INSTITUTE OF ACTUARIES OF AUSTRALIA

COURSE 1 INVESTMENTS **OCTOBER 2009 EXAMINATIONS**

Marking Guide

Level of difficulty

Question	Units	Knowledge & Understanding	Straight-forward Judgement	Complex Judgement	Total Marks
1 (a)	1		2		2
1 (b)	1	2			2
1 (c)	1		4		4
1 (d)	1		2		2
1 (e)	1			4	4
1 (f)	1			3	3
2 (a)	1	2			2
2 (b)	1			3	3
2 (c)	1		2		2
2 (d)	1	2			2
2 (e)	1		5		5
2 (f)	1		1		1
3 (a)	2			4	4
3 (b)	2	2	3		5
3 (c)	2			2	2
3 (d)	2	2			2
3 (e)	2			4	4
4 (a)	2	4	5	1	10
4 (b)	2	1	4		5
4 (c)	2		2		2
5 (a)	3		2	2	4
5 (b)	3	1	2		3
5 (c)	3		4		4
5 (d)	3	1	1	3	5
5 (e)	3			4	4
6 (a)	3	1		5	6
6 (b)	3	2	1	1	4
6 (c)	3			4	4
TOTAL		**20**	**40**	**40**	**100**

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Answer all 6 questions

QUESTION 1 **(17 Marks)**

The Equity Principle is a boutique funds manager that specialises in the active management of Australian shares. Its investment process seeks to find companies with above average, sustainable returns on equity (RoE). (Sustainable in this context refers to an ability to maintain RoEs over time rather than environmental sustainability, though it may include the latter as a source of RoE sustainability.) It only holds stocks that meet these criteria.

As part of its continuous improvement program one of the firm's senior members has suggested that its investment process means it must wait for companies that embark on RoE improvement programs to demonstrate that the improvement is well established before investing in such a company. He has suggested, therefore, that the firm seek a balance in portfolio construction between companies with sustainable RoE (termed 'core' holdings) and companies undergoing expected changes in RoE (termed 'developing' holdings).

Core holdings will reflect companies with sustainable RoE and developing holdings will reflect favourable or expected favourable changes in RoE. Developing holdings will be sourced in new companies or in higher weightings than exists in the core portfolio where the firm perceives RoE changes to be underway.

The Executive Committee (ExCo) of the Equity Principle has decided that it should construct a shadow portfolio of both 'core' and 'developing' holdings that embraces this suggestion to test its viability.

Once ExCo has determined selection criteria for developing holdings, ExCo will conduct back-testing of the performance of the shadow portfolio by:

- **building a shadow portfolio through the application of these selection criteria in the conditions that applied over the relevant past periods, and**
- **will monitor the performance of proposed shadow portfolio holdings recommended by its fund managers at their regular meetings over the next 6-9 months.**

If satisfied with the results of the back-testing and monitoring, The Equity Principle will then implement these changes into its live portfolios.

(a) How would you characterise the firm's investment beliefs in terms of the Efficient Markets Hypothesis? Why?

(2 marks)

(b) How do you calculate RoE? You may provide a formula or describe the measure in words. Whichever you choose, your formula or description should be specific enough to enable the reader to calculate RoE provided he or she has the requisite information from a company's accounts.

(2 marks)

(c) What characteristics would The Equity Principle look for in a company that would indicate the likelihood of a sustainable RoE?

(4 marks)

(d) What factors contribute to changes in RoE over time? Use your answer to (c) to frame your answer and provide examples to illustrate the points you make.

(2 marks)

(e) Assuming that investing in companies where the firm perceives favourable RoE changes to be underway is proven to be a successful investment strategy, and that the portfolio may now invest in companies fitting this criteria, how would you expect the part of the portfolio made up of developing holdings to differ from the part of the portfolio made up of core holdings?
(Things you may wish to consider might include investment style, market capitalisation etc.)

(4 marks)

(f) What precautions should The Equity Principle exercise when interpreting the results of the back-testing?

(3 marks)

Solutions Question 1

The solutions provided are longer and more comprehensive than would be expected of students under exam conditions. This is done because subsequent cohorts of students may use these solutions as a study aid.

Question	Points made	Allocation of marks
(a)	Inefficient under the semi-strong form of the EMH RoE is a form of fundamental analysis and depends on publicly available information	1 mark for statement of efficiency 1 mark for reasons = 2 marks

The Equity Principle (EP) believes targeting companies with above average RoE will add value.
RoE is calculable from company accounts.
For RoE to be considered above average, EP will have to calculate RoE for a company's peers as well as for the company itself.
For RoE to be considered sustainable, EP will need to look into the sources of RoE, understand the company's strategy and market positioning etc.
These are all forms of fundamental analysis that depend, among other things, on publicly available information.
EP must, therefore, believe that equity markets are inefficient at the semi-strong form of the Efficient Markets Hypothesis.

Question	Points made	Allocation of marks
(b)	Formula or explanation Definition of terms or explanation of components	1 mark for reasonable formula/explanation 1 mark for definition/explanation of terms/components = 2 marks

$RoE = NPAT(t) \div {}^{1}/_{2}[\, E(t-1) + E(t)]$
where NPAT = net profit after tax
E = shareholder's equity
t = year
and movements in equity are assumed to occur uniformly over the year.

Question	Points made	Allocation of marks
(c)	The emphasis here is on sustainable RoE and /or sustainable growth in RoE Should examine income, expenses and equity Need to recognise relativity between numerator and denominator Detail: • Income growth, particularly sustainable growth in operating revenues & less weight given to one-offs • Sources of growth • Franchise strength & quality and supporting strategies • Management quality • Understanding revenue & cost drivers • Cost management disciplines • Capital management policies (balance of contributed equity, debt, self-financing, distributions, balance sheet quality) • Historical record	1 mark for emphasising sustainability and for recognising three-part focus & relativity as issues ½ mark for each item of detail up to 2 marks 1 mark for quality of answer = 4 marks

The way this section has been drafted anticipates part (d) to some extent, though the focus here is on above average, sustainable growth in RoE whereas (d) is about change in RoE, whether sustainable or not. If students do the same, then a bit more detail on the change factors in (d) should be expected.

The search for RoE sustainability requires scrutiny of both the numerator and denominator of RoE.

The numerator is profit. Profit is income less expenses less tax.

In general EP is likely to focus on income growth, particularly sustainable growth in operating revenue, giving less weight to one-off boosts in or losses to income unless they indicate operating or management practices or problems that suggest a need for deeper study. EP is also likely to look for recurrent revenues as that would support sustainability. As such it will be interested in the sources of revenue growth and the strength or emergence of a company's franchise, examining the company's and its sector's competitive positioning and threats thereto and the company's strategy for improving its positioning.

In general EP will be looking at companies that grow revenues faster than expenses and, in respect of the latter, with well constructed expense management disciplines.
The denominator is average equity. Equity is built from contributed equity and retained profit and it, along with any debt raised, funds the growth EP is hoping for.

The balance of debt and equity is important in assessing balance sheet quality. Gearing improves RoE when the return on this source of capital is greater than the cost of debt. Excessive gearing leaves a company vulnerable to the costs of unhedged debt rising and to refinancing risk, with both likely to affect RoE sustainability. Excess equity which is not deployed into the business within a reasonable period either to reduce debt or earn rates of return at least comparable with historic rates will depress RoE.

Generalising these concerns implies a focus on capital management in terms of balance sheet quality, the mix of capital sources and the relative costs of these sources, capital investment return horizons and the company's policy for streaming these returns to shareholders.

In terms of relative focus, EP will prefer firms with RoE numerators increasing more than their denominators. It is likely that a company that shrinks its denominator on a one-off basis will not interest EP greatly unless that moves it back to a capital position better suited to its operating scale.

