THE INSTITUTE OF ACTUARIES OF AUSTRALIA

INVESTMENT MANAGEMENT **2001 EXAMINATIONS**
PAPER ONE

Answer all 7 Questions

QUESTION 1 **(11 Marks)**

a) Identify & briefly explain the various forms of the Efficient Market Hypothesis (EMH). (3 marks)

b) Briefly state with reasons the form/s of EMH you would expect to be relevant:

   i. for an Australian equity portfolio benchmarked against the All Ords Index
   ii. for a balanced portfolio including global equities and global bonds

(4 marks)

c) A major international broker who specialises in tactical advice has suggested a purchase of UK equities. The stated reasons are that the earnings yield (earnings/price) on the FTSE 100 Index is almost identical to the yield on 10-year gilts, whereas typically the earnings yield has been significantly lower than the yield on 10 year gilts.

   Discuss the factors which influence the relationship between the earnings yield and the yield on 10 year gilts, and reach a decision on whether the broker's suggestion has merit. (4 marks)

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QUESTION 2 **(14 Marks)**

You are an actuary whose work involves financial planning advice to individuals. The following describes the circumstances of a new client:

- Male aged 45
- Recently divorced
- Superannuation assets of $220,000, all of which is subject to preservation to age 60
- Property owned in his own name includes own residence valued at $400,000 and investment property valued at $180,000
- A share portfolio valued at $100,000
- An interest only mortgage of $80,000 (extendable up to $700,000).

The client's ex-wife has been granted a cash settlement of $300,000 to be paid by your client as $50,000 immediately and $250,000 in 15 years time (with no interest to be added). The forecast average long term returns for your clients' investments are as follows:

- Superannuation return 8% pa up to age 60 and 11% pa thereafter.
- Share return 10% pa
- Investment property return 6% pa
- Mortgage interest 7% pa
- Appreciation in value of own residence 5% pa

a) Ignoring any tax which might be payable, provide recommendation for the optimum priority of payment of the settlement from your client's assets to the wife. You may assume that the mortgage could be extended at any time to finance any part of the payment and that the client would readily sell the residence if this was a preferred option on financial grounds. Your recommendation may be either based on calculations of outcomes or a well reasoned explanation based on the above information only. Please state any additional assumptions that you make. (5 marks)

b) How would your answer in a) change if the superannuation return was 6% pa up to age 60 and 4% pa after age 60. (2 marks)

c) Based on the original assumptions, what advice would you give to your client about rearranging investments and mortgage to give maximum return, again ignoring tax. (3 marks)

d) Explain, by reference to the IAAust professional standards and guidance notes, the other factors which should be considered in determining recommendations for this client as per Part (a).

(4 marks)

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QUESTION 3 **(6 Marks)**

You are an analyst working for the Commonwealth Government. The Government is considering a plan to abolish the Australian semi-government bond market. This would involve the States relinquishing the ability to issue bonds through their central borrowing authorities (such as the New South Wales Treasury Corporation) and instead relying on the Commonwealth Government for their borrowing needs.

Your manager has asked you to state and assess the strengths and weaknesses of this proposal, taking into account the interests of the Commonwealth Government, the State Government and the capital markets.

Give a recommendation on the proposal based on your assessment of the relative importance of the strengths and weaknesses.

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QUESTION 4 **(20 Marks)**

a) Your client is a large Australian based general insurance company, which currently invests in a portfolio of Australian government bonds with a duration equal to that of its liabilities. A Fund Manager has approached your client marketing the following product:

> "The manager will invest exclusively in US corporate bonds. Whilst the manager has the scope to invest in corporate bonds outside the US, their marketing material states that it is intended that at least 90% of the portfolio will be invested in US corporate bonds.
>
> Currency is to be managed in the following manner: every three months a forward contract is to be entered into based on 100% of the market value of the portfolio (at the date of entering into the contract) to purchase Australian dollars and sell US dollars at the prevailing forward rate.
>
> Fixed interest futures are to be used to ensure that the duration of the portfolio matches the company's liabilities."

The marketing representative tells the client that by putting 50% of the portfolio with the manager, the client can achieve higher returns with no additional risk. The client has asked you to comment on the appropriateness of appointing the manager to manage 50% of their portfolio on this basis.

