INSTITUTE OF ACTUARIES OF AUSTRALIA

INVESTMENT MANAGEMENT **2003 EXAMINATIONS**
PAPER ONE

Answer all 6 questions.

QUESTION 1 **(8 marks)**

Recent years have seen large falls in all of the world's major sharemarkets, with average PE ratios falling dramatically. Is this evidence that the equity risk premium has increased over the same period? State your view and provide reasons for it. What other factors have played a role in the decline of these markets?

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QUESTION 2 **(21 marks)**

You are the investment manager for an Australian life insurer. Seeking to gain early momentum in the financial year, your company has successfully offered very competitive rates on 15-year complying annuities. These policies pay a fixed real amount per annum in each of the next 15 years. Each year, the annuity payments are adjusted in line with headline CPI inflation.

Your company has sold approximately $500 million (in terms of initial client investments) of these policies.

Initially it was proposed that inflation-linked bonds be used to match the liabilities. Recent government pronouncements that they would cease issuing inflation linked securities and the subsequent market disruption have forced the company to consider alternative strategies.

You have been asked to write a report for the company's investment committee on three potential investment strategies for the assets backing these liabilities. The three alternative asset mixes being considered are:

i) Commonwealth Government bonds only, but the total portfolio will have a duration less than that of the liabilities due to insufficient long dated bonds being available.
ii) Corporate bonds only, but with terms sufficient to permit duration and convexity matching.
iii) Government bonds as in i), but with a proportion of the portfolio invested in equities to "increase the duration."

(a) Outline the advantages and disadvantages of each of these strategies that you would include in your report (note: a report format is not required). (14 marks)

(b) Which strategy would you recommend? What additional risk constraints would you place on your chosen strategy? What further modelling work would you perform to confirm your initial recommendation? (7 marks)

QUESTION 3 **(15 marks)**

You are an Australian fund manager specialising in Australian equities for a local super fund, BBQ Super. You are currently responsible for a $500 million passive equities portfolio with the S&P/ASX200 index as your benchmark. One of the investment instructions specified in your investment manager's mandate is that the ex ante tracking error of the fund shall not exceed 0.5% per annum.

ABC is a local industrial company with 1.5 billion shares on issue. It is also a member of the S&P/ASX200 index with an index weight of 2.5% at the close of 29th August 2003. ABC has just announced an off-market buyback of up to 75 million shares. The price range has been set at between $7.00 and $9.60. Shareholders can tender their shares at any price (10c interval) within this range. The buyback closes at 5:00pm on the 5th September 2003.

(a) Briefly discuss the issues that you would consider before deciding whether your fund should participate in the buyback. (4 marks)

(b) The structure of the ABC buyback is such that the price consists of 2 components – a capital component of $3.00 and a fully franked dividend component equal to the difference between the buyback price and the capital component. It is now 4:05pm on the 5th September 2003. ABC closes at $10.00. Its index weight in the S&P/ASX200 index is still 2.5%. Being an index fund, your $500 million fund holds ABC at exactly its index weight at the moment. Assuming that you can still tender your shares for the buyback, determine the minimum price at which you would tender your shares for the buyback. In addition, calculate the number of shares you would tender for the buyback. State any assumptions you made in your calculations. (7 marks)

(c) In respect of the buyback, what additional issues would you consider if you were an active fund manager specialising in Australian equities with the S&P/ASX200 index as your benchmark? (4 marks)

QUESTION 4 **(22 marks)**

The value style investment management firm that you work for "This Is Superannuation Management" has been expanding into Asia for around 12 months. You have just been appointed as the Head of Asian Equities (ex Japan and ex Australia). As soon as you put your feet under the desk in Hong Kong, it becomes apparent that there are some important decisions to make with respect to the portfolio.

One of your first portfolio decisions is to decide on your position with respect to TELEFIN, a Hong Kong based company that operates two businesses, TELCO, a provider of retail telecommunications services and FUNDFIN, a distributor of retail funds management services (they outsource their funds management so they are not a direct competitor to you). Summary financial information for both companies is provided below.

Currently, this stock represents around 10% of your portfolio.

