MARKING GUIDE

Overall

The standard difficulty per exam is KU 20%, SJ 40%, CJ 40%. This exam is slightly overweight KU and CJ questions, and correspondingly underweight SJ questions.

Overall, this exam is expected to be in line with other subject papers in respect of difficulty.

Level of Difficulty

PAPER 1

	Topic	Unit	Aims	KU	SJ	CJ	Total
Question 1	Investment environment	1, 4	2	8			**8**
Question 2	Financial planning	9	7	3	6	12	**21**
Question 3	Fixed interest	3, 6	9, 13	5	7		**12**
Question 4	Derivatives	3	8	2	6	12	**20**
Question 5	Equities	4	10	3	6	10	**19**
Question 6	Asset modelling	1,2,7	3, 6, 15		13	7	**20**
TOTAL				**21**	**38**	**41**	**100**

QUESTION 1: AIMS

Coverage: Units 1 and 4.
Aim 2a) Describe the main features of Australian capital markets such as types of securities, issuers, investors, intermediaries, indices and costs.
Aim 10) Demonstrate an understanding of the principles and techniques for managing an Australian equity portfolio.

The aim of this question is to test whether students understand the fundamental drivers of equity values.

QUESTION 1 (8 marks)

(a) In the past, many have put forward the notion that equities provide a suitable match for inflation-linked liabilities. Discuss why this may <u>not</u> be the case.
(3 marks)

(b) As an analyst working for a major international broking house, you are responsible for researching companies in both Australia and the United States. Early on in your research you notice that the price-earnings ratios applying to US companies are somewhat higher than those applying to Australian companies.

Provide some reasons as to why this price-earnings multiple differential might exist, even for quite similar companies.
(5 marks)

QUESTION 1: SOLUTION

Part (a)

Equities may not be an appropriate matching asset for inflation-linked liabilities as:

- Inflationary spikes tend to invoke harsh monetary policy. This tends to negatively impact company profits and the price-earnings ratios required by investors (via higher risk discount rates).

- Harsh monetary policy can further damage company prospects, and hence share prices, by increasing the risk of recessions.

- High inflation can also impact companies via:
  - Higher working capital requirements
  - Higher future capital expenditure requirements.

Note that students may produce a wide variety of valid answers.

(1 mark for each reasonable answer, up to a maximum of 3 marks)

Part (b)

Such differentials may exist due to differences in:

- Interest rates (lower in the US). Impacts profitability as well as the required rate of return on equity.
- Growth prospects may be considered to be better in the US.
- Taxation could be a factor, although it is noted that this is a complex issue, as one needs to consider taxes at both the company and end investor level, the various types of investor and investor tax rates, the Australian system of dividend imputation that applies in Australia, etc.
- Risk profiles. For example, US companies may be less risky due to better access to large local consumer markets and deeper capital markets.
- Supply of funds, and potential flows of funds. In most countries there is a bias towards local markets. This may be an important factor from time to time as the supply of funds in different countries varies. The massive flow of funds into 401k plans and mutual funds in the US has been a big driver of US markets in recent years (recent flows notwithstanding). Further, the US's attractiveness for non-domestic investors may be considered greater than Australia's, further improving the supply of funds for investment in the US (and potential supply).
- Liquidity. The more liquid US market may command some form of premium in the form of PE ratios.
- Transaction costs. Transaction costs may be lower in the US, implying a PE ratio premium. This is likely to be particularly true in respect of market impact of trading (given its better liquidity).
- Regulation. Possibly lower costs of compliance in the US could
- Accounting standards. Earnings presented under US standards may be different to those prepared under Australian standards – implying lower earnings (and hence higher PE ratios) for the same company when preparing its accounts under US standards.
- Sentiment may favour US companies.

(1 mark for each valid point, up to a maximum of 5 marks)

QUESTION 2: AIMS

Coverage: Unit 9
Aim 7: Demonstrate an understanding of how to design personal financial plans

The aim of this question is to test whether students are able to demonstrate a basic understanding of financial planning.

QUESTION 2 (21 marks)

After a successful career as an investment actuary for a major fund manager, you recently decided to enter financial planning. Andrew (30) and Jean (28) have formally engaged you to provide financial advice. You note the following:

- **They are planning to marry in June 2003 at a cost of $15,000.**
- **Each has saved $90,000 in a high interest Internet easy saver account (total of $180,000).**
- **Currently they can save $6,000 per month ($3,000 each) to the high interest Internet easy saver account (after rent).**
- **Jean has quite a stable income whilst Andrew's income fluctuates quite dramatically as he moves between contracts.**
- **They are both high-income earners on the top marginal tax rate and each year incurs a hefty tax bill. Hence they are keen on any strategies you can suggest to improve their tax position.**
- **Andrew is an aggressive investor, in particular:**
  - **He recently lost $50,000 in an agricultural tax scheme; and**
  - **He has a $40,000 margin loan that regularly experiences calls, as he seems to consistently buy stocks that fall in value. In particular he suffered quite a loss on the recent fall in health/biotech and telecommunication stocks. Currently his portfolio is valued at $80,000 so he has a $40,000 net position.**
- **Over the last six months they have been looking to jointly purchase a property to 'call home' in Sydney for around $600,000. The property market seems overheated so they are finding it challenging to decide on a good entry point.**
- **Both are prepared to take managed risks to get ahead in life.**

They have been holding most of their resources in cash in anticipation of shortly buying a property, but now the property purchase could be three to twelve months or even further away.