Question	Points made	Allocation of marks
(d)	(d) is about change in RoE per se rather sustainability But numerator/denominator relativity and income vs. expenses vs. equity are again important Generally expect more detail on the change elements vs. (c) Detail: • Income – operating revenue (sales, prices, product mix), interest/dividends/rents, one-offs via asset sales etc • Expenses – staff numbers/salaries, input/manufacturing/distribution costs, inventory costs etc. • Tax • Equity – As for (c)	½ mark for recognising three-part focus & relativity as issues ½ mark for each item of detail up to 1½ marks total (to receive the ½ mark, answer must have both sensible comment and an example. The comment need only be succinct.) = 2 marks

Positive change in RoE comes from change in the numerator relative to change in the denominator – the former growing faster than the latter, or the latter falling faster than the former.

The numerator is profit and profit is income less expenses less tax as noted in (c) above. Hence the numerator will increase from income growing faster than expenses, or income reducing by less than expenses.

Income consists of operating revenue and other income.
Operating revenue changes through changes in sales volumes, sales prices or product mix.

Changes in other income depend on the sources of other income. These may include earnings on capital not deployed into the business – interest, dividends and rents – asset sales including financial assets, plant and equipment etc, book or mark-to-market changes taken through the profit and loss account etc.

Other changes in net income depend on changes in tax paid. Changes in the nominal tax rate or allowable deductions are outside the company's control (the Henry tax review is due to report in late 2009). Also there may be changes in taxation in other jurisdictions for companies that operate internationally. These will change the effective rate of taxation.

Expenses can increase or decrease. Increases can come from growth in staff numbers, increases in wage and salary rates, increases in input costs including raw materials and power, for example, economies in manufacturing processes, increases in haulage and other distribution costs, increases in professional costs such as consultants, increases in holding costs if inventory builds up (costs will have been generated without matching revenue) etc. Decreases will operate in the other direction.

Also as noted in (c) above, the denominator is average equity and this changes with contributed equity and retained profit. Contributed equity is equity raised in the share market and includes new issuance (increasing equity) and share buy-backs (decreasing equity). Retained profit is the historical outcome of profit less distributions. Changes in distribution policy will, therefore, change equity. Such changes may distribute accumulated, undistributed profit as well as pay-outs from current profits.

As noted in the opening remark in this section, it is the rate of change in the numerator relative to the rate of change in the denominator that will determine the rate of change of the return on equity.

Question	Points made	Allocation of marks
(e)	Tracking error/volatility Average capitalisation Turnover Growth-style bias	1 mark for each item identified & reason given as to why up to 4 marks = 4 marks

To score any marks, the answer will need to contain more than statements such as "new holdings will show higher average RoE".

EP will need to consider its individual holding limits, both maximum and minimum holding limits, to give full expression to the proposed change. One approach would be to address weightings initially at the sub-portfolio level and to then look at the overall stock weightings and decide whether the resultant diversification or concentration risk is acceptable.

Average capitalisation levels would be expected to decrease. There is a fair chance that a proportion of small and mid capitalisation stocks will find their way into the developing sub-portfolio – it will take movements of greater size to change the RoEs of higher capitalisation stocks by comparable amounts.

If this were the case, then overall tracking error relative to a S&P/ASX 200 index for the overall portfolio would probably increase, as could overall volatility. Decreases in tracking error relative to a S&P/ASX 300 index for the overall portfolio may occur because S&P/ASX 300 index representation levels could increase.

The developing holdings will favour growth in RoE over a sustainable RoE, or at least taking a bet that the proposed or recent lift in RoE will prove to be sustainable, and such developing holdings might, therefore, be expected to exhibit a growth-style bias compared to current core holdings.

Of course, there will a risk of disappointment in this regard, so one might expect a higher turnover in the 'developing' holdings than for the 'core' holdings in the portfolio. This would affect after-tax returns.

Question	Points made	Allocation of marks
(f)	Artificiality of back-testing vs. forward-looking experiment Difficulty of simulating decision conditions when outcomes are known Arithmetic compromises Guard against confirmation bias	1 mark for each point up to a maximum of three marks = 3 marks
		17 marks in total

Back-testing is an artificial process, particularly when the underlying investment process requires the exercise of judgement. In real-time portfolio management, judgement requires the assessment of probabilities under uncertainty whereas the outcomes are known in back-testing and it is difficult to recreate the conditions under which you think you would have operated. Decision trees or algorithms might be developed for this purpose but, in practice, discussion, experience and intuition would have played some part in the decisions made.

For this reason perhaps more weight should probably be given to the results of the forward-looking experiment than back-testing. The forward-looking experiment also provides a training window.

But, even here, compromises are often made in the arithmetic, as in back-testing, to make the calculation process pliable and EP will need to ensure that it compensates for any loss of information in interpreting the results.

Generic examples of compromises in back-testing include:
If an order is assumed to be filled say 5 years ago, back testing may assume that the order is filled at the closing price of a single day. This may not be the case because if the volume of order is high, the order fill may have to be spread over a week of trading.
If the strategy is a high frequency strategy, intra day pricing and volume available at each half hour 5 years ago may not be easily available or built into back-testing in a tractable way.

There may have been a corporate action event on the day that the back test was suppose to trade. This corporate action may have produced a price discontinuity during the day and/or thin volume before/after the corporate action. An assumption about the price at which a trading order would have been filled would need to consider at what time of day such an order would be done, and whether volumes would have been available.

EP would also need to guard against confirmation bias, the tendency to emphasise evidence that would support the new thesis and downplay that which would challenge it.

QUESTION 2 **(15 Marks)**

You have been hired as a consultant to a small family trust. At 1 October 2009 the trust has cash of $650,000. The money is being held in trust to pay cash amounts of $275,000 to each of three children when they turn eighteen on 1 October 2010, 1 November 2012 and 1 June 2014, respectively. Should a child have died beforehand, the amount is payable to his/her estate on the date at which the child would have turned eighteen if the child had not died beforehand. (An estate is a deceased person's pool of assets that is to be distributed to the beneficiaries of that deceased person's will).
The trust has asked for your advice regarding the meeting of its objectives, in nominal terms and real dollar terms.

(a) **Explain what is meant by the "term structure of interest rates"? What are two theories that attempt to explain the term structure of interest rates?**

(2 marks)

(b) **Comment on the proposition that the term structure of real interest rates is formed by the term structure of nominal interest rates less a deduction for inflation.**

(3 marks)

(c) **The trust has requested that you make a quick assessment of whether it has sufficient funds to meet its obligations as stated above. How would you perform this assessment? (Ignore the effects of inflation).**

(2 marks)

(d) **Comment on whether zero coupon bonds would be a suitable or practical type of asset for the trust. Note that the trust would require a return of approximately 8.75% p.a. to meet its objectives. (Ignore the effects of inflation and tax).**

(2 marks)

(e) **Discuss the key issues in using each of the other possible asset classes or investment strategies in light of the trust's required rate of return, and what you understand about general characteristics of various assets and market conditions to be in Australia at the current time. (Ignore the effects of inflation and tax).**

(5 marks)

(f) **Based on your answer to 2 (e), what other courses of action, that are outside of the investment strategy process, could be recommended to the trust? (Ignore the effects of tax).**

(1 mark)

Solutions Question 2

The solutions provided are longer and more comprehensive than would be expected of students under exam conditions. This is done because subsequent cohorts of students may use these solutions as a study aid.

Question	Points made	Allocation of marks
(a)	Correct explanation of "term structure of interest rates" Expectations theory Liquidity preference theory Market segmentations Preferred habitat theory	1 mark ½ mark for each up to a maximum of 1 marks (merely naming the theory is not sufficient) = 2 marks Ignore the classification system used but look for a clear statement of differences

There are different ways of classifying the various theories of terms structure. This answer follows Focardi and Fabozzi[1] in which the liquidity preference and a form of the preferred habitat theories are seen as sub-sets of the expectations theories.

