk appetite or to improve the fund's risk-return efficiency. **1 mark**

- This might arise from changes in the outlook for various sectors, the emergence of new sectors etc. **1 mark**

- An allocation to private equity must be funded by a reduction in exposure to other assets. **½ mark**

- Alternatively, funding might be by contribution redirection rather than disinvestment from other asset classes. **½ mark**

- Private equity generally operates on a partly-paid basis. Subscriptions are made for a specified commitment level and they are called down as investments are found. The actual exposure to private equity depends on the amounts called rather than the nominal commitments **1 mark**

Award marks for these or other valid points to a total of 3 marks for discussion of the asset allocation in part (d) (ii).

Total of 6 marks for part (d).

QUESTION 2 **(17 Marks)**

You are the Chief Investment Officer of a small and relatively little-known listed financial services company, with $1.2b of assets under management. It is currently the beginning of June 2008 and the Executive Chairman of the company has decided to launch a new managed fund in order to generate more profits. The fund aims to invest in undervalued small-cap stocks listed on the Australian Stock Exchange, in the belief the credit crisis has led to these stocks being oversold.

The fund's investment philosophy is based on investor overreaction relating to market shocks and the belief that substantial value is currently appearing in well-managed companies. Hence the fund aims to invest in these companies in the medium term to generate returns exceeding the ASX Small Ordinaries Index.

External specialist fund managers are being employed to manage the portfolio. The fund will pay half-yearly distributions depending on the corresponding period's financial performance.

The company itself, however, has been affected by the credit crisis. As a result, the company's financial position has been markedly weakened due to the company being burdened by a substantial amount of short-term debt. The company's share price has fallen by 70% over the past 6 months.

(a) Explain the observable characteristics of stocks classified as "value stocks", referring to suitable quantitative financial metrics and ratios. (3 Marks)

(b) Discuss this financial services company's role in forming an investment portfolio. (3 Marks)

(c) Explain the advantages and disadvantages of this company operating the fund under this particular structure. (5 Marks)

(d) Discuss three major risks faced by potential retail investors in this fund. (6 Marks)

Question 2 Solutions

a.) The concept of value investing is based on purchasing stocks which have been aggressively undervalued by the market. Characteristics of value stocks include:

- Low PE ratio (typically less than 10). In other words, the market is attaching a low price to the stock relative to the company's profits and earnings.
- High dividend yield (typically greater than 8%). The company is paying relatively high dividends relative to its market value. This signals the company is able to generate sufficient profits and have enough liquidity to distribute to its shareholders.
- The company has established a track record of generating sustainable profits and dividends (at least over the past 5 years). A company's stock is NOT a value stock if it meets the above quantitative conditions only for the most recent financial year, especially given the current market situation.
- The company's financial position is robust and preferably not overly exposed to leverage.

Marking Guide (3 marks – KU)

1 mark for each of the above points. Other reasonable points may attract 1 mark, as long as the candidate establishes a link between the market undervaluing the stock and its underlying financial strength.

For the first 2 points, only award half a mark if the candidate does not specify a reasonable range to define low PE ratio (PE ratio < 8-12 is acceptable) or high dividend yield (DY > 6-10% is acceptable).

The student cannot obtain full marks without stating the need for the company to have a sustainable track record of profits and dividends in the past.

b.) The structure is technically one where the company has outsourced the implementation process to the specialist fund managers. Hence, the company's roles in forming the investment portfolio include :

- Defining the investible assets for the fund and determining the suitable performance benchmarks with which to track the manager's performance.

- Setting risk limits with respect to the maximum amount of the portfolio held in cash assets, holdings in an individual company or in a particular sector.

- Selecting and dismissing fund managers. The fund outsources the portfolio investment to external managers but they have to select which fund manager(s) to manage the portfolio assets.

- Cash flow management. The company has to notify fund managers when a member wishes to withdraw their money or when a half-yearly distribution is to be paid out. At the same time, the company transfers the cash from members to the fund managers so it can be invested.

Marking Guide (3 marks – SJ)

1 mark for each of the above points to a maximum of 3 marks.