Andrew and Jean would like your advice on how they could better manage their financial affairs. In particular they would like to consider gearing into local and international shares. They are interested in how you as an actuary might approach their circumstances.

(a) What issues would you identify as the most important in formulating a financial plan for Andrew and Jean? Include in your answer a discussion of how

investment strategies will be influenced by each issue. (4 marks)

(b) What further information would you seek with respect to their future plans? (2 marks)

(c) You decide to build a relatively simple deterministic financial model for Andrew and Jean. Fill in the following table with the assumptions you would make in respect of:

- **The likely income yields (separately identifying assumptions for imputation credits); and**
- **A reasonable range of capital growth outcomes (both a maximum and a minimum) to include in your modeling of potential outcomes.**

Asset Class	Income Yield	Imputation Credits	Capital loss maximum	Capital gain maximum
Cash				
Property Trusts				
Large Capitalisation Australian Equity				
Small Capitalisation Australian Equity				
International shares				
Sydney Property				

What would you expect a margin loan to currently cost? (3 marks)

(d) Calculate the deposit Andrew and Jean would have available to apply to a property purchase in six months assuming that:

- **Andrew's existing share portfolio and margin loan remain in place.**
- **All existing cash plus the proceeds of another 50% margin loan are invested in Australian small capitalisation shares. That is, $360,000 is invested in small capitalisation shares, $180,000 funded by their current cash holdings and the remainder by the margin loan.**

Two answers should be given for this investment strategy:

- **One assuming that the shares experience the maximum capital growth assumption you made in part (c).**

- **The other assuming that the shares experience the maximum capital loss assumption you made in part (c).**

  Assume:

- **In respect of Andrew's existing share portfolio, that it consists of Australian large capitalisation shares.**
- **That interest on the margin loans is paid at the end of the six-month period.**
- **Capital value movements occur at the end of the six months, i.e. the shares do not change in value until the end of the period.**
- **For capital gains tax, that capital gains are not discounted as the investments are held for less than one year and that the tax benefit of capital losses can be realised immediately. Further, assume that there are no capital losses carried forward to offset future capital gains.**
- **Include a 1.5% Medicare levy in all tax calculations.**
- **Cash flows occur at the end of periods to allow ease of calculation.**

  Clearly set out all working. (12 marks)

QUESTION 2: SOLUTION

Part (a)

The primary issues to address in formulating a financial plan for Andrew and Jean are their risk appetite, relatively high income (and corresponding high tax liabilities) and significant savings. More specifically:

- Both are high-income earners. This suggests that:
  - Tax effective strategies such as gearing might be more attractive than otherwise.
  - Their ability to cope with swings in their wealth, i.e. investment risk, is likely to be higher than otherwise

  (1 mark)

- They have stated that their willingness to accept risk is reasonably high – suggesting a more aggressive asset allocation than otherwise is likely to be attractive to them.

  (½ mark)

- Purchasing a house is obviously a priority for them, but they appear to be flexible in regards to timing. If this was a fixed commitment, liquidity would be important. Their flexibility on timing suggests that taking measured risk may be more acceptable than otherwise.

  (½ mark)

- Andrew's loss on the agricultural investment scheme also suggests that he may well have some tax losses that can be carried forward. This means that some future realised capital gains may be tax-free.

(½ mark)

- Andrew's income is not stable, while Jean's income is relatively secure. If the final path taken involves gearing/margin lending, they should make sure that they have the capacity to cope with the cash flow pressures that could arise should Andrew's income fall for a reasonable period.

(½ mark)

- They have stated that they would like to gear into Australian and/or international shares. This raises several issues:
    - What would be their preferred vehicle for investing in such assets? Direct investments or managed funds? Andrew's track record indicates that stock picking is not his strong suit, suggesting that a managed fund might be a better option.
    - What could be the taxation implications of investing in international shares?

(1 mark)

(Guide to markers: Marks as above to a maximum of 4 marks)

Part (b)

Further information that you might seek from them would include:

- At what age would they like to retire?
- In what circumstances (financially) would they like to retire?
- What other financial commitments do they foresee over the medium term, e.g. an extended break or children.
- No mention is made of their current superannuation savings. An integrated financial plan would allow for these savings.
- What insurances do they have in place? If they embark on any gearing strategies is the current level of insurance sufficient?

(Guide to markers: ½ mark for each reasonable point made to a maximum of 2 marks)

Part (c)

Asset class	Income Yield	Imputation Credits	Capital loss Maximum	Capital gain maximum
Cash	4.75%	-	0%	0%
Property Trusts	7.50%	-	-5.00%	5.00%
Large Capitalisation	3.50%	50.00%	-10.00%	10.00%

Australian Aussie Equity				
Small Capitalisation Australian Aussie Equity	1.50%	0%	-20.00%	20.00%
Sydney Property	3.00%	-	-5.00%	5.00%
International	1.50%	0%	-20.00%	20.00%
Margin Loan	7.70%			

Guide to markers:

- Effectively 18 assumptions required.
- ½ mark for the assumption set for each asset class (including margin loan) to a maximum of 3 marks.
- Deduct ½ a mark for each invalid answer.

Part (d)

Key elements of the calculations are as follows.

- Incremental tax is calculated at 48.5% on the additional income (capital gains, dividends and imputation credits) less the margin loan interest. A final adjustment is made for tax "pre-paid" via the imputation credit.
- All cash flows other than savings are assumed to occur at the end of the period.
- At the end of the period all shares are assumed to be sold and the margin loans repaid in full. The net wealth then available is the amount available for the deposit on the house.