The term structure of interest rates describes the relationship between the yields to maturity of bonds of the same credit quality and payment structure but differing maturities. The yield curve is the graphical representation of the term structure of interest rates. Spot, forward and swap rates have their own yield curves.

Various theories have been advanced to explain term structure. These include:

- Expectations theories, including:
  - Pure expectations theory – The points along the yield curve represents the market's expectations of short term interest rates at those times
  - Liquidity preference theory – This theory asserts that the points along the yield curve are not unbiased estimates of future rates because they also embody a premium for forgoing liquidity for the various periods, and
  - Preferred habitat theory – This theory starts with the liquidity theory but, to the extent that supply and demand do not match at the various term points long the yield curve, some borrowers and lenders will be tempted to move from their preferred positioning along the curve given a sufficient risk premium

[1] S M Focardi and F J Fabozzi (2004), *The Mathematics of Financial Models and Investment Management*, Wiley Finance, 2004.

- Market segmentation theory – This theory asserts that investors have preferred habitats along the yield curve according to their asset-liability requirements (self-imposed or regulatory). The balance of supply and such demand will determine the clearing yield at each point along the curve rather than the presence of expectations. Such investors cannot be tempted to reposition themselves along the curve as in the preferred habitat expectations theory.

Question	Points made	Allocation of marks
(b)	Expectations perspective Need to estimate inflation at each point along the curve Dependence between nominal rate and inflation estimates Comparability of real rate liquidity premium relative to nominal rate premium Segmentation perspective & separate real rate market dynamics	1 mark for comments on inflation estimation 1 mark for separate market dynamics 1 mark for quality of discussion = 3 marks Do not be too prescriptive on the contexts in which these issues are raised but students should display an understanding of the issues involved

There are two problems with this proposition as stated – How would you determine the allowance for inflation? And there appears to be no allowance for a market in real rate assets distinct from the market in nominal rate assets.

Within an expectations framework, the inflation allowance would need expectations to be formed for inflation over the various time periods involved, not a simple deterministic allowance, and there would probably be some level of dependence because a nominal rate estimate would depend, in part at least, on the inflation estimate, particularly for shorter periods.

Overlaying that would be a need to determine if a real rate liquidity premium took the same form as a nominal rate liquidity premium.

From a segmentation perspective, there are likely to be natural holders of real rate assets in the form of investors with inflation-affected liabilities (defined benefit superannuation funds, long tail general insurers etc) in addition to bond investors assessing the prospects of

a break-even trade. There are certainly traded real rate assets with market demand and supply dynamics that vary from nominal rate assets at times sufficiently to present potential arbitrage opportunities.

All this suggests that a real rate yield curve may have, at times, its own shape and that the constituent term points may not simply reflect the nominal curve less a simplistic allowance for inflation.

Question	Points made	Allocation of marks
(c)	A need to calculate IRR Compare IRR against market yields The closer the IRR is to yields of low risk assets the more viable it will be for trust to meet its obligations acknowledgement of a need to consider tax on trust's income as an issue (actual knowledge of the mechanics of trust taxation is not required to score mark)	Full marks would require the three elements – calculation, market testing and acknowledgement of tax as an issue = 2 marks There may be other approaches, e.g. testing against comparators, that you will need to assess for reasonableness

A simple way of testing the adequacy of the current amount would be to calculate the IRR required to meet the prescribed amounts and to test the calculated IRR in the market. This testing would need to take into account the likely level of risk needed to be taken to achieve the required level of return. The closer the return is to yields available on lower risk forms of investments, the more viable the current level of the trust is likely to be.

In order to make such a comparison, it is necessary to know the tax status of the trust and its probable tax rate.

Normally a trust's income is taxed at the top marginal rate unless the income is distributed in the financial year it is deemed to have been earned. Given the constraints on the trust's distributions, the trust is likely to pay the top marginal rate of tax in the financial years 2009/10 and 2011/12.

The required IRR is approximately 8.75% p.a. on an after tax basis.

Question	Points made	Allocation of marks
(d)	Cashflow matching to ensure required amounts are available when due No reinvestment risk Low availability of zero coupon assets, especially at the trust's low dollar values If available, then they are likely to be OTC and entail counter-party risk	1/2 mark for each reason = 2 marks

Three zero coupon bonds with maturities of 1 October 2010, 1 November 2012 and 1 June 2014 each for an amount of $275,000 would enable the trust to utilise a cash flow matching strategy and ensure (within a manageable credit risk if needs be) the required amounts will be paid at the required times with no reinvestment risk.

Zero coupon bonds are generally not freely available although there are some discount-based assets for shorter terms, e.g. bank bills and other forms of commercial paper. These are unlikely to be available for periods of more than a year in any volume, though.

Longer term assets would probably require over-the-counter issuance by an investment bank and it is unlikely they would be available for amounts this low. In any event, accepting zero coupons from an investment bank would require an assessment of the counter-party risk. While recent experience would generate scepticism on this score, a bank with a degree of (recently acquired) Government ownership may afford some comfort.

At current bond yields, zero coupon bonds will not return 8.75% p.a. after tax or anywhere near this level without taking on significant credit risk.

Question	Points made	Allocation of marks
(e)	There is no ideal answer but the key issues are: Bank Term deposits - Operate like zero coupon assets for maturities of less than 1 year, but longer maturities have coupon reinvestment risk. Also, maturities after October 2011 do not enjoy the Commonwealth government guarantee. Bonds – duration matching, term matching difficulties, coupon reinvestment risk, appreciable credit risk required to bridge the gap between available yields and the required IRR, some appreciation of current yield curve levels Equities – Opportunity given low historical valuations (depending on whom you talk to), highish dividend yields, potential for profit taking and reducing residual risk Property – liquidity, high transaction costs, indirect property a form of equity Mixed asset portfolio Managed funds as an alternative, but effect of fees Volatility, risk of capital loss, mark-to-market risk Trust's risk appetite and potential need to go outside to meet objectives	2.5 marks going through the various options in a logical fashion, for itemising reasonable risks and for displaying knowledge of market conditions 2.5 marks for quality of examination and discussion = 5 marks Note that there is a maximum of 1 mark per asset class/investment strategy; the answer must mention at least 5 asset classes /investment strategies to score full marks While mention of tax, such as assuming it away or as qualifying after-comment, would be ideal, students should not be penalised for ignoring it.

In what follows tax is generally ignored. Taking account of tax would serve to make the funding/investment task harder.

Term deposits would remain a possible choice and may present a more practical means of gaining zero coupon-like exposure. They would entail taking bank credit risk enhanced by a Government guarantee whenever it is available. Available rates at 1 August vary from about 4.25 – 4.75 % over 1 year to 6.0-7.5% over 5 years – a positive yield curve is currently operational. Term deposit rates are well short of the required IRR.

Capital redemption polices may be sought from life offices but a willingness to do so would probably depend on the strength of the relationship an intermediary had with a particular office. In any event the life office's profit margin would reduce the attractiveness of such options.

Bonds would be available for the approximate terms required (1 year, 3 years - 3 years and 1 month and 4 years and 8 months - 5 years as at 1 October 2009) and intermediate coupons could be reinvested as they were received. Bonds originally issued for longer terms but with unexpired terms of or near the required length may be possibly sourced through a fixed interest broker. Note that agreement would be required to defer the last payment to the extent that part of the initial principal were invested for 5 years.

Bonds would afford duration matching as a means of providing greater assurance that the objective would be met (save for the issues mentioned below).