Note the company does NOT perform any stock research, trading or modelling for the purpose of stock selection. Candidates who include any of these functions in their answer have not read the question carefully.

c.) The advantages of operating under this structure include :

- Access to greater expertise in investing into small companies. This company has a small pool of managed assets and it is unlikely they have investment managers with expertise in the area of small company stocks. As a result, outsourcing the implementation to specialist managers is likely to be a wise idea as the company can focus on what it does best.
- Hiring and retaining in-house fund managers may be costly. Given the company's current financial position, the better strategy is to minimise costs of servicing this product to reduce risk of insolvency.
- This structure gives the company time to develop its knowledge before it manages everything in-house. The company can gradually manage the portfolio in-house when it accumulates experience and has achieved financial stability. (CJ)
- Flexibility. If the company has internal fund managers, they lose the flexibility to exit the market quickly because they have already invested in these talents. The current arrangement allows them to simply request the managers to redeem their members' investments and close the fund. (CJ)

The disadvantages of this structure include :

- The company is likely to incur more expenses by having external fund managers as they charge more than in-house managers. Hence, the company will generate less profit from this arrangement than if they offer a fund managed by in-house managers.
- The company cannot directly control the fund manager's investment decisions. Hence there are risks of investing with a fund manager whose philosophy may be divergent with the fund's objectives, or it underperforms. This could further tarnish the company's reputation.
- The structure is unlikely to be popular because the company is not demonstrating product differentiation through outsourcing. Investors are more inclined to directly invest with the fund managers rather than with the company. (CJ)

An important issue is whether the fees paid to the specialist fund managers exceed the cost of setting up and doing the investing in-house. If not then it is an advantage financially to use the specialist fund managers.

Marking Guide (3 marks – SJ, 2 marks – CJ)
1 mark for each of the above points (or other valid points) provided clear explanations are given. For full marks the student should have at least 2 points relating to advantages and at least 2 relating to disadvantages.

The key theme relating to the advantages centres on the company benefitting from greater exposure by co-operating with more well-known market players. Another theme is the company currently needs to operate with low fixed costs in order to increase its chances of financing its debt, which could make the company insolvent.

The key theme relating to the disadvantages centres on the company forgoing profits through outsourcing. Furthermore, the candidate should identify the difficulties faced by a little-known company offering a fund-of-funds rather than a directly managed fund.

d.) The following risks are considered major risks faced by the investors :

- Insufficient fund size meaning the fund is liquidated before any gains can be made. The company is launching a fund during a global market turmoil. The appetite for risky investments such as this one is likely to be low. Coupled with the company being little-known, the fund could be overlooked in favour of funds offered by larger companies or that have lower risk.
- The company becomes bankrupt and hence the investors risk losing their investments or having them locked up during the liquidation process. The declining equity market could deteriorate further and force the company into voluntary administration. If this happens, the investors' funds may be locked up and it is possible they may get little or nothing back in the end.
- If the fund is sufficiently subscribed, investors still face significant market risk by investing in more volatile small cap shares. Small cap shares have less diversified operations and less access to additional capital funding. As a result, the investors risk making less returns through this fund than if they invested in other funds as they are more vulnerable to the current credit crisis.

Marking Guide (6 marks – CJ)
1 mark for identifying each valid risk and 1 mark for each valid explanation.

If the candidate offers other risks, and explains it clearly in the context of the fund, award them a maximum of 1.5 marks for each risk. Appropriate contexts include relating to the slump in global equity prices, the company's weak financial position, little-known reputation and the fund management structure.

If the candidate offers generic risks – risks which apply to any fund,
award a maximum of 1 mark for each clearly explained risk.

QUESTION 3 **(15 Marks)**

You are the Chair of the Investment Committee for a large multinational general insurance company. The committee is meeting to discuss the management of the investment portfolio for the newly set up personal liability insurance business. The insurance department has sent to the committee financial projections of future premium income and claim payments.

The recent subprime crisis has led to a severe decline in the capital markets, especially the corporate debt securities market. Typically, the committee would recommend using a combination of government and corporate fixed interest securities to match the estimated future liabilities. However, the current market conditions have led to the committee considering alternative solutions.