Calculations must then be made in respect of:

- Andrew's initial share portfolio
- Andrew's initial margin loan
- The new small capitalisation share portfolio
- The new small capitalisation share margin loan

Hence our calculations are as set out below. For simplicity simple interest is used.

Andrew's existing margin loan is kept as is.

Andrew's Margin loan		
		Calculation
Opening Balance	40,000	
Interest @ 7.7%	1,540	40,000 x 7.7%/2

(½ mark)

Andrew's Share portfolio (large capitalisation)		
		Calculation
Opening value	80,000	
Dividends @ 3.5% pa	1,400	80,000 x 3.5%/2
Imputation credits (50%)	300	1,400 /(1-30%) x 30% x 50%
Capital Gain @ 10% pa	4,000	80,000 x 10%/2

(3 marks)

On day one the free cash of $180,000 plus another $180,000 from the margin loan is invested in a small capitalisation portfolio. Small capitalization shares have lower dividend yields as per our assumptions and lower imputation credits (as a % of the dividend rate).

New margin loan		
		Calculation
Opening Balance	180,000	
Interest @ 7.7%	6,930	180,000 x 7.7%/2

(½ mark)

New share portfolio (small capitalisation shares)		
		Calculation
Opening value	360,000	
Dividends @ 1.5%	2,700	360,000 x 1.5%/2
Imputation credits (0%)	-	
Capital Gain @ 20% pa	36,000	360,000 x 20%/2

(2 marks)

As Andrew and Joan have the same marginal tax rate, we can perform a single tax calculation – using the highest marginal tax rate.

Tax payable		
		Calculation
Interest income	0	
Capital gain	40,000	4,000+36,000
Dividends	4,100	1,400+2,700
Imputation credits	300	Large cap shares only
Margin loan interest	(8,470)	(1,540) + (6,930)
Taxable income	**35,930**	**Sum of above**
Prima facie tax payable (48.5%)	17,426	48.5% x 35,930
Less: Imputation credit	(300)	As above
Tax payable	**17,126**	**17,426 - 300**

(2 marks)

There is no interest earned as all free cash at the outset is invested into small capitalisation shares, and all salary is assumed invested at the end of the period (as per the question). Using the above calculations, we can now calculate the amount available at the end of the period as the amounts earned less those incurred, plus proceeds from share sales less the amounts required to repay the margin loans.

Net wealth at the end of the period		
		Calculation
Savings	36,000	6 x 6,000
Interest income	0	
Dividends	4,100	
Margin loan interest	(8,470)	
Tax paid	(17,126)	
Proceeds from share sales	480,000	80,000+360,000+4,000+36,000
Repayment of margin loan	(220,000)	40,000+180,000
Final net wealth	**274,504**	

(1 mark)

Once again, if the capital gain (loss) was -10% rather than +10% (i.e. a capital loss) for large capitalisation shares and –20% instead of 20% for small capitalisation shares, then the tax paid figure and final net wealth figure would be lower, as follows. Note that one just has to change the sign on the capital gain amount before adjusting for tax payable (a negative tax payment involves a reduction in other tax liabilities due).

Tax payable	
Interest income	0
Capital gain	(40,000)
Dividends	4,100
Imputation credits	300
Margin loan interest	(8,470)
Taxable income	**(44,070)**
Prima facie tax payable	(21,374)
Less: Imputation credit	(300)
Tax payable (rebate)	**(21,674)**

(2 marks)

Net wealth at the end of the period		
		Calculations
Savings	36,000	6 x 6,000
Interest income	0	
Dividends	4,100	
Margin loan interest	(8,470)	

Tax paid	21,674	
Proceeds from share sales	400,000	80,000+360,000-4,000-36,000
Repayment of margin loan	(220,000)	40,000+180,000
Final Net wealth	**233,304**	

(1 mark)
(Maximum of 12 marks)

QUESTION 3: AIMS

Coverage: Units 3 and 6
Aim 7: Demonstrate an understanding of the main principles and techniques for investing in fixed interest securities
Aim 13: Selecting and appointing investment managers

The aim of this question is to test candidates' understanding of fixed interest markets, and the issues involved with managing a portfolio of such securities.

QUESTION 3 (12 marks)

You work for a large Australian based funds management company. The company employs an active investment approach to its fixed income investments.

Recently you have come under criticism from asset consultants for your inability to add value from your active approach.

(a) What arguments would you put forward in favour of continuing with an active approach? Which areas of active value added do you perceive as being the most likely to produce results in the future? (5 marks)

(b) As part of an internal review of the company's approach to managing its fixed-income investments across both government and corporate exposures, the company is considering using a global fixed-income benchmark (and broadening its range of permissible assets accordingly) rather than an Australian fixed interest benchmark. What advantages does this have, and what might be the pitfalls? (7 marks)

QUESTION 3: SOLUTION

Part (a)

There are several arguments in favour of active fixed interest management.

Consider the various sources of value add for a fixed interest manager, namely duration management and credit risk.

Arguably it has been difficult for fixed interest managers to add value from duration management in recent years due to the fact that the yield curve has been relatively stable

(not to mention flat!). This may not be the case in future with the present goings on in the share market and the broader economy. (1 mark)

The decrease in the availability of highly rated government debt, and the increase in the availability of credit risky fixed interest securities, raises the **number** of opportunities for skillful fixed interest manages to add value via active credit risk management. That is, with an increased number of credit "bets" being available, the probability of a skillful manager adding value should increase.