The 1/3/5 year Government bond yields to maturity are 3.6%, 4.4% and 5.5% at 1 August 2009. A fair amount of credit risk would be required to make up the gap between these rates and the IRR (which is about 8.75% p.a.). 200-300 basis points would indicate around an AA-rated spread for an average duration; 400-500 basis points would indicate an A-rated spread.

Alternatively the trust may have to consider a mix of investment types including equities but this would require an assumption that the worst is over and that the recent recovery in share prices will substantially hold and consolidate. Average dividend yields are a touch under 5%. If significant gains were made at any stage, the trust might consider taking profits and reducing residual portfolio risk if its funding looked to be in good repair.

Capital gains from shares may be taxed at a concessional rate. Likewise, franked dividends would improve the after-tax attractiveness of shares.

Both credit and equity would involve higher volatility and the risk of capital loss. While diversification may defray some of this risk, this would not help much in extreme situations. Diversification is probably easier for equities than for credit at these volumes.

<u>Direct Property</u> might suggest itself for similar reasons as equities but its illiquidity and lumpiness might prevent it playing a meaningful role. Buying a unit, say, and betting on a recovery in property prices, while accumulating rents along the way, would be subject to high transaction costs, the risk the cycle will not work in your favour and the ability to sell at the required time. In any event it would probably only be possible to consider such a strategy for the 5 year payment.

Indirect Property would be as for equities, although the extreme price falls experienced in REITs may make them attractive on valuation grounds. Distribution yields are relatively attractive for some stocks. On the risk side, debt-based restructuring still overhangs a part of the market. Notwithstanding this REITs may have a partial role to play in the same way as equities. Active profit taking might represent an opportunity under the right conditions.

If a viable strategy could be found, it would probably require a mix of asset types.

Given its size and its family origins, the trust is likely to be a private entity and able to determine its own accounting policy. To the extent, however, that it must or chooses to mark its asset to market, the reported values of higher volatility assets would fluctuate over time. This may cause concern to the beneficiaries. Where such assets can be held to a defined maturity this reporting volatility can be explained.

Managed funds might be vehicles that meet both the trust's volume limitations and its asset type needs, and afford it some flexibility. Fund fees, which could be of the order of 1-2%, would militate against them, though.

At first glance, annuities might have some appeal but the cost of the guarantee and the life office's profit margin would be likely to make them untenable. A matched approach by the life office would put it in a similar position as the comments on the underlying asset types.

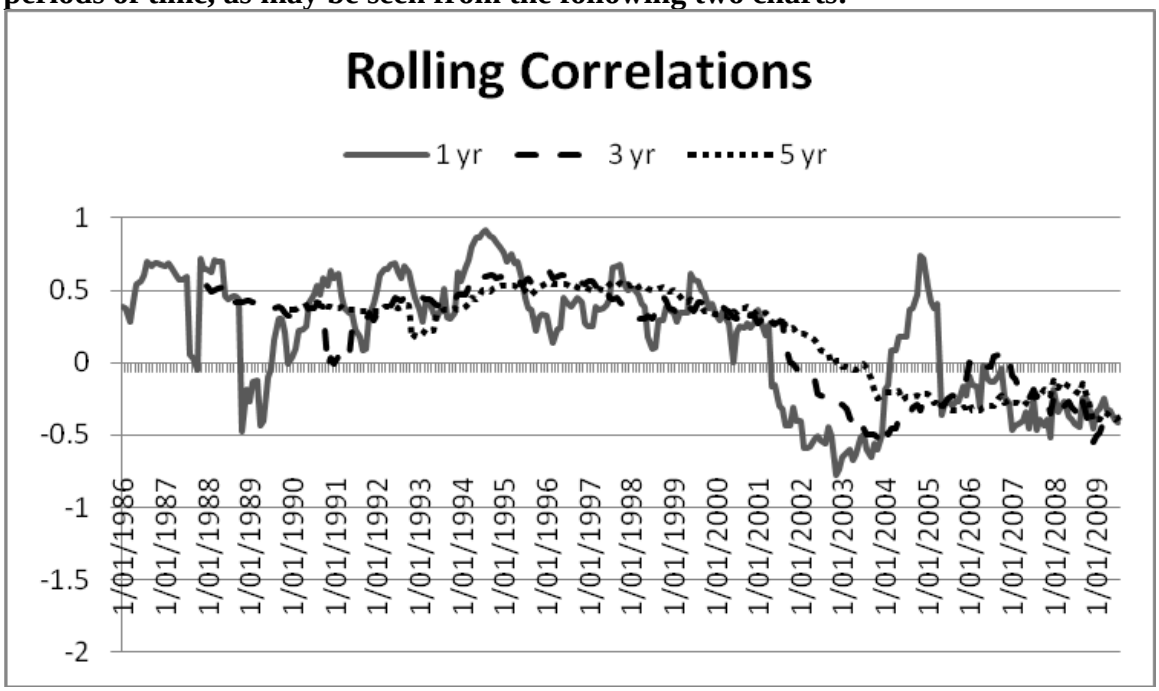
The suitability of such assets would depend on the trust's risk appetite – which would appear to be low given its current level of cash and the specified liabilities - but the trust may equally have to be made aware that it may need to take risk to meet its objectives.

Question	Points made	Allocation of marks
(f)	This is not an investment question per se but seeks to have the student consider what options the trust might face if it did not meet its objectives • Consider availability of additional capital • Face consequences of not meeting objectives - for example, scale down amounts, make partial payments and top-ups from withheld funds etc • Communicate with trust originators or their representatives and beneficiaries	1/2 mark for each reason up to a total of 1 mark
		15 marks in total

Given the risk that the objectives might not be met, the trust should consider whether additional capital is available. Failing that it should consider whether to adjust the objectives to reflect achievable outcomes or partial allocations below $275,000 with top-ups from earnings on the money held back. Whichever of the latter it considers, the trust will need to communicate with the trust sponsors (presumably the family) or their representatives to let them know of the risk the objectives will not be met and with the beneficiaries so they can adjust their plans if necessary.

QUESTION 3 **(17 Marks)**

When developing asset assumptions for use in asset modelling it is common to base assumptions regarding the covariance structure of returns on the history of the covariance structure. Assumptions for use in long term asset modelling may make use of, say, the last 20 years' experience to derive the covariance structure. It is however the case that the correlations between asset class returns are not stable over shorter periods of time, as may be seen from the following two charts:



The above chart shows rolling correlations between the ASX All Ordinaries (equity) and the Citigroup WGBI Australian Government Bonds (bonds) total return indices.

Is the correlation in international equity returns constant?: F Longin and B Solnik