(a) What do you believe are the three necessary investment objectives which apply to the portfolio in question? In your answer, refer to the timing and certainty of the future liabilities. (3 Marks)

(b) Suppose the committee has decided the investment portfolio will have a strategic asset allocation of 70% government fixed interest securities, 20% local equity and 10% cash.

i.) Explain two factors you would consider in determining whether this portfolio should be managed by a single fund manager or multiple specialist managers? (3 Marks)

ii.) For the equity component of the portfolio, list the four investment restrictions you believe are most important given the investment objectives you provided in (a). (2 Marks)

iii.) Discuss the role of benchmarks in monitoring the portfolio performance on an annual basis for this situation. Evaluate the appropriateness of market index benchmarks for this scenario. What is a reasonable alternative? (4 Marks)

(c) Provide two mathematical risk measures, other than volatility, which may be useful in assessing the investment risk for this portfolio. Give reasons to support your proposed risk measures. (3 Marks)

Question 3 Solutions

a.) The three investment objectives may include :

- To ensure the investment portfolio assets exceed the technical liabilities of the personal insurance business by a margin as required by APRA and / or other regulators
- To maintain sufficient liquidity in the portfolio to meet claim payments as they fall due
- To generate investment returns with a view of contributing to additional income for the company beyond the underwriting income
- Manage the asset pool within the specified mandate relating to credit criteria, matching, permissible securities and other possible constraints.

Marking Guide (3 marks – SJ)
0.5 marks for other valid investment objectives not on the list.
1 mark for each of the above investment objectives, to a maximum of 3 marks

b.) This question considers the different aspects of manager selection :

(i)The factors to consider relating to choosing a single fund manager or a number of specialist managers include :

- The size of the portfolio and hence the size of each asset class component making up the portfolio. Specialist fund managers may be relatively more expensive and yield less benefits, especially in a small fund.

- May be a good idea to have more than 1 bond manager to allow for the use of more investment strategies given bonds form 70% of the portfolio. Using a variety of bond-investment strategies may materially boost returns. (CJ)

- Having too many fund managers increases the complexity of managing this particular line of business and this may not be desirable. The insurer may want to allocate more time and resources to managing the insurance liabilities, claims processing and improving their sales quality. (CJ)

Marking Guide (1.5 mark – SJ, 1.5 marks – CJ)
1.5 marks for each reasonably discussed factor. The first point is essential.

(ii) The following are possible restrictions on the equity component :

- Equity investments may be restricted to large-cap shares because this reduces the volatility of the portfolio and controls the risk of substantial falls in the value of the portfolio
- Limit exposure to a particular sector, industry (especially insurance company shares) and any particular share
- Have a minimum requirement of the portfolio being exposed to shares paying substantial and sustainable dividends (for example, requiring them to hold at least 50% of equity investments in high yield shares)
- Restricting exposure to shares of companies with substantial debt

- Restricting exposure to shares of companies with high exposure to complex derivative products
- Restrictions on the use of derivatives

0.5 marks for each point (or other relevant points made) to a total of 2 marks.
Marking Guide (2 marks – SJ)

(iii)

The candidate should note the market index benchmark still plays a role in this scenario, but only in conjunction with the more important objective of meeting insurance liabilities as they fall due. The layout could be as follows :

- Benchmarks set the bounds for measuring the performance of the fund managers. The fund performance is compared against the benchmark to see if the objectives are met. (KU – 0.5 marks)
- Furthermore, the benchmark sets restrictions on how the fund should be invested, as the benchmark is what the fund is compared against. (KU – 0.5 marks)
- An appropriate benchmark is one consistent with the investment objectives. In this case, an appropriate benchmark needs to align closely with meeting the insurance liabilities as they fall due. (SJ)
- Hence, the market index benchmark is inappropriate for determining if the investment process is successful because a portfolio achieving high returns come with higher risk and this may threaten liability matching. (CJ)
- A more appropriate benchmark is to consider a CPI-based benchmark because personal liability insurance is a long-tail business and the claim payments are likely to be more aligned with the CPI. (CJ)

