

**FURTHER CAPITAL MARKETS EVIDENCE IN
RELATION TO THE
MARKET RISK PREMIUM AND
EQUITY BETA VALUES**

**used by regulators for regulated businesses
in the National Electricity Market**

by

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for

Electricity Consumers Coalition of South Australia

December 2003

Preparation of this report has been partly funded by

The National Electricity Market Advocacy Panel

The support of the Advocacy Panel is gratefully acknowledged by the authors.

Whilst Advocacy Panel funding has assisted the report to be prepared, the content and conclusions reached are entirely the work of the authors.

“It seems to me that the community has not yet come to terms with the fact that nominal rates of return on financial and real assets are likely to be much lower over the coming decade or so than over the previous two decades.”¹

RBA Governor Ian Macfarlane

¹ “Economic Opportunities and Risks over the Coming Decades” by I.J. Macfarlane, Governor, RBA, 13 November 2003)

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Executive Summary

Regulated network businesses are generally considered to be conservative investments, and these businesses market themselves accordingly. Rating agencies also rate companies operating monopoly network assets as investments having a very secure and predictable revenue stream, and, as such, imply an expectation that the returns they earn would reflect the conservative nature of the companies' earnings and would therefore be lower than the returns earned by more risky companies.

Australian regulators, under the National Electricity Code, are required to set a revenue cap for non-contestable (monopoly) network service providers, and have adopted the Capital Asset Pricing Model to determine a regulated return for these businesses.

There is some recent evidence that points to Australia regulators determining higher than expected rates of return compared to their counterparts in comparable overseas jurisdictions. This evidence is examined in the Report.

The evidence from recent research indicates that a Market Risk Premium (MRP) of 6% and an equity beta (β_e) of 1.0 currently used by Australian regulators in the CAPM formula are too high, and that a MRP of 3-4% and a β_e of 0.3-0.7 are more appropriate assumptions, particularly in the light of recent capital markets developments.

This Report provides evidence from analyses of capital markets to substantiate other recent research findings on MRP and β_e .

Using financial data from the largest 300 companies operating in Australia, this Report shows that:-

- nominal and real returns earned by Australian companies are lower than the regulated returns determined by Australian regulators for electricity (and gas) networks/businesses;
- Australian regulators use MRP data extending from over 100 years ago, and this does not realistically reflect the current and prospective outlook for the financial environment – more recent data should be used;
- Australian regulators have disregarded the “conservative” rating of network businesses by determining an β_e of unity;
- Australian regulators are arguably in error in their use of the CAPM formula by:-

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- applying a MRP generated from historical depreciated actual values to an asset value (of the regulated business) using the depreciated optimized replacement cost method; and
- applying a gearing of 60% debt and 40% equity when the gearing typically used in capital markets is as high as 77% debt.

These factors compound the initial MRP and β_e assumptions by inflating the Weighted Average Cost of Capital resulting in the granting of high returns which distort the investment decisions of the regulated businesses, and negatively impact on the international competitiveness of downstream (competitive) enterprises.

In order to ensure that the key CAPM inputs resulting from the analysis of *current* business performances are correct and robust, these inputs were then tested against other financial indices and comparable businesses - the ASX accumulation index and the property market. The outcome of this further testing demonstrates remarkable consistency with the conclusions drawn from the financial analysis of the sample 300 companies.

The Report's primary finding is that Australian regulators are granting regulated networks MRP and β_e values which are too high and are outside the realm of latest empirical estimates derived from capital markets.

1. Introduction

There are a number of network assets in Australia for which it is widely accepted should not be replicated as to do so would create unnecessary investment and would be financially inefficient to do so. The owners of these network assets have a unique position of being a 'natural' monopoly with regard to the supply of the services these assets provide, notwithstanding that these assets are owned by corporations from both the public and private sectors. To ensure that the owners of these assets do not abuse their monopoly position, the return these assets are entitled to earn is independently regulated.

Government appointed regulators are provided with the responsibility of setting regulated maximum guaranteed returns for such businesses over a specified regulatory period, commonly over 5 years. In setting a (forward looking) return for such assets, regulators seek to establish parameters which will replicate the risk/reward returns achieved by enterprises normally operating in the competitive business environment.

The regulators overall are required by the National Electricity Code (NEC)²

“to set a revenue cap with an incentive mechanism (such as CPI-X or some variant) for non contestable transmission network services.”

and

“to adopt a process which eliminates monopoly pricing, provides a fair return to network owners, and creates incentives for owners to pursue ongoing efficiency gains through cost reductions.”

Australian energy regulators have elected to use the Capital Asset Pricing Model (CAPM) as the principal tool in setting a regulated return on assets employed by the monopoly businesses operating in the national electricity (and gas) market. The National Electricity Code details extensively in Chapter 6, schedule 6.1, the way the CAPM formula³ is to be used in developing a weighted average cost of capital (WACC) for regulated businesses.

Essentially the CAPM sets out the relationship between debt, equity, gearing, risk premium, risk profile together with the tax effects. Allowing appropriate inputs to the elements of the CAPM permits a relatively mechanistic approach by regulators to set an assumed WACC for each regulated business.

² Australian Competition and Consumer Commission, NSW and ACT Transmission Network Revenue Caps, 1999/2000 – 2003/2004, Final Decision , 25 January 2000, page ix.