(2 marks)

Active fixed interest management may also be attractive in that the active value added may be lowly correlated with the value added from other sources of active management value added within the investor's portfolio, e.g. from their equity investments.

(1 mark)

As to where active value add is most likely to come from in the future:

- The above comments regarding yield curve volatility notwithstanding, a consistent active return from duration management is a difficult task - even in a liquid market where trading opportunities can be readily implemented.
- Credit risk would appear to be a more likely candidate for future value adding activities.

(1 mark for a plausible conclusion and simple supporting argument. Allocate marks to alternatives as long as suitably measured supporting arguments are provided.)

(Maximum of 5 marks)

Part (b)

The main issues are:

Advantages:

- The main advantage is diversification. This is a very significant benefit. This involves a diversification of country risk and credit risk.
- It may be possible to get exposure to names and credits not available in the domestic market.
- The universe of available securities has increased considerably. Hence the opportunities to add value from security selection have also increased. The probability of consistent, positive value from active management should similarly increase.

Potential disadvantages include:

- Managing to a global benchmark is a considerably more complex task.
- Currency issues are likely to be significant.

- The size of the fund required to get meaningful diversification, liquidity and reasonable transaction costs is considerably larger.
- The costs of managing such a portfolio, given its complexity, may also increase.
- Keeping track of all once active bets across a large portfolio but can become quite difficult.
- Taxation of such portfolios might become more complex.
- The nature of the risk has changed. While one has become more diversified, one may also be gaining exposure to individual markets that are riskier than the domestic market, e.g. emerging markets debt.
- Creditor security arrangements differ across countries – this can be an issue of particular significance as one goes down the credit curve.
- Costs of setting up such a portfolio may be high. "Conservative" clients may depart the fund if the do not seek such overseas exposures.
- Some investment mandates with the fund manager may need some revision before they can invest in overseas fixed interest.

Guide for markers:

1 mark per valid point, subject to:

- Maximum of 4 marks for advantages
- Maximum of 4 marks for disadvantages
- Maximum of 7 marks in total.

QUESTION 4: AIMS

Coverage: Unit 3
Aim 8: Demonstrate knowledge of the various derivatives used in the Australian market
Aim 13: Selecting and appointing investment managers

The aim of this question is to test candidates' understanding of equity derivatives, and the risks involved with implementing derivatives strategies. Understanding the intricacies of this question might prove challenging for some students.

QUESTION 4 (20 marks)

You are employed in the investment division of a large Australian life insurance company. Recent share market volatility has created considerable demand for your company's capital guaranteed business. Hence you now have a $500 million portfolio of assets over which your company has offered capital guarantees.

The nature of the capital guarantee is as follows:

- **The related policies offer a guarantee that at least (100 – x)% of investors' capital will be available for redemption at the end of the twelve-month period, <u>before</u> allowance for management fees.**
- **The x% amount is determined at the beginning of each year after considering advice from your department.**
- **If the return on the ASX 200 accumulation index (capital gain plus reinvested dividends), denoted R, is greater than zero for the year, the investor's return will be (100 - x)% times R, less x%, less an adjustment for tax and, of course, management fees.**
- **If the ASX200 accumulation index return is below zero, then (100-x)% of the investor's capital, less management fees, is returned.**

The investment mandate allows you to invest across a wide range of asset allocation bands, and to use derivatives.

Your manager is considering the various options for managing this portfolio, and seeks out your advice.

(a) One of the options for managing this exposure is to use derivatives. What are the key risks that the life office is exposed to if it uses derivatives? (2 marks)

(b) An investment bank has offered to assist the life office by selling put options over the relevant index. Your manager is sceptical:

"I know that those investment banking clowns will pad their derivative pricing with all sorts of margins – why should we pay away this margin! Let's replicate the delta hedging strategy ourselves on a daily basis."

What are the key disadvantages of this delta hedging strategy, as compared to using derivatives? (6 marks)

(c) After due consideration, your manager decides to go down the derivatives route. The next choice to be made is whether you should either:

- **Purchase a call option and invest the remainder of the portfolio in cash; or**
- **Purchase physical shares and a put option over this portfolio.**

(i) Describe how each of these strategies could be implemented.

(ii) What are the pros and cons of each approach? (12 marks)

QUESTION 4: SOLUTION

Part (a)

The key risks are:

- Basis risk. This is the risk that the derivative chosen does not behave in the same manner as the underlying asset position that one is trying to hedge.
- Credit risk. This is the risk that the counterparty defaults on its obligations when a payoff under the option falls due.

(1 mark for each of the two primary risks and explanation, maximum of 2 marks)

Part (b)

The key disadvantages of delta hedging in this situation are:

- The life office will not receive capital relief for its delta hedging strategy.
- Theoretically, the life insurance company could delta hedge this position. In practice however this may not be easy.
  - To start, the life insurer may not have the necessary systems to monitor their positions sufficiently closely.
  - Further, it is exposed to the risk of the market gapping at any point in time, i.e. large market movements that can render delta-hedging strategies ineffective. Such situations would put the life insurance company's capital at risk.
- Because the investment bank can manage its derivatives position across a large portfolio of options, it may be able to reduce the amount of its trading, and hence offer a competitive price for the option.
- Conversely, the life insurance company will not have this advantage, and may incur quite significant trading costs, both in terms of market impact, brokerage and other transaction costs.