Marking Guide
1 mark for a clear explanation of a benchmark's purpose.
1 mark for stating what makes an appropriate benchmark.
1 mark for explaining why market index benchmarks are sub-optimal.
1 mark for recommending a more suitable benchmark.
To a maximum of 4 marks for b (iii). (1 mark – KU, 1 mark – SJ, 2 marks – CJ)

c.) The following risk measures may be useful :

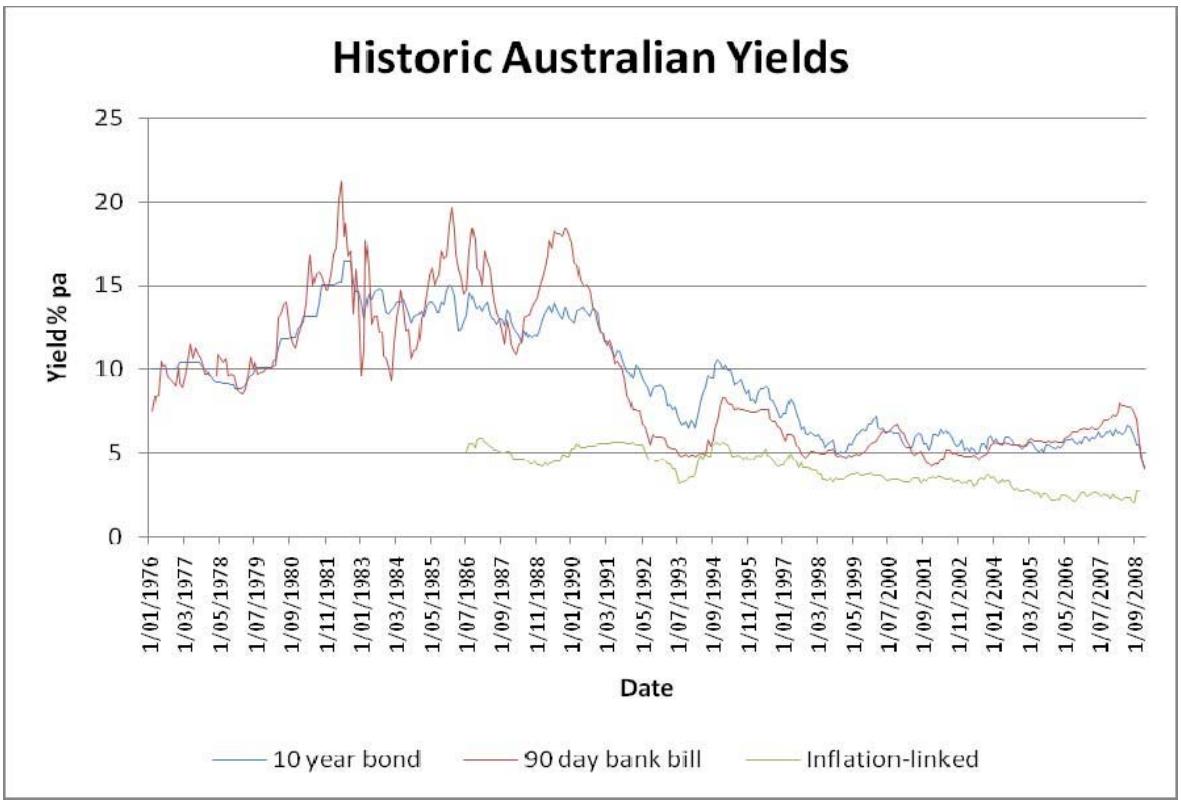
- Probability of shortfall. The insurance company in this particular scenario is more averse to having the asset level fall beyond a given level relative to the liabilities
- Relative semi-variance measure. The risk for this portfolio is related to assets falling below liabilities and hence we are not as interested in the upside risk
- Expected shortfall. The insurance company may be interested in how much the portfolio may decrease in value during the year and whether this may jeopardise their solvency position
- Value at Risk (VaR). The insurer may be interested in comparing the VaR measure and its current asset value with the current level of liabilities. This could give information on how far the asset value may fall before the firm reaches a point where the assets exceed the liabilities by the margin of comfort they usually use (possibly enforced by the regulators)

Marking Guide
½ mark for stating each appropriate risk measure. (SJ)
Another 1 mark for explaining how each of the proposed risk measures achieves its purpose. (CJ)
To a maximum of 3 marks. (2 marks – SJ, 1 mark – CJ)

Students who propose non-quantitative risk measures should not be awarded marks. These risk measures include liquidity risk or market risk, but discussed qualitatively and cannot be converted to numerical measures.