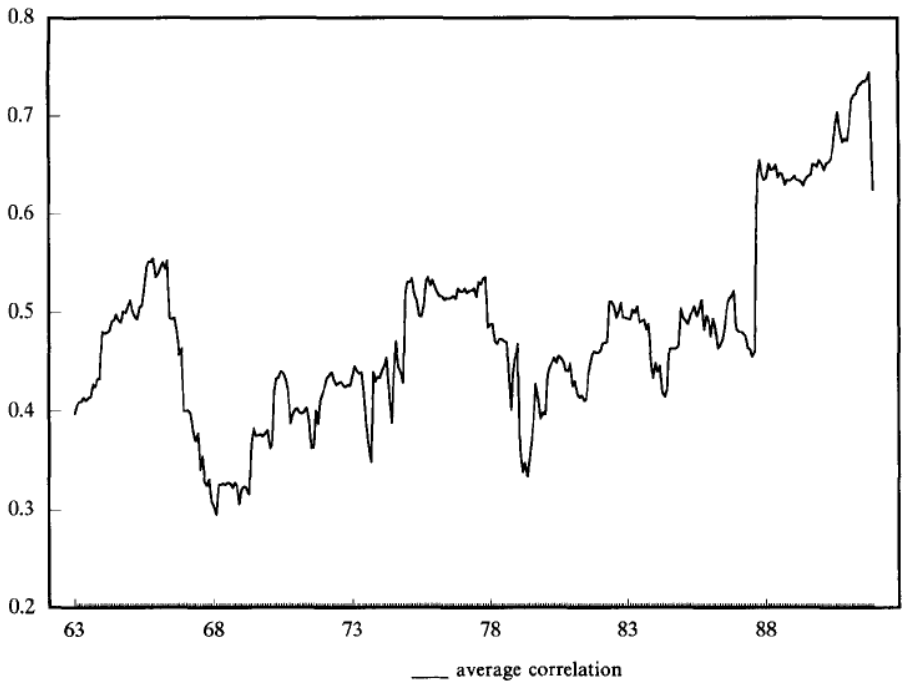


FIGURE 1. Correlation of the US stock market. This figure reports the (unweighted) average correlation of the US stock market with the other seven stock markets. The correlation is computed over sliding windows of four years, using local currency monthly total returns. The period is December 1959–91.

Source: Journal of International Money and Finance 1995 Vol 14 No 1

The above chart illustrates changing correlation between different equity markets.

Deviations from the historical correlation structure have caused difficulties in the past for long/short hedge fund strategies (strategies where the manager buys one asset which he expects to go up and sells another which he expects to go down). Long-Term Capital Management and Sowood Capital illustrate these strategies, and their failings.

In the context of a hedge fund manager considering the introduction of a new long/short investment strategy:

(a) Comment on the significance of non-stationary covariance structures for the practical application of classical mean-variance models in portfolio construction.

(4 marks)

(b) In the context of current market conditions:

- **describe how scenario testing can be used in asset modelling to explore the effects of changes in market conditions;**
- **list two examples of some changes in market conditions that are plausible; and**
- **describe any corrective actions that the hedge fund manager may utilise as a result of a scenario test.**

(5 marks)

(c) Suggest an alternative approach to asset modelling which does not require the assumption of a fixed covariance structure.

(2 marks)

(d) What other approaches could be used by a hedge fund manager to quantify their potential losses from an unexpected change in market conditions?

(2 marks)

(e) Describe the factors that a hedge fund manager could assess in seeking to manage non-stationary correlation between asset classes?

(4 marks)

Solutions Question 3

The solutions provided are longer and more comprehensive than would be expected of students under exam conditions. This is done because subsequent cohorts of students may use these solutions as a study aid.

(a) When using classical mean-variance models in portfolio construction it is important to be aware of these models' limitations.

- The asset class assumptions upon which the modelling is based cannot be regarded as constant and equally applicable to all future time periods.
- Therefore the covariance structure used should be influenced by the purpose of the modelling – long term modelling would use long term covariance history and shorter term modelling would be more influenced by shorter term covariance history.
- Any conclusions drawn from the modelling should be used only after sensitivity testing them for plausible future shifts in the covariance structure. For example an increase in the overall level of correlations between asset classes, combined with an increase in asset class volatility.
- It is particularly important to be aware of these limitations when modelling hedge fund long/short strategies, the effectiveness of which can be destroyed by a change in the covariance structure.
- Mean-variance models also do not generate the bull and bear runs often seen in equity markets, nor do they reflect the asymmetric nature of returns in these markets. Mean variance modelling is therefore inappropriate for use in applications which are sensitive to these market characteristics.

[4 marks; 1 mark for each point up to a total of 4 marks]

(b) Rather than just using current market conditions and past history as a guide, scenario modelling would instead formulate several distinct possible future economic scenarios and then carry out separate modelling for each scenario using assumptions that had been developed to be consistent with that scenario.

In the current market environment, possible scenarios might include:

- A recovery over the next two years to normal long term market conditions;
- A long term continuation of the current short term market conditions;
- A further loss of confidence leading to a market crash and a prolonged recessionary environment;
- Quantitative easing being withdrawn too slowly leading to an high inflation environment.

If it turns out that modelling on one or more of the scenarios considered as plausible will result in a high probability of unacceptable outcomes, then this is a sign that the new long/short investment strategy proposal being investigated may need to be redesigned to reduce these dangers, or abandoned if such redesign is not practicable.

In the light of various scenarios, a hedge fund manager may decide to:

- Hedge some exposures (e.g. equity or debt) in the short term, by means of options, or an option like strategy;

- Depending on confidence in a scenario, 'lock in' profits in a long/short position (e.g. emerging market debt vs. domestic debt) by means of forward contracts;
- Invest in proven inflation-proof assets (e.g. real property, infrastructure, inflation linked bonds), where a high inflation environment is anticipated;
- Diversify in assets that are countercyclical (e.g. gold, other commodities, consumer staples);
- Identify differentiating factors within the same industry (e.g. energy efficient cars in the motor industry); or
- Identify differentiating factors within the same asset class (e.g. platinum and silver have more industrial uses than gold within the precious metal category of commodities).

[5 marks: of which:
- 1 mark for sensible answer for description of scenario testing (SJ);
- 1 mark for each valid possible scenario up to a limit of 2 marks (KU);
- 1 mark for each sensible point made about corrective actions up to a limit of 2 marks (SJ).]

(c) An alternative approach would be to adopt a GARCH or regime switching type model for the asset returns. These models have the advantage of more realistically reflecting the time dependent nature of the covariance structure.

In particular, GARCH models by their nature have no separately specified covariance structure, the time varying covariance that they exhibit is an outworking of, not a premise of, the modelling.

These models are, therefore, better adapted to investigating proposals, such as long/short strategies, that may well function rather differently in bull markets and in bear markets.

[2 marks; 1 mark for model, 1 mark for reasoning]

(d) Other approaches that are available to the Hedge Fund manager include:

- VaR (Value at Risk) analysis to attempt to quantify probable maximum loss, and
- The use of Extreme Value Theory to estimate the "dangerous tail" of the distribution of outcomes.

[2 marks; 1 mark for each point]

(e) The hedge fund manager may seek to manage non-stationary correlations by:

- Identifying conditional variables that might indicate the relative performance of equity and debt in the short term (e.g. flow-of-funds data; budget surpluses);
- exploiting factors that explain the relative performance of equity markets (e.g. interest rates, fiscal policy, monetary policy, currency movements, commodity prices);

- assessing the timeframe over which correlations might depart from their long term levels;
- identifying the industry sectors which give rise to non-stationary correlations (e.g. mining in Australia; manufacturing in China; technology in US).