- Frequent trading may also mean that benefits such as the deferral of capital gains tax will be lost.

(Maximum of 6 marks, 1 mark for each valid point)

Part (c)

Notes to markers:

The implementation of this approach involves protecting the downside by ensuring that at the end of the year there is a portfolio equal to $(100-X) for every $100 invested. Ignoring costs, the X amount would have to be solved for iteratively. This is due to the fact that X is both the cost of the put option required (to take the case of the stock and put option approach) but also impacts the level of the strike price of the option, 100-X.

In the case of the cash and call option approach, $(100-X) / (1+annual risk free rate) is invested in a one year cash deposit, $100 less this amount is invested in a call option with a strike price of $(100-X).

Part (c) (i)

Cash and call approach

This approach could operate as follows:

1. The life office buys one-year zero-coupon bonds, with a combined redemption value equal to (100-x)% of the amount on money invested in this product.

   (1 mark)

2. The remainders of the monies are invested in a call option over the ASX 200 accumulation index with a strike price equal to the starting level of the index. The option would cover stock with an initial value of (100-x)% of the original amount invested. This option would have the same expiry date one year from the commencement of the capital guaranteed contracts, i.e. the redemption date of the bond.

   The strike price of the call option would be set such that the strike price is maximized. This occurs where the option cost is equal to 100 – (100-x)/(1+annual risk free rate).

   (2 marks)

3. At the end of the year, if the option expires worthless, the zero coupon bond will support the capital guarantee. If the market is above this level, the upside to investors is funded via the call option payoff.

   (1 mark)

(Marker's notes: the student should be rewarded for noticing that the option needs to be over the accumulation index, or else that some other accommodation should be made for reinvested dividends).

(Maximum of 4 marks)

Hold physical shares and purchase put option approach

This approach could operate as follows:

1. The life office buys all of the shares in the ASX 200, equal to (100-x)% of the amount on money invested in this product. All dividends paid over the course of the year are reinvested in the index at the time of payment using the appropriate weights. (1 mark)

2. The remainder of the monies is invested in an at the money put option over the ASX 200 accumulation index covering stock to the value of (100-x)% of original amount invested. This option would have the same expiry date one year from the commencement of the capital guaranteed contracts, i.e. the redemption date of the bond. (2 marks)

3. At the end of the year, if the accumulation index returns below zero, the put option payoff plus accumulated dividends and the share portfolio should be sufficient to fund the capital guarantee. If the index is above this level, the option expires worthless but the portfolio plus accumulated dividends will provide the necessary return to investors. (1 mark)

(Maximum of 4 marks)

Part (c) (ii)

Cash and call approach

The primary advantage of this approach is the relative lack of credit risk relating to the derivative. When the option is heavily on the money, this will be in times of a reasonably buoyant share market, at which point the option counterparty is likely to be in a relatively strong position to make payment. (1 mark)

Arguably this approach is simpler to implement. Basis risk is passed to the seller of the option – avoiding any troubles regarding timely reinvestment of dividends and so on. (1 mark)

Hold physical shares and purchase put option approach

By holding physical shares, there may be capital gains tax advantages. Many customers will roll over their products at the end of the year, meaning that the same shares can be held

to back products for several years in a row. Hence capital gains tax can be deferred over this period. (1 mark)

The disadvantages of this approach are primarily the loss of the cash and call approach, i.e.

- The principal disadvantage of this approach is that the times in which one needs the option to payoff in order to fulfill the capital guarantee the option counterparty may well be in distress, particularly if it is an investment bank.
- Reinvesting dividends in all ASX200 shares at various times may be a complicated task and as noted above, can lead to basis and operational risks.

(1 mark)

(Maximum of 4 marks)

QUESTION 5: AIMS

Coverage: Unit 4
Aim 10: Demonstrate an understanding of the principles and techniques in investing in managing an Australian equity portfolio

The aim of this question is to test candidates' understanding of fundamental equity investment, and the risks involved in it.

QUESTION 5 (19 marks)

You have recently joined This Is Superannuation Management, an Australian equities funds manager with a fundamental analysis orientation.

One of your first tasks is to recommend an investment in the retailing sector. Your boss has considered the available stocks and limited your choice to one of two companies. Summary profit and loss statements and balance sheets for each company are set out below. All numbers are in AUD millions unless otherwise stated.

Company A					
Calendar year	1998	1999	2000	2001	2002
Revenue	1,000	1,100	1,210	1,331	1,464
Operating Expenses	(600)	(660)	(726)	(799)	(878)
EBITDA	400	440	484	532	586
Interest payable	(150)	(150)	(150)	(150)	(150)
Depreciation	(100)	(100)	(100)	(100)	(100)
NPBT	150	190	234	282	336
Tax	(45)	(57)	(70)	(85)	(101)
NPAT	105	133	164	198	235
No of issued shares (million)	1,000	1,000	1,000	1,000	1,000
Share price ($)	$1.58	$2.13	$2.78	$3.56	$4.46
Dividends per share paid ($)	$0.03	$0.04	$0.05	$0.06	$0.07
Assets	3,360	3,434	3,527	3,641	3,780
Liabilities					
Senior Debt	2,000	2,000	2,000	2,000	2,000
Other liabilities	100	100	100	100	100
Equity	1,260	1,334	1,427	1,541	1,680