QUESTION 4 **(20 Marks)**

You are an adviser in an investment bank, responsible for the debt investment of your institutional clients. In recent months, interest rates in Australia (and worldwide) have fallen to historic lows, as may be seen in the following chart of Australian yields:



- **The inflation linked bond series commenced on 1/7/1986**
- **The 90 day bank bill yield exhibits more variability than the 10 year bond yield, particularly prior to the 1990's**

You are concerned to explain the implications of these developments for your clients.

(a) Suggest reasons for the recent fall in cash rates, as measured by the 90 day bank bill rate. (3 Marks)

(b) Suggest reasons as to why 10 year Australian bond yields have tended to track cash rates, whilst tending to be less volatile. Would you expect the same in other countries? In your answer, refer to theories of the term structure of interest rates. (4 Marks)

(c) Discuss the factors that are relevant to the prospects for bond yields at the present time, and the investment implications for your clients. Justify your answer. (6 Marks)

(d) What assumptions as to the long term return on debt investments would you currently recommend for asset modelling purposes? Justify your response. (3 Marks)

(e) How would you advise clients who have adopted an investment strategy of immunising inflation-linked liabilities about whether they should remove this immunisation strategy in the current low yield economic environment? (4 Marks)

Question 4 Solutions

(a) Possible reasons for the current low interest rate environment are as follows:

- Low economic growth, and even recession in some countries, resulting from the worldwide credit crisis;
- Easing of inflationary pressures, because of falling commodity prices and rising unemployment as a result of falling demand;
- Reduction of official cash rates by central banks, including the RBA, to stimulate economic demand.

1 mark per point to a maximum of 3 marks for part (a).

(b) Under the expectations theory of the yield curve, long term bond yields are determined as the expected future level of cash rates. As such expectations are based on the current cash rate (with the cash rate being often modelled as a mean-reverting martingale), then it is natural for short and long term yields to align over time.
1 mark

The mean reverting behaviour of interest rates tends to make long term yields less volatile than short term yields.
1 mark

However expectations are only partly based on current cash rates and tend to evolve gradually over time (in much the same way as inflationary expectations react to changes in current inflation). Hence long term yields tend to be less volatile than short term ones, especially in response to central bank monetary policy.
1 mark

The same feature would apply to all economies, except that in some economies other theories of the yield curve may have greater prominence.
1 mark

One example is in the UK, where pension fund investors may heavily favour the long end of the yield curve over the short as a means of immunising pension liabilities. This is consistent with the market segmentation theory. In this case short and long term yields may diverge for long periods.
1 mark

1 mark per point to a maximum of 4 marks for part (b)

(c) Possible factors for yields are as follows:

- Real cash rates tend to be driven by real economic growth (the so-called 'golden rule' of the yield curve), which is expected to be low in the short term, as a result of low consumer confidence. **1 mark**

- Inflation and wage pressures will tend to be restricted as a result of low demand. The same features of depressed demand will tend to apply to all economies, even the fast growing ones. **1 mark**

- Nonetheless, there may be a higher risk premium associated with long term debt over short term debt, and for corporate debt over sovereign. **2 marks**

- The implications of these factors would be that short term fixed interest debt is an unattractive investment in the short term (though this has to weighed against the prospects for equity, which may be equally unattractive). **1 mark**

- Alternative Investments: Whether long term equity is more attractive would depend on the magnitude of the risk premium available. The same conclusion may be drawn for creditworthy corporate bonds. **1 mark**

Total of 6 marks for part (c).