(a) Outline what your primary considerations in respect of the weighting of this stock in your portfolio would be going forward. (6 marks)

(b) Analyse both businesses. Comment on the different features of each. (8 marks)

(c) Subsequent to your initial analysis, TELEFIN "demerges" the two business units into two separate companies. Both are now listed in Hong Kong, with TELCO and FUNDFIN trading at PE ratios of 15 times and 16 times respectively, based on the 2003 earnings shown below. You have decided to hold only one of the two companies. Outline which company you would prefer to hold post demerger, and explain your reasons. State any assumptions that you make and any further research that you would conduct before making your final decision. (8 marks)

TELCO

Calendar year	1999	2000	2001	2002	2003
Revenue	100	102	104	106	108
Operating Expenses	(60)	(61)	(62)	(64)	(65)
EBITDA	40	41	42	42	43
Interest payable	(10)	(10)	(11)	(10)	(12)
Depreciation	(5)	(5)	(5)	(5)	(5)
NPBT	25	26	26	27	26
Tax	(3)	(3)	(3)	(3)	(3)
NPAT	22	23	23	24	23
Dividends paid	11	12	12	12	12
Assets	500	511	532	544	585
Liabilities					
Senior Debt	200	200	210	210	240
Other liabilities	3	3	3	3	3
Equity	297	308	319	331	342

FUNDFIN

Calendar year	1999	2000	2001	2002	2003
Revenue	80	88	77	77	84
Operating Expenses	(64)	(79)	(69)	(54)	(55)
EBITDA	16	9	8	23	29
Interest payable	(1)	(1)	(2)	(1)	(1)
Depreciation	(5)	(5)	(5)	(5)	(5)
NPBT	10	3	1	17	23
Tax	(1)	0	0	(2)	(2)
NPAT	9	3	1	15	21
Dividends paid	8	2	1	12	16
Assets	70	71	81	84	94
Liabilities					
Senior Debt	10	10	20	20	25
Other liabilities	3	3	3	3	3
Equity	57	58	58	61	66

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QUESTION 5 **(18 marks)**

You have recently been appointed as an equities analyst at Tactical Investments of Australia, a manager of Australian equities. In this role, one of the first tasks given to you is to analyse a number of stock selection filters being considered for improving the fund manager's investment process.

One of their proposed filters involves valuing each company in their universe using the formula:

Company Value = EBIT/(r-g) – Net Debt

The explanation of each of these variables is set out in the table below.

Variable	**Explanation**
EBIT	Earnings before interest and tax
r	Risk discount rate. 10% is used for all companies
g	Expected future growth rate in earnings
Net Debt	Total company financial debt less cash holdings

Once each company has been valued in this way, the estimated value will be compared to the market value. Where the estimated company value is higher than the market value an overweight position in the company will be taken, and vice versa where the estimated company value is lower than the market value.

Outline some of the problems and challenges of implementing this filter.

Your answer should include:

- A discussion of each element of the valuation formula.
- Any changes that you would suggest for applying this approach in practice.

You should also comment on constraints that you might apply to this methodology in practice. (18 marks)

QUESTION 6 **(16 marks)**

You have been retained as an asset consultant to a large Australian superannuation fund. Some questions have arisen in respect of one of their more unusual Australian equities mandates. The mandate is for $500 million of assets.

The investment manager in question is seeking to change the fee structure of their mandate, from a flat percentage of funds under management, charged monthly, to an incentive based formula.

In short, the manager wants the performance fee and mandate changed to the following:

- The mandate is for one year certain.
- Fees are equal to 10% of the increase in fund value over the course of the year (before fees are deducted), payable at the end of the year.
- All dividends occurring across the year are reinvested with the manager.
- Fees are capped at 10% of $100 million, i.e. if the fund finishes above $600 million in value the fund manager's fees remain at 10% of ($600 million less $500 million), or $10 million.
- No contributions or redemptions are to be applied to the fund over the year.

