Institute of Actuaries of Australia

2010 PART III EXAMINATIONS

Subject Title: **C1**
Investments

Date: **Tuesday 27th April 2010**

Time**: 9:15 am – 12:30 pm**

Time allowed: Three (3) hours plus fifteen (15) minutes of reading time

Instructions: Each new question (but not each section of a question) must be commenced in a new answer book.

Number of Questions: **Six** (6)

Question	Marks
1	18
2	19
3	17
4	14
5	15
6	17
Total	**100**

Candidates are required to answer <u>ALL</u> questions.

This paper has ten (10) pages (excluding this page and the blank back page).

INSTITUTE OF ACTUARIES OF AUSTRALIA

COURSE 1 INVESTMENTS **APRIL 2010 EXAMINATIONS**

Answer all 6 questions.

QUESTION 1 **(18 Marks)**

You are a member of the Investment Committee of a large Australian superannuation fund. The Committee has been considering whether or not to invest in infrastructure for some time and, if so, in what form. The fund has now been offered participation in an international rail transport syndicate to be constituted as an unlisted company (IRT).
The company is taking a diversified approach to raising equity capital and debt:

(i) Short term (up to 3 years) debt

(ii) Longer term (5, 10 and 15 year tranches) debt with coupons varying with the revenue performance of the syndicate

(iii) The formation of a special purpose entity (SPE) to be listed on a major international stock exchange whose only investment will be IRT. The listed SPE will be offered a substantial share of IRT.

(iv) Direct equity in IRT.

IRT has obtained long term (25 year) operating rights to the passenger rail systems of several large UK and European cities with ticket prices agreed with the relevant authorities.
The maintenance of these operating rights will be subject to periodic regulatory reviews that will take account of the rail system's safety record and operating performance amongst other items.
Ticket pricing will also be overseen by a regulatory process on an ongoing basis.
Existing rolling stock (carriages etc) and network control systems will be transferred to the syndicate but the track, stations, tunnels etc will remain the property of the various provincial and national Governments.

(a) Outline 6 other items of general information [i.e. NOT specific to the actual investment securities in (i) to (iv)] about the IRT and its intended operations that you would like as an Investment Committee member to assist you in considering the business merits of IRT.

Give your reasoning as to why you consider each of the six items outlined would be useful to you as an Investment Committee member.
(6 marks)

(b) Briefly outline six items of additional information for the debt securities in (i) and (ii) above that you require from the security issuers or your investment staff and advisors to assess their attractiveness. Where it is appropriate, note any differences between short term and longer term securities that may be relevant. (6 marks)

(c) Briefly outline six items of additional information for the equity interests in (iii) and (iv) above that you require from the security issuers or your investment staff and advisors to assess its attractiveness. Where it is appropriate, note any differences between the listed and direct equity that may be relevant. (6 marks)

QUESTION 2 **(19 Marks)**

You are a member of the investment team at Weadd Value Investment Management (WVIM), a quantitative manager of listed Australian equities. Your investment process is factor-based as follows:

Factor	**Basis**
Earnings Growth	
Historic earnings per share	3 year moving average
Earnings per share outlook	Consensus estimates over next 1 and 2 years
Earnings quality	3 year moving average of earnings realisation ratio (actual earnings ÷ earnings guidance, where given and calculable)
Dividends	
Dividends per share	3 year moving average
Dividend sustainability	3 year moving average of ratio of operating cashflow to dividend
Value	
Price relativity	Price to historic earnings, price to projected earnings
Momentum	
Price momentum	3 and 6 month factors, reviewed monthly

Composite measures are formed for the above as required.

These factors feed into 1 and 3 year return regression equations (that also incorporate a risk free rate estimate).

An iterative apportionment process which gives highest active weights to the highest returning stocks and lowest active weights to lowest returning stocks is used to construct 1 and 3 year return portfolios.
Active weights relative to index weight are limited to +/- 0.75% so if stock XYZ has an index of 5% the allocated weight may range from 4.25% to 5.75%. These portfolios are weighted to produce the model portfolio which is then subjected to optimisation techniques that seek to ensure a reasonable diversification in factor risk exposure and to avoid undue sectoral concentrations.

The factors are tested for explanatory power and the regression equations are recalibrated every twelve months or at other frequencies as circumstances dictate.

WVIM's PR (public relations) consultant is concerned that the industry and quantitative managers, in particular, have been criticised for under-performance during the global financial crisis (GFC) - your firm's portfolio under-performed the index over the period of the crisis - and for slavish adherence to models and assumptions that don't reflect reality and proved incapable of dealing with the crisis. She is planning a series of thought-pieces to counter this criticism and to position WVIM as an exception.

The PR consultant has been undertaking a reading program in preparation for the series and you have been asked to assist her in this regard.