(d) Possible long term return expectation for asset modelling purposes:

- On the basis of current yields, it might be argued that a return expectation of 5% pa would be suitable for long term debt investment.

- However, given the prospect in (c) for worldwide demand and cash rates to fall even further in the near future, an even lower expectation- down to 4.5% pa would be plausible.

- This is supported by current evidence of falling price inflation.

1 mark per point to a maximum of 3 marks for part (d).

(e) Possible advice regarding immunisation:

- It may seem superficially attractive to remove (or reduce) immunisation when interest rates are at historic lows.

- However as argued in (d) there is no certainty that the bottom has been reached.

- In any event, the relevant yield for inflation-linked liabilities is the expected real yield, the difference between the nominal yield and expected inflation.

- The chart provided does not offer any evidence that real yields have bottomed, in fact only that they have recently increased.

- Inflationary expectations, as noted in (b), are only partly dependent on current inflation levels, which are unambiguously falling. However it is possible that the economic stimulus package put together by the government could reverse this in the near future.

- The issue to be decided is whether falls in inflationary expectations are enough to offset falling long term yields.

1 mark per point to a maximum of 4 marks for part (e).

QUESTION 5 **(20 Marks)**

You are an investment consultant advising institutional investors on asset allocation.

One of your clients is a general insurer that is concerned primarily with solvency. Partial immunisation of liabilities has been used for this purpose.

It has been traditional to consider a Static Asset Allocation for meeting investor objectives, usually in the framework of the client's liabilities. However it is becoming increasingly common to consider an Asset Allocation Strategy. This is a set of rules which allow asset allocations to be varied from time to time, according to the occurrence of particular triggers that are related to the prevailing conditions.

You are considering how such strategies can be formulated and modelled for your client.

(a) **Outline how Static Asset Allocations for a solvency objective may be assessed under an asset liability framework. You should include a discussion of the type of asset model that you would adopt for this purpose.** **(6 Marks)**

(b) **Discuss how Asset Allocation Strategies may be more useful than Static Asset Allocations for meeting investor objectives.** **(4 Marks)**

(c) **Discuss whether the scope of asset models for investigating Asset Allocation Strategies needs to be greater than the scope for Static Asset Allocations. What different features have to be modelled?** **(4 Marks)**

(d) **In an asset modeling context, why is it that Asset Allocation Strategies are more difficult to formulate in practice than Static Asset Allocations.** **(4 Marks)**

(e) **For asset modeling purposes, what is the main difference between Asset Allocation Strategies, of the type described above, and Tactical Asset Allocation as practiced by active managers?** **(2 Marks)**

Question 5 Solutions

(a)

- The first step in an assessment of a given asset allocation is a projection of liability cash flows.
- These may be deterministic or stochastic in real terms, but should allow for inflation being stochastic in nominal terms.

½ mark per point to a total of 1 mark.

Once such a liability cashflow model is constructed, an asset model should be chosen with regard to the following concerns for modelling solvency realistically:

- dynamic volatility, particularly in equity returns
- serial correlation in returns, allowing for bull and bear runs
- a full yield curve, in line with the duration of the liabilities
- consistency between yield curve movements and debt returns
- return expectations in line with current conditions for interest rates and inflation

½ mark per point to a total of 2 marks

With such an asset model, the insurer's business can be modelled in its entirety.
This would involve:

- projection of asset returns for a given asset allocation
- projection of liability cash flows, updated with inflation if relevant
- assessment of reserves in the light of projected yields
- comparison of reserves against accumulated assets.

½ mark per point to a maximum of 2 marks

The frequency and severity of insolvency can then be assessed for any given time horizon.
1 mark

Award marks as suggested above to a total of 6 marks for this part.