[4 marks; 1 mark for each valid point up to a total of 4 marks]

QUESTION 4 **(17 Marks)**

You are developing investment assumptions for two clients:

- **The funds held by an Australian (tax exempt) charity to fund its future operations.**
- **The funds held by a large complying Australian superannuation fund.**

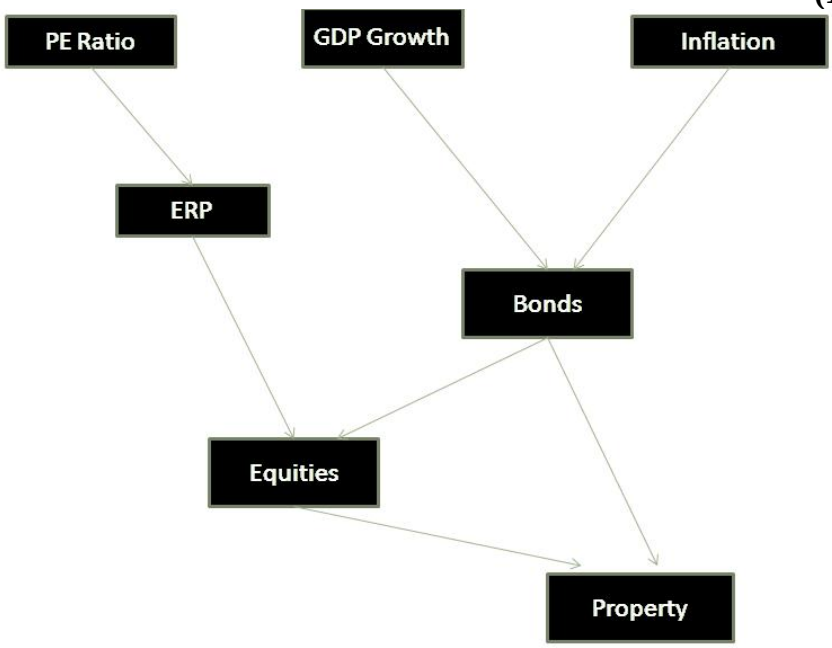
For the purposes of this question, the taxable income, including realised capital gains, of a complying superannuation fund is taxed at the rate of 15 per cent. Investment income is taxed on an 'as received' basis, while capital growth is taxed as a capital gain upon realisation of the profit from sale. If the asset sold has been held for 12 months or more the gain is discounted by a third.

Franking credits on dividends paid by Australian equities are fully recoverable both by the charity and by the superannuation fund.

(a) Using the 'cascade' method (refer to the chart below), develop reasonable pre-tax assumptions in the context of the current economic conditions for the returns on:
- **Australian bonds;**
- **Hedged international bonds;**
- **Australian equities;**
- **Unhedged international equities; and**
- **Australian listed property trusts.**

Ensure that your answer includes both the assumed pre-tax return and the reasoning utilised in choosing the assumed pre-tax return for each of the five asset classes.

(10 marks)



(b) Adjust your pre-tax assumptions to arrive at appropriate after tax assumptions for:

- **The charity;**
- **The superannuation fund.**

Assume a dividend yield on both Australian and international shares of 3% and that 75% of Australian share dividends are franked. Assume a distribution yield on Australian listed property trusts of 5%. Assume also that assets are held on average for 7 years before being sold. Note that only 2/3rds of capital gains made by superannuation funds on assets held for more than one year are included in assessable income.

(5 marks)

(c) What practical difficulties might be encountered by the charity if it uses a pooled investment vehicle with respect to whether the charity is investing its funds efficiently?

(2 marks)

Solutions Question 4

The solutions provided are longer and more comprehensive than would be expected of students under exam conditions. This is done because subsequent cohorts of students may use these solutions as a study aid.

a)

- Real bond yields are expected to equal GDP growth rates in the long term, the consensus forecast for Australian GDP growth is 3.5% and this coupled with the assumption that the RBA will be successful in keeping price inflation between 2% and 3% (say at 2.5%) in the long term, leads to an expected long term return on Australian bonds of 6%.
- Hedged international bonds may likewise be expected to provide a long term return of 6%, although a slightly higher return could be justified for those developing countries where GDP growth is expected to be higher than in Australia.
- The return on Australian Equities is arrived at by adding the Equity Risk Premium to the return on bonds. With a current market PE of around 12 and a normative level of 14, assuming mean reversion over 5 years and a long run average ERP of 5.5% we can calculate an ERP of 5.5% + $(14/12)^{1/5} - 1$ = 8.5% (approximately). The expected return on Australian Equities is thus 14.5% (risk free rate + ERP i.e. 6% + 8.5%). As the period for mean reversion is not known with any certainty, full marks should be given for the use of any period between 5 and 10 years.
- Similarly, the return on unhedged international equities is expected to be 14.5%.

(Note to marker: if a student uses a more complicated method such as comparing current PE for MSCI Global Index vs. long run PE for MSCI Global Index for ERP mean reversion, then as long as assumptions are reasonable, award the 1 mark)

- Australian listed Property, with a beta of around 0.5 against the equity index, therefore is expected to come out midway between bonds and equities at 10.3%.
  (risk free rate + LPT beta x ERP i.e. 6% + 0.5 x 8.5%)

(Note to marker: markers are to allow reasonable assumptions in the following ranges:
GDP: 2% to 4%
Inflation: 2% to 3%
Normative ERP: 5% to 6%
Normative PE: 13 to 16
LPT beta: 0.4 to 0.6)

[1 mark for each reasonable numeric pre-tax return assumption (SJ), 1 mark for the reasoning supporting the calculation of each of the five numeric pre-tax returns (KU except for Australian Equities which is CJ) - Total 10 marks]

(Note to marker: if a student does not realise that normalising the market PE is required to calculate ERP or calculates an incorrect ERP arithmetically in the initial stage, then

subsequent assumed numeric pre-tax returns of all equity asset classes will be incorrect. The marker should use judgment in awarding some marks in the subsequent answers where this has occurred.)

b) Adjusting for taxation:

For the charity:

Because the charity is tax exempt, the only adjustment required is for the recovery of franking credits on dividends. It is assumed that these are not fully priced in by the market, as these franking credits are not available to overseas participants in the Australian market.

We assume that the dividend yield on Australian shares is 3%, and that 75% of these dividends are fully franked. We also assume that the corporate tax rate is 30%.

Franking credits thus increase the return on Australian equities to the charity by 0.75 x (0.3/0.7) x 3% = 1.0% approximately, resulting in an after tax return of 15.5%.

[1 mark for numerical after tax return (SJ). Note that any attempt to calculate an after-tax LPT return for the charity is wrong because LPT distributions being derived from rental returns are not franked]

For the superannuation fund:

We have a tax rate of 15% on investment income and 10% on capital gains (as we assume that assets are held for 7 years on average before being sold).

The after tax risk free rate is thus 6.0% x 0.85 = 5.1%

The effective tax rate on capital gains is therefore 10% x 1.051^{-7} = 7.1%

<u>Australian shares</u>
The effective after tax income on Australian shares is
3% - [0.75 x [(0.15-0.3)/0.7] x 3% + 0.25 x 0.15 x 3%} = 3.4%

Resulting in a total after tax return on Australian shares of
3.4% + (14.5%-3.0%) x (1-0.071) = 14.1%

<u>International shares</u>
If we assume that the dividend yield on International shares is also 3%

We get an after tax return on International shares of
3.0% x 0.85 + (14.5%-3.0%) x (1-0.071) = 13.2%

Australian listed Property
If we assume that the distribution return on Australian LPTs is 5%

We get an after tax return on Australian LPTs of
5.0% x 0.85 + (10.3%-5.0%) x (1-0.071) = 9.2%
(Note that LPT distributions being derived from rental returns are not franked)

The effective tax rates and after tax returns for the various asset classes are thus:

Asset class	After tax return	Mark allocation
Australian Bonds	5.1% = 0.85 x 6.0%	½ mark (KU)
International Bonds (hedged)	5.1% = 0.85 x 6.0%	½ mark (KU)
Australian Equity	14.1% (see above)	1 mark (SJ)
International Equity (unhedged)	13.2% (see above)	1 mark (SJ)
Australian Listed Property	9.2% (see above)	1 mark (SJ)

[Total 5 marks for (b)]

c) The charity will wish to invest in such a way so as to maximise its franking credits. It may well be restricted, however, for practical reasons related to its size, to investing through pooled investment vehicles. Most of such vehicles are dominated by taxed, rather than tax exempt, investors and so the investment manager running the vehicle is most likely to invest so as to optimise the after-tax returns for these other investors, rather than for tax exempt investors, such as the charity. (CGT is not the same impediment to active management for a tax exempt investor as it is for a taxed investor).
Any constraints on the charity such as taking into consideration the ethical practices of investee companies may rule out usage of a large number of high performing pooled investment vehicles that do not use ethical factors as part of their investment process.
Lastly, the unpredictable cash flow of a charity may mean that asset allocations, and manager allocations, have to be constantly reviewed.