Company B					
Calendar year	1998	1999	2000	2001	2002
Revenue	400	480	576	691	829
Operating Expenses	(340)	(408)	(490)	(588)	(705)
EBITDA	60	72	86	104	124
Interest payable	(15)	(15)	(15)	(15)	(15)
Depreciation	(5)	(5)	(5)	(5)	(5)
NPBT	40	52	66	84	104
Tax	(12)	(16)	(20)	(25)	(31)
NPAT	28	36	46	59	73

No of issued shares (million)	**150**	**150**	**150**	**150**	**150**
Share price ($)	**$1.87**	**$2.67**	**$3.72**	**$5.08**	**$6.82**
Dividends per share paid ($)	**$0.15**	**$0.19**	**$0.25**	**$ 0.31**	**$0.39**
Assets	**524**	**530**	**537**	**546**	**558**
Liabilities					
Senior Debt	**200**	**200**	**200**	**200**	**200**
Other liabilities	**100**	**100**	**100**	**100**	**100**
Equity	**224**	**230**	**237**	**246**	**258**

(a) Based on the above information, what do you see as the primary differences between Company A and Company B? Which trends or issues would you examine more closely? Show calculations where necessary.

(6 marks)

(b) This Is Superannuation Management's Chief Strategist is firmly of the view that the economy is likely to prove difficult for retailers over the next two to three years. On this basis, which of Company A and Company B do you consider likely to offer better security of capital as an equity investment? Explain your reasoning. (3 marks)

(c) What further information would you analyse before finalising your recommendation? (3 marks)

(d) Like several of its contemporaries, your employer has become increasingly vocal in terms of shareholder activism. List six issues that that you believe This Is Superannuation Management should express its views on - either publicly (e.g. via the press) or by voting their proxies at shareholder meetings - in respect of the companies that it invests in. (3 marks)

(e) Ultimately you decide to invest in Company B, acquiring a large (10%) stake in its shares. Twelve months after taking this position a private equity investor offers to buy the entire company and take it private, i.e. its shares will no longer trade on the Australian Stock Exchange. The private equity investors are very keen on this company, and wish to take the business model overseas.

Given your large stake, they have offered you the option of either selling shares to them or retaining a 10% investment in the company via a special purpose vehicle they are setting up for this transaction. In the case where you remain invested, you still have an effective 10% shareholding with the private equity investor controlling the other 90%.

What are the issues that would impact on your decision to keep or sell your stake? (4 marks)

QUESTION 5: SOLUTION

Part (a)

The primary calculations for analysis are set out in the tables below:

	Company A				
Calculation	**1998**	**1999**	**2000**	**2001**	**2002**
EBITDA margins	40%	40%	40%	40%	40%
EBITDA/interest	2.7 x	2.9 x	3.2 x	3.5 x	3.9 x
EPS	$ 0.11	$ 0.13	$ 0.16	$ 0.20	$ 0.24
Payout ratio	29%	30%	30%	30%	30%
Dividend yield	2%	2%	2%	2%	2%
Gearing:					
Debt/(Debt+Equity)	61%	60%	58%	56%	54%
P/E ratio	15.0 x	16.0 x	17.0 x	18.0 x	19.0 x
Growth in revenue		10%	10%	10%	10%
Growth in profit		27%	23%	21%	19%

	Company B				
Calculation	**1998**	**1999**	**2000**	**2001**	**2002**
EBITDA margins	15%	15%	15%	15%	15%
EBITDA/interest	4.0 x	4.8 x	5.7 x	6.9 x	8.3 x
EPS	$ 0 .19	$ 0.24	$ 0.31	$ 0.39	$ 0.49
Payout ratio	80%	79%	82%	79%	80%
Dividend yield	8%	7%	7%	6%	6%
Gearing:					
Debt/(Debt+Equity)	47%	47%	46%	45%	44%
P/E ratio	10.0 x	11.1 x	12.1 x	12.9 x	14.0 x
Growth in revenue		20%	20%	20%	20%
Growth in profit		29%	28%	28%	24%

From the above analysis, we can see that the key differences between these two companies are:

- Company B is growing both revenues and profit much faster than Company A
- Company A is considerably larger in terms of absolute levels of profit and market capitalisation.
- Company A has higher profit margins.
- Company B has lower gearing.
- Student should make the link between these two (profit margins and gearing). Higher profit margins makes higher gearing more acceptable.

- Company A is currently trading on a much higher PE ratio (19x) than Company B (14x). The reasons for this differential should be further investigated.

(1 mark for each valid point, maximum of 4 marks, each point should be supported by calculations, ½ mark for each point not supported by a calculation)

Trends/issues to examine more closely include:

- Why is Company A's dividend payout ratio so low? Does it have a deliberate strategy to reduce gearing? What is Company A doing with the reinvested earnings? Are they being invested productively, i.e. earning a reasonable rate of return on shareholders' funds?
- Company B has grown quickly over recent years? Can this growth pattern continue? If so, for how long? What are the risks to this future growth?

(2 marks)

(Maximum of 6 marks)

Part (b)

Company B probably is a better option is terms of capital security as an equity investor:

- It has a lower debt level as measured by balance sheet gearing (debt to debt and equity).
- Although it has tighter margins, Company B has better EBITDA and NPAT interest cover ratios.
- Hence subject to the need to get comfortable with its margins being sufficient to withstand the tougher times expected ahead, given its track record of solid growth and its lower PE ratio Company looks to provide better security of capital.