(a) What do you see as the primary advantages and disadvantages of performance fees of this nature in general? What are the potential problems with these particular arrangements? (6 marks)

(b) Calculate what you consider to be the value of these fees, assuming that performance will be in line with the index, and that option valuation techniques can reasonably be applied. Show all assumptions. (You may use the Standard Cumulative Normal Distribution Table on the following page.) (8 marks)

(c) Regarding your fee valuation, explain which assumptions concern you the most. (2 marks)

Standard Normal Distribution Table

x	Φ(x)	x	Φ(x)	x	Φ(x)	x	Φ(x)
0.00	0.50000	**0.80**	0.78814	**1.60**	0.94520	**2.40**	0.99180
0.02	0.50798	**0.82**	0.79389	**1.62**	0.94738	**2.42**	0.99224
0.04	0.51595	**0.84**	0.79955	**1.64**	0.94950	**2.44**	0.99266
0.06	0.52392	**0.86**	0.80511	**1.66**	0.95154	**2.46**	0.99305
0.08	0.53188	**0.88**	0.81057	**1.68**	0.95352	**2.48**	0.99343
0.10	0.53983	**0.90**	0.81594	**1.70**	0.95543	**2.50**	0.99379
0.12	0.54776	**0.92**	0.82121	**1.72**	0.95728	**2.52**	0.99413
0.14	0.55567	**0.94**	0.82639	**1.74**	0.95907	**2.54**	0.99446
0.16	0.56356	**0.96**	0.83147	**1.76**	0.96080	**2.56**	0.99477
0.18	0.57142	**0.98**	0.83646	**1.78**	0.96246	**2.58**	0.99506
0.20	0.57926	**1.00**	0.84134	**1.80**	0.96407	**2.60**	0.99534
0.22	0.58706	**1.02**	0.84614	**1.82**	0.96562	**2.62**	0.99560
0.24	0.59483	**1.04**	0.85083	**1.84**	0.96712	**2.64**	0.99585
0.26	0.60257	**1.06**	0.85543	**1.86**	0.96856	**2.66**	0.99609
0.28	0.61026	**1.08**	0.85993	**1.88**	0.96995	**2.68**	0.99632
0.30	0.61791	**1.10**	0.86433	**1.90**	0.97128	**2.70**	0.99653
0.32	0.62552	**1.12**	0.86864	**1.92**	0.97257	**2.72**	0.99674
0.34	0.63307	**1.14**	0.87286	**1.94**	0.97381	**2.74**	0.99693
0.36	0.64058	**1.16**	0.87698	**1.96**	0.97500	**2.76**	0.99711
0.38	0.64803	**1.18**	0.88100	**1.98**	0.97615	**2.78**	0.99728
0.40	0.65542	**1.20**	0.88493	**2.00**	0.97725	**2.80**	0.99744
0.42	0.66276	**1.22**	0.88877	**2.02**	0.97831	**2.82**	0.99760
0.44	0.67003	**1.24**	0.89251	**2.04**	0.97932	**2.84**	0.99774
0.46	0.67724	**1.26**	0.89617	**2.06**	0.98030	**2.86**	0.99788
0.48	0.68439	**1.28**	0.89973	**2.08**	0.98124	**2.88**	0.99801
0.50	0.69146	**1.30**	0.90320	**2.10**	0.98214	**2.90**	0.99813
0.52	0.69847	**1.32**	0.90658	**2.12**	0.98300	**2.92**	0.99825
0.54	0.70540	**1.34**	0.90988	**2.14**	0.98382	**2.94**	0.99836
0.56	0.71226	**1.36**	0.91308	**2.16**	0.98461	**2.96**	0.99846
0.58	0.71904	**1.38**	0.91621	**2.18**	0.98537	**2.98**	0.99856
0.60	0.72575	**1.40**	0.91924	**2.20**	0.98610	**3.00**	0.99865
0.62	0.73237	**1.42**	0.92220	**2.22**	0.98679	**3.02**	0.99874
0.64	0.73891	**1.44**	0.92507	**2.24**	0.98745	**3.04**	0.99882
0.66	0.74537	**1.46**	0.92785	**2.26**	0.98809	**3.06**	0.99889
0.68	0.75175	**1.48**	0.93056	**2.28**	0.98870	**3.08**	0.99896
0.70	0.75804	**1.50**	0.93319	**2.30**	0.98928	**3.10**	0.99903
0.72	0.76424	**1.52**	0.93574	**2.32**	0.98983	**3.12**	0.99910
0.74	0.77035	**1.54**	0.93822	**2.34**	0.99036	**3.14**	0.99916
0.76	0.77637	**1.56**	0.94062	**2.36**	0.99086	**3.16**	0.99921
0.78	0.78230	**1.58**	0.94295	**2.38**	0.99134	**3.18**	0.99926
0.80	0.78814	**1.60**	0.94520	**2.40**	0.99180	**3.20**	0.99931

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