[2 marks; subject to a maximum of 2 marks:
award

- 1 mark for either maximising franking credits or risk appetite of the charity may not be consistent with maximising franking credits
- ½ mark for the tax disadvantages associated with using pooled investment vehicles,
- ½ mark for CGT not being a major impediment to active management for a tax exempt investor,
- ½ mark for unpredictable cashflow,
- ½ mark for the likelihood of needing to review asset allocation and/or manager allocation
- ½ mark for constraints on what they invest in for ethical purposes.]

QUESTION 5 **(20 Marks)**

You have been appointed as the Portfolio Manager for a diversified Australian infrastructure fund. The fund's core assets include partial ownership of two domestic airports (book value of $450 million), full ownership of a port facility (book value of $250 million) and partial ownership of three coal power generators (book value of $1.6 billion). The fund currently holds $120 million in cash. It has no other significant assets.

The fund is significantly leveraged. At present, the assets are funded by $1.6 billion of debt. $400 million in the form of a syndicated bank loan is due in nine months time. The other debt obligations are not due for the next twelve months. It has no other significant liabilities.

Based on the most recent closing market price, this fund has a market capitalisation of $620 million. The lenders have a right to request early repayment if the market capitalisation falls below $300 million.

Given the current climate, you are aware of the difficulties of trying to sell your assets at a reasonable price.

You are now preparing your investment plan for the coming twelve months for the Board of Directors.

(a) **The Board of Directors has asked you to set your two primary investment objectives for the coming twelve months. State your two investment objectives, and give a relevant quantitative measure for assessing performance in meeting each of the two objectives.**

(4 marks)

(b) **Your first step in managing this fund's assets is to arrange these assets into an investment portfolio. Explain why you would not simply classify the non-cash assets under the "infrastructure" asset class. Describe two other methods of classifying the assets that you would consider instead with reasons for choice of the methods.**

(3 marks)

(c) **Identify four potential major risks faced by the fund in the coming twelve months. Your answer should relate to the objectives described in (a) but consider also the broader environment.**

(4 marks)

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(d) **Two years ago, you purchased a put option on the port facility to sell it to a finance company (not one of your lenders) for $300 million.**

What are two common models used to value a put option?

Explain the key difficulties in determining the fairness of the put option purchase price paid, and the implication for the level of the put option price paid two years ago.

You are not required to give any parameter estimates nor calculate the put option price.

(5 marks)

(e) **One of your potential strategies is to conduct a rights issue to raise $250 million equity capital from existing unit-holders.**

From the perspective of a current investor of the infrastructure fund, discuss what types of portfolio management factors the investor would consider before deciding whether to take up the rights entitlements.

(4 marks)

Solutions Question 5

The solutions provided are longer and more comprehensive than would be expected of students under exam conditions. This is done because subsequent cohorts of students may use these solutions as a study aid.

a) The two key investment objectives for this fund are:

- Accumulating enough cash from asset sales, revenues and capital raisings to repay the $400 million loan. The quantitative measure would be the amount of cash after deducting capital expenditure, maintenance costs and other operating expenses and taxes.
- Generating strong sustainable returns from asset investments in order to remain competitive in the market. The quantitative measure would be the net investment profit after tax. Alternatively, candidates may specify the level of out performance of the stock price returns relative to its peers.

[Candidates need to specify repaying the loan as the key reason to earn more than 2 marks out of 4.
Award 1 mark for each objective (CJ) and 1 mark for an appropriate quantitative measure (SJ). Students should not be given marks for the second quantitative measure if they specify a % of investment returns relative to a benchmark (e.g. 2% above the government bond rate) as this fund is a listed entity.

4 marks: 2 marks SJ, 2 marks CJ]

b) Specifying the portfolio as comprising infrastructure assets is meaningless as almost all the non-cash assets are infrastructure assets. Analysing the portfolio further by classifying these assets more clearly makes more sense.

Appropriate alternative approaches may include:

- Splitting the assets by their primary function (airports, port facility, power generators). The different assets have their own risk profile, earnings pattern, interactions with economic and other factors affecting their value and performance.
- Considering the assets by geographic location because the cash flows from these assets are likely to vary according to the prevailing legislations and business activity.
- Whether the assets have regulated or unregulated rates of return. A regulated asset will have more stable cashflows.
- Whether the fee or price that the asset receives from providing the product or service is fixed by contract versus the asset being subject to spot pricing i.e. price received fluctuates according to the balance between market supply and demand. An asset subject to spot pricing will have more volatile cashflows.

[1 mark for reason why would not classify the non-cash assets under the “infrastructure”

asset class (KU),
1/2 mark (up to a total of 1) for each of two appropriate alternative approaches (SJ),
1/2 mark (up to a total of 1) for providing reason for selecting the method (SJ).
Total 3 marks, 1 mark KU, 2 marks SJ]

c) The fund faces these following risks:

- The core operating assets underperform and therefore generate a lower cash flow than expected. This underperformance puts an additional strain on the fund's ability to repay debt.
- The lenders request early loan repayment because of the share price falling below the market capitalisation trigger point. This may cause an immediate liquidity crisis for the company and potential wind-up.
- Operational risks in the investment assets leading to higher expenditures than expected. This risk leads to less cash being available to meet debt repayment.
- The fund risks being unable to sell their core operating assets at a reasonable price or within a reasonable timeframe in order to raise sufficient cash to repay the loan as it falls due.
- The fund is unable to negotiate an extension to the loan in the case the fund is unable to raise enough cash to repay the loan at the maturity date.
- Financing costs increase, putting additional strain on the fund's ability to repay debt.

1 mark for each clearly explained risk up to a total of 4 marks (SJ).
Do not award any marks for simply quoting generic risks (liquidity risk, operational risk, market risk). Candidates must clearly explain the risk in context of the given scenario.

d) The put option is priced typically using an option pricing model such as (1) the binomial lattice model or (2) the Black-Scholes option pricing model.

The key difficulties in pricing this put option include:

- The book value of the asset is not necessarily the market value. Infrastructure assets are typically unique or are a natural monopoly, thus an appropriate market value cannot be easily calculated as comparable assets with a known market price are not commonly able to be found.

- The volatility of the asset is unlikely to be reliably estimated because these assets tend to be transacted irregularly. Any periodic appraisal valuations will understate volatility because appraisal valuation methods tend to smooth prices from one valuation date to the next.
- This put option is an over-the-counter option so it is very illiquid. Being over-the-counter means that any transactions are conducted in private and the traded price is not publicly disseminated.

The above difficulties are likely to mean the put option was sold at a significant mark-up over fair value to protect the writer's interests.

Award 1/2 mark for stating each model used for pricing a put option(KU).
Award 1 mark (up to a total of 3 marks) for each identified difficulty. The key to this answer is recognising the difficulties in choosing the right parameters for (i) asset price & (ii) volatility, and the illiquidity of this particular option (CJ).
Award 1 mark for stating the likelihood of the put option being sold at a significant premium (SJ).

[5 Marks: 1 mark KU, 1 mark SJ and 3 marks CJ]

e) The key issues to consider are the investor's objectives, diversification of portfolio holdings, performance and risk.