(Maximum of 3 marks, 1 mark for each reasonable point made. Answer should cover existing gearing, debt service capability and current PE ratios. IF the student can put forward a reasonable case for Company A this is also acceptable – but they should acknowledge that it is trading at a higher PE ratio and that they would need to get comfortable with this PE ratio level being sustainable.)

Part (c)

At a minimum, one would consider:

- Broker reports
- Annual reports for (say) the last 5 years. This would include:
    - Statements of Financial Position (Balance sheets)
    - Profit and Loss
    - Cash flow statements
    - Management commentary on the progress on the company

- Industry information, e.g. research from the management consulting houses, ABS statistics, etc.

(1 mark for each valid point, maximum of 3 marks)

Part (d)

Likely issues include:

- Executive compensation, both in terms of structure and quantum
- Capital management
- Broad company strategy
- Appointments/sackings of senior executive positions
- Appointments/sackings of company director
- Dividend policy
- Mergers and acquisitions.

(1/2 mark for each valid point, maximum of 3 marks)

Part (e)

The primary issues are:

- What are the risk/return expectations of the majority shareholder (i.e. the private equity investor) post acquisition? Are these expectations compatible with those of This Is Superannuation Management?
- The overseas expansion will lead to a greater amount of income being sourced from overseas. This has taxation and franking credit implications.
- How tax effective is the new special purpose vehicle being used by the private equity investors?
- What changes to the corporate governance of the company will occur?
- What are the expectations of the private equity investor with regards to future cash flows? In particular, what are their preferences as regards dividend payments versus reinvesting earnings back into the business?
- What changes to the current management is the private equity investor contemplating? Are these changes compatible with This Is Superannuation Management's views?
- How liquid/saleable will the new investment be?

(Maximum of 4 marks, 1 mark for each valid point)

QUESTION 6: AIMS

Coverage: Units 1, 2 and 7
Aim 3: Identify the main characteristics of the major asset classes
Aim 6: Formulate an asset allocation strategy for institutional investors
Aim 15: Monitor the overall risk framework

The aim of this question is to test candidates' understanding of risk and return issues associated with asset allocation issues The question also permits them the opportunity to demonstrate an understanding of the current environment and what types of assumptions might be appropriate in this environment.

QUESTION 6 (20 marks)

The Trustees of the Nervous Company Superannuation Fund recently heard some disturbing news emanating from an investment conference. At this conference there was a session on long-term investment returns. Several of the speakers suggested that future returns were likely to be significantly lower than those experienced in the previous two decades.

Naturally, the Trustees were very concerned to hear this. In your capacity of asset consultant to the fund, you have been asked to report back to the Trustees on this topic. Your report is to discuss some of the reasons why expected investment returns over the next decade may be lower than those experienced in the previous two, and the implications of such an expectation.

(a) Outline some reasons why future investment returns might be expected to be lower than those experienced in the 80s and 90s. (4 marks)

(b) Your research has led you to the same conclusion regarding future investment returns (i.e. lower return expectations are reasonable). As part of your report, you decide to run revised future investment return assumptions through your firm's proprietary stochastic asset return model.

Derive, with appropriate explanation, your expected return assumptions (after tax) for cash, long term fixed interest, domestic equities and direct property for use in your firm's model. (5 marks)

(c) How would you expect your revised inputs to affect the benchmark asset allocations suggested by the model? (2 marks)

(d) What are the practical issues involved in moving from the current benchmark asset allocation to a revised benchmark asset allocation? (2 marks)

(e) The Fund offers investment choice to its members, including cash, capital stable, balanced and growth options. The Trustee has also asked your opinion as to what advice they should give to members regarding their level of contributions and their chosen investment options. In particular, they are interested in your

thoughts on whether members should (i) maintain current contribution levels but invest more aggressively or (ii) maintain their current investment strategy but increase their contribution levels.

What considerations should be taken into account by members making such decisions? Draft your response to the Trustee in letter format.

(7 marks)

QUESTION 6: SOLUTION

Part (a)

Reasons for lower future expected returns include:

- The current high levels of markets make future progress difficult. PE ratios are at relatively high levels by historical standards.
- Markets display some tendency to mean revert.
- Relatively high historic returns are arguably a large function of the transition to a low inflation, low interest rate economy. Ceteris paribus, such a transition process leads to increasing P/E ratios.
- Looking forward however, growing profits once after one has arrived at such an environment might be more difficult. The rate of growth for the economy as a whole is likely to be relatively low in a low inflation environment, meaning that future profit growth may be lower. Further P/E ratio stretch also becomes less likely.
- Working through the tail end of the tech bust up may take some time.
- Confidence in markets and corporations in general is at reasonably low ebb. This in turn may raise the equity risk premium required by investors, putting further pressure on P/E ratios.

(1 mark for each point, to a maximum of 4 marks)

Part (b)

Note: Some candidates picked up on the fact that the course notes used this year (2002) did not reflect the most up to date taxation arrangements for superannuation funds. In particular, the capital gains tax regime has changed. Students were not penalised either way so long as they were consistent in their application of rules (using either current or previous).

Reasonable future expectations might include the following.

Pre tax returns

Assume a long-term inflation rate of 2.5%, equal to the middle of the RBA's target range.

Going forward, assume that cash earns something approximating the current cash rate (in a stable, low inflation environment this is not an unreasonable assumption) of roughly 5%.