The answer should address

– need for projection model for liabilities,
– need for asset model and its features,
– how to use the model to assess solvency

(b)

- It is evident that solvency is determined by a combination of economic and financial factors: the interaction between asset returns, yields and inflation. **1 mark**
- If this interaction can be realistically modelled, it might be exploited under an asset allocation strategy, which seeks an optimum allocation given current conditions for these parameters at a particular time. **1 mark** For example, if there is significantly positive correlation in equity returns, this might be exploited by maintaining high exposure to equity once returns have proved favourable.
- Nonetheless, even without a detailed knowledge of these interactions, dynamic strategies have the potential to be at least as effective as (and possibly more so) as static allocations. This is because a static allocation is a special case of a dynamic strategy. **1 mark**
- In addition, dynamic strategies can accommodate changes in solvency arising, not from the asset experience, but from the stochastic liabilities. **1 mark**

Total of 4 marks for this part

(c)

- The scope of asset models for investigating Asset Allocation Strategies does need to be greater than the scope of models for investigating Static Asset Allocations **½ mark**.

- Even without a detailed knowledge of asset/economic interactions, a dynamic strategy has to rely on the effectiveness of the particular triggers, that is the events which would lead to the asset allocation being revised at a particular time. **1 mark**

- Such triggers may include:
  realisation of particular asset returns;
  achievement of a given solvency level;
  a given level of interest rates or of inflation.
  1 ½ marks

- Naturally these triggers must be modelled more rigorously than other events. **½ mark**

- To be effective, the model for future asset returns must be conditioned on the triggers, which requires a more sophisticated asset model than independent and identically distributed returns (iid) models. **½ mark**

Award marks as above to a total of 4 marks

(d)

- The outcomes under static allocations at a particular time may be found directly from a simulation as described in (a). This is makes it possible to compare directly the outcomes under different allocations, even allowing the construction of an 'efficient frontier' to reflect a risk/return trade-off. **1 mark**
- In contrast there is no single asset allocation for an asset strategy, and such strategies have to be classified as members of a family of strategies with the same set of triggers. **1 mark**
- Optimisation of the outcomes has to be conducted over all members of the same family of strategies. Of course different sets of triggers will lead to different families, so that selection and modelling of the triggers is key to the whole approach. **1 mark**
- Need to specify both the triggers and the changes to the strategies that would flow from the triggers being “triggered”. **1 mark**
- In order to do this it would be necessary to do an extensive modelling exercise to make an assessment of how well the asset allocation strategy would perform and of how it might be modified. It could be a big job to build and check the model, and then to use the model for this purpose. **1 mark**

Total of 4 marks for part (d).

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(e)

The Asset Allocation Strategies proposed share one common feature with Static Asset Allocations: they require no intervention (except rebalancing assets) once they are put in place. That is to say, all information about asset behaviour is built into the asset model construction. **1 mark**

On the other hand, Tactical Asset Allocation as practised is about the seeking of new sources of information, and exploiting it continuously as experience develops. **1 mark**

Total of 2 marks for part (e).

QUESTION 6 **(12 Marks)**

The investment firm, Lightning Rod Investments, has recently hired you as an investment analyst in its property securities team following the resignation of the previous incumbent.

The SAA (strategic asset allocation) of the Lightning Rod Balanced Fund, offered as an unlisted fund through financial planners, allows for both property security exposures and domestic equities.

The equities team, which is separate to the Australian property securities team, may also invest in property securities should it see superior return opportunities in them from time to time. This team is responsible for managing the Australian equity exposures in the Balanced Fund and your team is responsible for managing the property securities exposures.

Within the property securities sector, the SAA allows for exposures to both domestic and international securities. The fund manager of the Balanced Fund is allowed discretion to adjust sectoral allocations within preset ranges.

(a)

(i) What issues might the fund manager of the Balanced Fund face when the equity team chooses to exercise this discretion (to invest in property securities)? How might these issues be dealt with? (3 Marks)

(ii) What issues might the fund manager of the Balanced Fund face when the equity team chooses not to exercise its discretion? How might these issues be dealt with? (3 Marks)

(b)

(i) Why might the fund designers have decided to allow exposure to both domestic and international property securities? (3 Marks)

(ii) What additional management challenges does the introduction of international investments pose for the fund manager? (3 Marks)

Question 6 Solution
(a) (i)

The scale of any issue would depend on the sizes of the two allocations and any over- or under-weighting of property trusts within the equity allocation. We are not given this information.