The following factors would be considered:

- The current holdings in this fund as a proportion of the investor's portfolio. Investors are unlikely to take up the rights if they are either overweight in this particular fund and/or overweight in the infrastructure sector.
- The infrastructure fund has a small market capitalisation. Investors are unlikely to take up the rights if they are likely to become or are already overweight in small cap stocks.
- The additional volatility or investment risk taken because this infrastructure fund is facing significant liquidity and sector-specific risks. These risks may be undesirable to the investor, especially if superior alternatives exist.
- The effect of the rights issue on the portfolio's rate of returns. If the rights issue is not accompanied by a distribution/dividend cut, the rights issue potentially increases the portfolio's yield due to the discounted price of the issue. Moreover, a potential exists for a quick profit as seen by some rights issues to date.
- The investor's portfolio will have less cash after taking up the rights entitlements. This may reduce the investor's flexibility to take advantage of other investment opportunities if they appear.
- The taking up of the rights entitlements may lead to the portfolio breaching their mandate e.g. any single holding may be subject to a maximum % of the portfolio, in the case of certain funds which restrict holdings of individual issues.
- However, if the investor was not to take up the rights issue, then the investor's holding in the fund will be diluted. This would reduce the investor's exposure to any future upside from outperformance of the fund.

Award 1 mark (up to a total of 4 marks) for each appropriate point. Other reasonable points may also be considered.

QUESTION 6 **(14 Marks)**

You are an external adviser for an established unlisted buyout firm, Conquest Securities. The firm is structured as an unlisted unit trust that accepts investment monies from wholesale investors. The management of Conquest Securities is conducting a portfolio review to ensure they are positioned well for the volatile times ahead. They have sought your services in advising them on this assignment.

Conquest Securities aims to purchase controlling stakes of underpriced companies in different sectors in the Australian market. Some companies are fully bought out, after which they are delisted from the stock exchange. The acquired companies are then managed by key personnel appointed by Conquest Securities with a view to rebuilding these companies to their fair value. Conquest Securities then exits these companies through an IPO (initial public offer), trade sale, spin-off or selling off the majority stake. This process may mean the rewards are realised several years later.

The market value of "Assets Under Management" is $7.2 billion. The breakdown of the sector exposures is given below:

SECTOR	MARKET VALUE OF COMMITTED FUNDS
Financial	$1.2 billion
Industrials	$1.5 billion
Materials/Resources	$0.6 billion
Healthcare/Biotechnology	$0.3 billion
Consumer Discretionary	$1.1 billion

Conquest Securities currently also holds $1.5 billion in cash; and $1.0 billion in fixed income securities (consisting of short-term bank bills and 5 year government bonds only). Conquest Securities does not have any debt obligations.

Over the past 18 months, Australian listed companies have raised over $50 billion of capital in rights issues to repay debt and replenish their balance sheets. A number of companies are lining up for a second round of issues. Conquest Securities have indicated in the case this happens, they will contribute capital to retain their controlling stakes.

(a) Evaluate Conquest's investment portfolio's risk profile by considering the three different asset classes forming this portfolio. Ensure your answer discusses significant features of the portfolio's investments within an asset class which will affect Conquest's investment performance and financial position.

(6 marks)

(b) Describe the investment style that you think is appropriate for Conquest to use.
What analytical steps should be taken for considering whether a new company investment should be included into the portfolio (the analytical steps are with reference to the portfolio's investment attributes only). **(4 marks)**

(c) Conquest Securities is considering charging an annual performance-based fee to their wholesale investors (investment houses, superannuation funds, university endowment funds) for the services they provide. Give two key challenges you anticipate in formulating a fair performance-based fee structure for Conquest Securities.

(4 marks)

END OF PAPER

Solutions Question 6

The solutions provided are longer and more comprehensive than would be expected of students under exam conditions. This is done because subsequent cohorts of students may use these solutions as a study aid.

a) The key themes to consider are the level of risk for each asset class, the state of the current economy magnifying equity risk but being beneficial to bank bill and bond investments in the short-term as well as the risk of further rights issues diluting control.

The fund's general risk profile includes the following points:

- 70% of the fund's assets are in high risk equity investments while 30% is invested in shorter term and more defensive asset classes.

Equity holdings

- Underpriced securities in this current market are likely to contain distressed companies and these stocks are very high risk.
- The sector exposure is relatively diversified with Conquest's portfolio being invested in five sectors.
- A $300 million exposure to healthcare stocks may seem small but this represents 6% of total equity holdings whereas the S&P/ASX 200 Healthcare index weight is less than 3%. Furthermore, Australian healthcare/biotechnology stocks tend to be highly speculative.

Cash holdings

- $1.5 billion in cash forms slightly over 20% of the portfolio. This proportion is reasonable because it offers flexibility to the fund to invest in opportunities as they arise and to contribute to rights issues to avoid diluting their control.
- The level of cash may not be enough if most of their invested companies decide to raise further capital.

Short-term bank bills and 5 year government bonds

- $1 billion in bank bills and 5 year government bonds are a reasonable enhancing component to the portfolio because it offers diversification benefits to the portfolio and also produces returns slightly above cash.
- The potential for a further decrease in the RBA cash rate makes bank bills and bonds attractive as their price increases, boosting returns from this asset class. Conversely, 5 year government bonds run the risk of a capital loss if instead the RBA increases its cash rate in the future placing upward pressure over the whole yield curve.

Candidates are awarded 1 mark for giving the first statement (70/30 split), which is essential (KU).

Award a maximum of 2 marks for a reasonable discussion on the risk profile of equity holdings (CJ).
Award a maximum of 2 marks for a reasonable discussion on the risk profile for cash, and award a maximum of 2 marks for a reasonable discussion of fixed income securities (i.e. short-term bills and 5 year government bonds holdings) up to a total of 3 marks for cash and fixed income (CJ).
[total 6 marks]

b) Conquest Securities should adopt the value approach to selecting suitable companies to include in their portfolio

The analytical steps for value investing include:

- Assess companies according to the financial ratios such as PE ratio, dividend yield, price to book value ratio and net asset value per share. Shortlist companies with ratios pointing to underpricing.
- Investigate the short listed companies for their current financial position, corporate strategy and risk levels. Compare these against suitable competitors to determine if the company is suitably priced for investing in.
- If the company is to be included into Conquest's current portfolio, the investment portfolio needs to be analysed with regards to changes to expected return, volatility, sector exposure and cash liquidity of both the acquired company and Conquest's portfolio post-acquisition.

Award 1 mark for candidates stating clearly the fund should take a value approach to acquire companies for investment (SJ).
Award a maximum of 2 marks for describing the generic approach to value investment. The idea is to start with financial ratios and then investigate the company in greater detail if they meet the financial ratios criteria (KU).
Award 1 mark for a statement explaining how the new investment is assessed in relation to the existing portfolio (CJ).
[total 4 marks]

c) The key challenges rest on the long term horizon, the difficulty of selecting a suitable benchmark and the absence of a standard and reliable metric to measure investment performance for delisted companies.

Conquest Securities is expected to face the following key challenges for determining a fair annual performance-based fee structure:

- Conquest Securities has a long-term investment horizon so annual performance may not indicate fairly the rewards to investors due to them in the future. Hence, trying to set performance fees on an annual basis is unlikely to be particularly meaningful.

- Selecting an appropriate benchmark to compare portfolio performance is not easy because Conquest Securities would typically invest in distressed companies whose returns are highly unpredictable. Comparisons to a broadbased index like the S&P / ASX 200 would be too low a hurdle because a broadbased index would be much less volatile than a distressed companies portfolio.
- An appropriate measure for investment performance is not easy to find because some companies are bought out and delisted. Delisted companies have no share price so an alternative metric needs to be used. The reported profit figures of these companies do not necessarily tell the full story.
- Difficult to verify whether Conquest Securities is delivering superior returns because of a lack of a standard benchmark that includes equities, fixed income and cash holdings together in a single portfolio. Hence, investors may resist the introduction of such a fee structure.

Award 2 marks up to total of 4 marks for each clearly explained point.
[total 4 marks]

END OF SOLUTIONS