(½ mark)

Assume a long-term bond rate of inflation plus a real return of 3.5%, giving a long-term (say 10 year) bond rate of 6%. Hence the return on a long term fixed interest portfolio (over average term of 3 to 5 years) could roughly be estimated as the average of these two, i.e., 5.5%. (½ mark)

An expected equity return based on the cash rate plus a risk premium of 3.5%, somewhat lower than the level traditionally used (4%-6%). This gives an expected pre-tax equity return of 8.5%. (1 mark)

Direct property returns might be expected to be somewhere between that for bonds and equities, say 7%. (½ mark)

Post tax returns (Tax Calculations based on current capital gains tax regime)

The superannuation tax rate is 15% on income. For cash and fixed interest, simply deduct 15% from the above returns (cash return of 4.250% and long term fixed interest return of 4.675%). (½ mark)

For Australian equities, an adjustment should be made for dividend imputation and capital gains tax concessions. Capital gains tax deferral can be ignored. Assume that dividends represent 3% of the pre-tax return, the remainder being capital gains. Assuming that dividends are franked 50%, this gives a post tax equity return from dividends calculated as follows:

Franking credits = (3%/.7-3%) x 50% = 0.64%
Post tax return from dividends = (3% + 0.64%)*(1-15%) = 3.1%

For the pre-tax capital gains return of 5.5%, assume a tax rate of 10% (the concessional rate if assets are held for more than 12 months).

Hence the post tax return for domestic equities is equal to 3.1%+5.5%*0.9 = 8.0%
(1½ marks)

For property, most of the return would be expected to come from income yield. Although the deferral of capital gains might be quite lengthy with amount of expected capital gain is also expected to be small (e.g. one might expect an income yield/ capital gain split of 5%/2%). Hence, we can assume negligible tax effects of capital gains tax using deferral and the 10% rate (or alternatively the full 10% tax rate with no deferral) and hence a post tax expected return of approximately 85% times 7% or 5.95% is reasonable.
(½ mark)

In summary:

Asset class	Pre tax expected return	Post tax expected return
Cash	5.0%	4.3%
Long term fixed interest	5.5%	4.7%
Australian Equities	8.5%	8.0%
Direct property	7.0%	6.0%

(Maximum of 5 marks)

Part (c)

The lower equity risk premium would mean that to achieve the same expected return a higher risk/volatility portfolio would be required, assuming that volatility measures remained roughly unchanged. (1 mark) If the benchmark portfolio is based on risk constraints, then a lower expected return portfolio would be the result. If the portfolio chosen is based on an expected return basis, then a riskier portfolio will be suggested by the model.

(Maximum of 2 marks, student should note the possibilities for the results to go either way based on the constraints of the client regarding wanting to hit a target return or achieve a certain level of risk/volatility)

Part (d)

The primary issues are transition management. Money will likely have to be moved between different asset classes and possibly different managers.

(1 mark)

Such movements of assets will have frictional costs associated with them, such as capital gains tax, various duties, market impact, etc. To move to the required benchmark portfolio as soon as possible a professional transition manager may be employed. Derivatives may be used to move to the benchmark asset allocation ahead of the movement of physical assets. (1 mark)

(Maximum of 2 marks)

Part (e)

Note: Candidates were awarded a bonus mark for identifying the inherent limitations that an actuary faces in this particular situation. The actuary above provides a list of issues to the Trustee that members may consider and does not constitute financial advice as is generally understood under law. Individual members should seek their own advice relevant to their particular circumstances from a qualified financial planner where necessary.

1 October, 2002

Trustee
Nervous Company Superannuation Fund
777 Investor Street
Sydney NSW 2000

Dear Trustee

Recently you requested that I provide some guidance to the trustee in respect to matters that the Fund members should consider in light of lowering future return expectations.

On reflecting on this matter, I have come up with the following list of issues that I believe individual members should be encouraged to consider:

- What is the individual member's investment time horizon? A longer time horizon (i.e. they are still far away from retirement) may mean that a maintaining the previous benchmark asset allocation may still be appropriate.
- Can the member afford to make additional contributions? For low income earners increasing their level of contributions may not be viable.
- What other assets (and liabilities) does each member have? The greater is their current net wealth, the greater is their capacity to bear risk, generally speaking.
- Consideration should be given to the relative impact of fees and other costs – which become proportionately more important in a low absolute return environment.
- Can target retirement benefits be achieved under current conditions? What adjustments might they need to make to their non-superannuation assets/liabilities to prepare for this?
- How aggressively managed is the growth asset allocation of the portfolios? Some investors may have less appetite for stock specific risk given the importance of preserving their current wealth. Hence might the prefer indexing a larger portion of their portfolio (if this is a current option – or at least an option that might soon be offered by the Trustee). This is especially the case if indexing is considered a lower cost option.
- To what extent will a future low inflation environment impact on the cost of living in retirement –meaning that a lower target retirement benefit in absolute terms is not quite drastic as it may at first seem?

Please note that the above is a list of issues that members may consider and does not constitute financial advice. Individual members should seek advice relevant to their particular circumstances from a qualified financial planner where necessary.

I trust that the above list gives us some food for thought for our next meeting at which we can discuss member communications regarding this important matter.

Yours Sincerely,

The Actuary.

(Maximum of 7 marks, 1 for each valid point to a maximum of 6 marks + 1 mark for appropriate letter format)

END OF PAPER ONE SOLUTIONS