(a) The PR consultant has encountered the term "rational expectations", the "efficient markets hypothesis" (EMH) and "capital asset pricing model" (CAPM).

i. Give a separate explanation for each of these three terms in a way that she might understand. (3 marks)

She has asked, out of general interest, whether there are other approaches in the literature to the issues that underlie each of these three terms.

ii. Provide and briefly explain an alternative approach to "rational expectations" (1 mark)

iii. Provide and briefly explain an alternative approach to EMH. (1 mark)

iv. Provide and briefly explain an alternative approach to CAPM. (1 mark)

(b) The PR consultant has asked to what extent your firm's processes depend on EMH and CAPM. Provide a response to her that briefly discusses how WVIM's investment process depends or does not depend on each of the efficient markets hypothesis and CAPM and leads to above average investment performance.
(Hint: Consider the assumptions required for WVIM's factor-based investment process to work.)
(2 marks)

(c)

Explain what the theoretical basis of above average investment performance may be for WVIM's choice of the following items as part of WVIM's investment process:

- **earnings factors**
- **dividends factors**
- **value factor**
- **momentum factor**
- **active over- and under-stock-weights relative to index weight are limited to ± 0.75%**

(5 marks)

(d) Discuss three reasons as to why WVIM's investment process might have led to under-performance relative to the index over the period of the global financial crisis (GFC). (6 marks)

QUESTION 3 **(17 Marks)**

You are the portfolio manager for an investment bank. You are designing an investment vehicle which is to be authorised to invest in Australian cash, bonds, shares and direct property. Your potential clients are all institutional investors. You have a good reputation as a tactical asset allocator and to take advantage of this, the vehicle will have wide permissible ranges in the asset allocation for each asset class.
The liquidity risks that your fund will experience will be driven by the behaviour of your clients in investing or withdrawing from the fund, in response to the future economic and financial environment that they face.

(a) Define liquidity risk in the context of the above fund.
(2 marks)

(b) Give three examples of why an institutional investor may wish to make an unexpected redemption request.
(3 marks)

(c) Under stable financial conditions, outline three situations that will cause the fund to require liquidity. **(3 marks)**

(d) Outline three examples of how another Global Financial Crisis might impact the fund's liquidity risk situation.
(3 marks)

(e) Outline four features that could be incorporated in designing the new vehicle to mitigate these liquidity risks. (both in stable conditions and at times of extreme market events)
(4 marks)

(f) What essential features of new asset classes would you investigate in deciding whether they have appropriate liquidity?
(2 marks)

QUESTION 4 **(14 Marks)**

You are the Actuary to a General Insurance company that is considering a proposal to expand certain existing long tail business lines. A Director of the company has requested the use of a simple approach to modelling the profit impact of the proposal and presenting it to the Board. The Director suggests the use of a simple asset model: the mean-variance (MV) model. That is, an asset model where each asset class' returns are independent and identically distributed from year to year, with a stationary covariance structure.

(a) **Explain to the Director why it would be unwise to use a simple asset model as exemplified by the MV model to model assets (6 brief points, 3 marks) and even more unwise to model profit impact (3 points, 3 marks) with this model.**

(6 marks)

(b) **State your recommended asset model and outline what your recommended asset model will need to be able to do. Give reasons why it is more suitable to the task at hand**

(5 marks)

(c) **What dependencies would you establish with the insurance company's liability model, so as to arrive at an integrated asset-liability model (consider how underlying economic and financial variables affect both the assets and the liabilities).**

(3 marks)

QUESTION 5 **(15 Marks)**

You are the investment manager of an unlisted Australian equities unit trust of $4.5 billion. The unit trust holds a 10% stake in XYZ, a financial services conglomerate; the stake is worth $250 million. XYZ has two businesses

- **a life insurance company, and**
- **a mortgage fund asset management business.**

The Board of Directors of XYZ are proposing to sell the mortgage fund asset management business so as to concentrate on the life insurance business i.e. XYZ will become only a life insurance company. The proceeds from the sale of the mortgage fund asset management business will be returned as a cash distribution to the shareholders. (Assume negligible transaction costs).

According to your analysis, the life insurance business forms 75% of the company's current market value and the remaining 25% is attributed to the mortgage fund asset management business. The life insurance business has relatively stable earnings and is managed by a conservative management team. The mortgage fund asset management business has over the past three years been a significantly unprofitable business and hence is being sold.

You are now considering a review of your current investment portfolio in light of this proposal by XYZ.

(a) **Explain how this proposal by XYZ affects your current portfolio.**
(2 marks)

(b) **If the XYZ proposal succeeds, you must decide whether to increase or decrease the number of XYZ shares held in your portfolio.**
Discuss two aspects of the investment portfolio you will review before making your decision.