If the equity team chose to exercise its discretion, possible issues are:
- There would be potential for an increased allocation to property trusts.
- Moreover there could be potential for increased exposure at an individual security level that would need to be accommodated within stock concentration limits.
- There could also be conflict in the stock selection preferences of the two teams.

½ mark per point to a maximum of 1 ½ marks

Possible ways in which this can be dealt with - The Balanced Fund manager could choose to:
- Ignore the potential for conflict and deal with it when it arose – If s/he then chose to still ignore it, s/he would need to be prepared to justify why
- Deal with any conflict on materiality grounds – If of negligible effect, then ignore it
- Adjust exposures or stock picks in one of the two sectors (or both) if within his/her management discretion or seek approval to do so, or
- Seek to have the team mandates adjusted to avoid material conflict, e.g. change the equity mandate to an ex-property mandate.

½ mark per point to a maximum of 1 ½ marks

Total of 3 marks for part (a)(i)

If the equity team chose not to exercise its discretion,
- The manager might have cause to question the balance of exposures between equities and property.
- The equity team is saying there are better risk-return opportunities within general equities than property trusts.
- If the fund manager is of the same opinion then one might imagine a tilt away from property securities (or an exposure at least less than the allowed maximum), although the opportunity set is different at the fund level than the sector level and the risk-return trade-off required also canvasses other inputs at the total fund level.

½ mark per point to a maximum of 1 ½ marks

- If the fund manager is of a different option, s/he might choose to discuss the matter with the equity team or tilt away from equities in some way.
- In any event the matter would be worth discussing with the two teams or with the CIO.
- If the mandates were adjusted as suggested above, then the problem would not arise, but the manager might also not receive the benefit of the equity team's opinion on the matter.
- Again, materiality might dictate the extent that an issue needed to be dealt with.

½ mark per point to a maximum of 1 ½ marks

Total of 3 marks for part (a)(ii)

(b) (i)

International investments offer potential for improved diversification owing to:

- The availability of a broader opportunity set of securities when taken with the domestic sector
- A different opportunity set - For property, there will be different underlying properties and there may be property sectors that don't exist locally or are only sparsely populated that are better represented overseas
- Market pricing efficiency may be lower in some markets, thus offering an information advantage
- There may be different population, economic and industry dynamics affecting property as a whole or the various property sectors, or
- Secular developments may be more or less advanced than locally or the economies may be in different phases of the economic cycle.
- The validity of the latter two points might be affected by the trends towards increasing globalisation and increasing economic integration.

½ mark per point to a total of 3 marks for b(i)

b(ii)
Additional management challenges

- To manage international assets effectively the fund manager will need to be confident in his/her knowledge in the relevant markets and his/her ability to trade in them, given that market conventions may differ between markets. Legal, regulatory and taxation systems also differ and the markets operate in different time zones.
- The latter has the potential to confer a timing advantage for local investors in these markets over the Balanced Fund. There may be both skill and resource level dimensions within this.
- The fund manager will also need to be confident that the fund's custodian and the firm's back office also have the requisite skills.
- The fund manager will also need to consider whether to frame the international mandate in global or ex-Australia terms. If defined in global terms, then the conflicts mentioned above in terms of equities vs property trusts will intrude into the local vs international property trust nexus and the fund manager will have to watch exposures to Australia and at the individual stock level. It would be generally easier to have an ex-Australia mandate.
- It can be assumed that investors in the Balanced Fund largely have the majority of their liabilities in local currency terms and that the fund is denominated in the local currency, so that introduction of international investments brings with it currency mismatch risk. The fund manager will need to decide how to manage this risk – hedge it out, manage it actively or accept it on the argument that it deepens the effective diversification offered.

- Apart from the qualitative arguments presented above, diversification is also measured by the correlation coefficient. The correlation coefficient will differ for hedged and unhedged exposures, and unhedged exposures are likely to be more volatile in local currency terms. Correlations will need to be measured against all other asset classes as well as local property trusts to understand the total portfolio effect.

- Currency management will also be required across multiple currencies and the mix will vary over time, although the manager may have a benchmark that is multi-currency.

½ mark per point to a total of 3 marks for part (b)(ii)

END OF PAPER