Discuss the appropriateness of the proposal. (5 marks)

b) Consider the following two statements:

> "Listed Property Trusts are really just a hybrid between bonds and equities. They are not a property investment at all."
>
> "Listed Property Trusts have market values that change daily and are geared. An investment in an unlisted property fund therefore provides a lower risk investment".

State with reasons whether or not you agree with these statements. (11 marks)

c) Discuss the suitability of listed property trusts, directly held property and unlisted property trusts as an investment for a defined benefit superannuation fund of approximately $100 million that is closed to new entrants. The average age of members is 45 years. (4 marks)

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QUESTION 5 **(9 Marks)**

The Black-Scholes formula is probably the most commonly used option pricing formula. The value of a put option is given by:

$$p = \max [\ 0,\ Xe^{-rt}N(-d2) - SN(-d1)\ ]$$

a) It is not always appropriate to use the standard Black-Scholes formula to value an option. Explain why use the standard Black-Scholes formula is not appropriate for the following derivatives:

i. a put option on a CBD office tower (2 marks)

ii. an interest rate cap {an interest rate cap limits the effective interest rate used to determine a cash payment, which is equivalent to a call option on the interest rate} (2 marks)

iii. a call option on the US dollar {this option gives the holder the right to buy US dollars at a specified exchange rate} (2 marks)

iv. share options used in remuneration of senior executives (3 marks)

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QUESTION 6 **(20 Marks)**

a) An industry colleague of yours says that he is an active quantitative equity manager but with a very strong value focus. However, he mentioned to you that one of the traps of being such a value manager (albeit from a quantitative perspective), is being heavily in stocks that appear to be cheap but for a good reason and this has recently hurt his performance.

> He says "We had big positions in stocks like Pacific Dunlop, PMP, Pasminco, and Caltex. Even though they had fallen a fair bit before we bought them, they still continued to decline in price after we got set in them. We need to improve our performance."

After looking at the active value factors used by your colleague you noticed that as far as "value" was concerned they looked sound.

i. Discuss other active return factors that your colleague could include to avoid falling into those "value traps"? (5 marks)

ii. You also noted that your colleague just used the average of the z-scores of the active factors as his "alphas". Explain a better approach to generating alphas, the logic behind it, and the further final adjustment you need to make to those alphas before you can commence portfolio construction? (5 marks)

b) Your colleague becomes bored after successfully running the quantitative value approach for quite some time, and decides to try fundamental stockpicking. He says, "The company I work for believes the best stocks to have in your portfolios are those stocks whose earnings are not only going to grow consistently over time but will also be re-rated."

What exactly is your colleague saying, and do you agree with him? (5 marks)

c) One of the "Risk Factors" discussed in the Grinold & Kahn text is the industry factor. Standard & Poors (S&P), who purchased the ASX index business, will soon replace the old ASX industry groupings with GICS (Global Industry Classification Standard).

Many quantitative analysts will now argue that risk modelling stocks under GICS can be done with higher explanatory power than under the old ASX industry groupings. Therefore they would argue that active fund managers can now have greater confidence in taking larger active bets than before while staying within the same ex-ante active risk constraints.

Discuss this statement. (5 marks)

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QUESTION 7 **(20 Marks)**

The Board of Directors of XYZ Superannuation Fund is currently reviewing the benchmark asset allocations and variance bands (ie. minimum and maximum holdings in each asset class) that apply to the Fund.

You are the asset consultant to the XYZ Superannuation Fund.

The Board has provided you with the following list of issues relating to the superannuation fund investments:

a) fund surplus
b) fund liabilities
c) possible future benefit improvements
d) cash flow and liquidity
e) risk tolerance of the employer sponsor
f) risk tolerance of the members
g) historical fund crediting rates
h) historical asset class returns
i) future investment returns
j) future view on inflation, which is that inflation will rise sharply in the next 12 to 18 months
k) taxation

Prepare a report to the board which:

(1) briefly describes the process you will use to determine the benchmark asset allocations and variance bands. (5 marks)

(2) discusses the impact, if any, of each issue raised by the board on your recommendations. Where the issue is important, describe how you will incorporate it into your process. (15 marks)

END PAPER ONE

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