Give an example for each aspect to illustrate whether the investment manager will choose to increase or decrease the number of shares held after the demerger.
(3 marks)

(c) **The asset management company that manages the Australian equities unit trust (of which you are the investment manager) is reviewing whether to purchase XYZ's mortgage fund asset management business.**
The internal review is recommending that if the purchase of the mortgage fund asset management business occurs, then the mortgage fund and your Australian equities unit trust will be managed by a single team, but the assets are to be kept in separate funds. The aim of this arrangement is to minimise costs.
Identify and explain three key <u>operational</u> risks associated with this recommendation of an integrated management structure.
(6 marks)

(d) Given your fund's $250 million stake in XYZ, your vote regarding whether XYZ's proposal to sell the mortgage fund, return the sale proceeds as a cash distribution, and focus on the life insurance business is important.
Who will you consult to gather further information to help you vote at the shareholders' meeting? Explain your answer.

(4 marks)

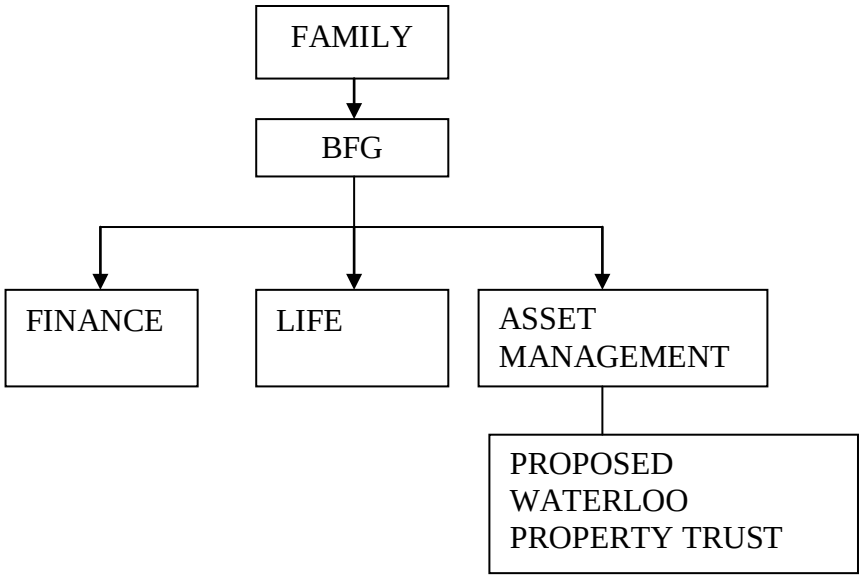
QUESTION 6 **(17 Marks)**

The year is 2011 and the global economy has recovered from the most devastating effects of the global financial crisis (GFC). Retail and commercial lending have loosened to levels similar to 2004. The Reserve Bank of Australia has set the Target Cash Rate at 4.25%. A very rich Australian family wholly owns an unlisted diversified financial services group, Bonaparte Financial Group. BFG has three operating divisions:

- **A finance company offering personal and commercial mortgage loans, and funds the loans with retail and wholesale deposits. Gross assets on the balance sheet are $2.0 billion.**

- **A life insurance company that only offers yearly renewable term life insurance with non guaranteed premium rates, and**

- **An asset management division exclusively managing BFG's other family assets excluding the finance company and life insurance company mentioned above. These family assets under management total $15 billion of which $11.4 billion is in equities and $3.6 billion is in uncommitted cash that is available for investment purposes such as acquisitions.**



The Australian family wishes to take advantage of the current conditions by expanding the scope of the <u>asset management division</u> to include both direct and listed property in the existing equity portfolio. The domestic retail and commercial property markets are still significantly underpriced. A number of existing listed property funds are trading at values well below their last reported Net Asset Value. Assume the Target Cash Rate will remain unchanged for 12 months.

The Australian family has sought your advice as their external adviser on acquiring a mid-size listed property trust, Waterloo Property Trust. WPT has $9 billion of retail and commercial properties at their last reported book value. The share price is $1.83, while the last reported Net Asset Value is $2.45. The current market capitalisation of the trust is $2.2 billion.

(a) Discuss the asset profile of Bonaparte Financial Group (BFG) by analysing the three operating divisions forming this group. Your answer should consider BFG's customer diversity, liquidity, risk profile and asset-liability matching capacity.

(6 marks)

(b) Give reasons for and against BFG considering expansion into property investment in the context of the current environment and their investment portfolio.

(A total of five reasons are required. There must be at least two reasons in the 'for' category, and at least two reasons in the 'against ' category. The five reasons are to relate to property investment in general, and not to any specific issues of WPT)

(5 marks)

(c) The Board requests you to submit a report detailing the <u>various risks</u> associated with acquiring Waterloo Property Trust (WPT). Give three aspects relating to WPT's portfolio that you would highlight in your report.

Explain how this information contributes to the report.

(6 marks)

END OF PAPER