³ Extracts of this section of the code are included in appendix 1

Since the system of setting regulated revenues commenced, regulators have generally adopted the following core parameters⁴ when setting a WACC:-

1. A gearing debt to asset value (debt plus equity) of 60%.
2. A risk free rate using 5 or 10 year Australian government bond rates.
3. A debt margin range of 100 to 150 basis points.
4. Imputation credit value of 50%.
5. Debt beta range of 0.0 to 0.2.
6. Equity beta (β_e) range of 1.0 to 1.1.
7. Market risk premium (MRP) of 600 basis points (6%)

There is, however, a growing view that regulators responsible for the electricity and gas markets in Australia are awarding higher than expected WACC's than their counterparts in other comparable overseas jurisdictions, such as in the UK and the USA. For example, Pareto Associates carried out a study on behalf of BHP Billiton (BHP-B) as part of its response to the recent revenue application by GasNet. In that report, Pareto noted:-

“However, there is substantial divergence between judgments on values for the return on equity. UK regulators judge that equity markets see regulated utilities in the gas, electricity and water industries in (generally) comparable terms – and come down with estimates for the return on equity that are very close for all three industries. This has not been the case in Australia. The judgment of Australian regulators is that equity is more costly than in the UK, and substantially different for different utilities. We were not able to identify evidence that supports the need for this disparity. It is our view that financial markets would be expected to see regulated utilities in (generally) consistent terms regardless of geographical location.”⁵

Pareto Associates went on to note:-

“It is clear that the major cause of the differences for estimates of the return on equity between the UK and Australian regulatory decisions is that Australian regulators have accepted higher values for the market risk premium than do UK regulators; and higher – and much more varied - values of equity beta.”⁶

As will be shown in this Report, there is a substantial body of evidence that the MRP of 600 basis points (6%) and equity beta of 1.0 currently used in the CAPM formula by Australian regulators are both too high and that levels of 300-400

⁴ These figures are summarised from a range of regulatory decisions for energy transport companies carried out over the past six years.

⁵ Pareto Associates Pty Ltd, The weighted average cost of capital for gas transmission services, June 2002, page (ii)

⁶ *ibid*, page (ii)

basis points for MRP (3-4%) and equity beta levels of 0.3-0.5 may be more appropriate to the profile of risk applying to businesses with a guaranteed revenue stream.

Whilst there may be extraneous reasons for the continued use by Australian regulators of what might be construed as excessively generous figures, the contention of this Report is that these have not been articulated by regulators. Whilst there have been many public statements made by regulated asset owners and others to the effect that higher WACC's are needed to encourage investment regulated assets, *it is not the role of the regulators to set returns on monopoly assets which are greater than those received in the competitive market place.*

Nevertheless, there appears to be recognition that more research on Australian capital markets is needed to support recent empirical studies which have concluded that Australian regulators have been generous in awarding higher WACC's than would appear justified. For instance, the Essential Services Commission of Victoria recently noted that:-

“...additional evidence from the capital markets should be available at future reviews, at which time [it] envisaged placing far more weight on the latest empirical estimates than it did in the Draft Decision.”⁷

The purpose of this Report is to examine the financial performance of a large sample of businesses and by doing so provide additional evidence from Australian capital markets to demonstrate (or otherwise) whether the market risk premium and equity beta values used by Australian regulators are too high compared to current financial performance of businesses as a whole, and if so, to present the evidence to regulators in order that the new evidence can be used as part of the overall development and setting of fair and reasonable returns for regulated businesses. Rewarding monopoly electricity businesses with excessive returns can have a negative impact on the performance of all competitive downstream industries operating in Australia. Perhaps just as importantly, awarding higher than appropriate WACC's can lead to excessive and inefficient network investments by regulated businesses.

The approach taken in this Report is to examine the returns achieved by enterprises operating in the competitive environment, particularly focussing on the larger public and private businesses. Regulators are tasked with ensuring that the decisions they make regarding returns for regulated businesses replicate the outcomes which should be obtained by businesses operating in the competitive environment. To achieve this outcome, regulatory calculations must be based on inputs achieved with competition, that the actual regulatory outworkings are not only consistent with the returns obtained in a competitive environment but that *they reflect the outcomes being earned at the same time the*

⁷ Review of Gas Access Arrangements, Final Decision of the Essential Services Commission of Victoria, October 2002, page 342.

regulatory decisions are made – that is, the regulatory decisions must use as inputs, data derived which are coincident with regard to time, and not based on data relating to different economic circumstances or excessively dated data.

There is always the risk that data derived from the particular and extrapolated to the general may give distorted results. In order to ensure that the results obtained from examination of the sample of enterprises operating in the competitive environment can be extrapolated, the results of the sample are compared to the average financial performance of listed businesses included in the ASX 200 accumulation index. The ASX 200 Accumulation index was selected as this provides the investment return from both the growth of the asset and the dividends issued by companies.

Further, as the property market has many features consistent and comparable to regulated businesses, comparison will be made of the common features and with the returns achieved through investment in property.

Gearing has a major impact on the WACC, and an analysis is carried out to establish the validity or otherwise of the appropriateness of the 60% gearing assumed to apply to regulated businesses.

2. Recent Analyses

A survey of the literature has revealed that a number of recent studies have provided evidence that Australian regulators have made determinations which favour regulated network businesses by awarding higher WACC's than those awarded by their comparable overseas counterparts.

In 2002, Pareto Associates presented a comparison between the WACC's awarded by UK regulators and Australian regulators and provided a graphical presentation⁸ showing that the return on equity element of the WACC awarded by UK regulators is significantly lower than those of Australian regulators.

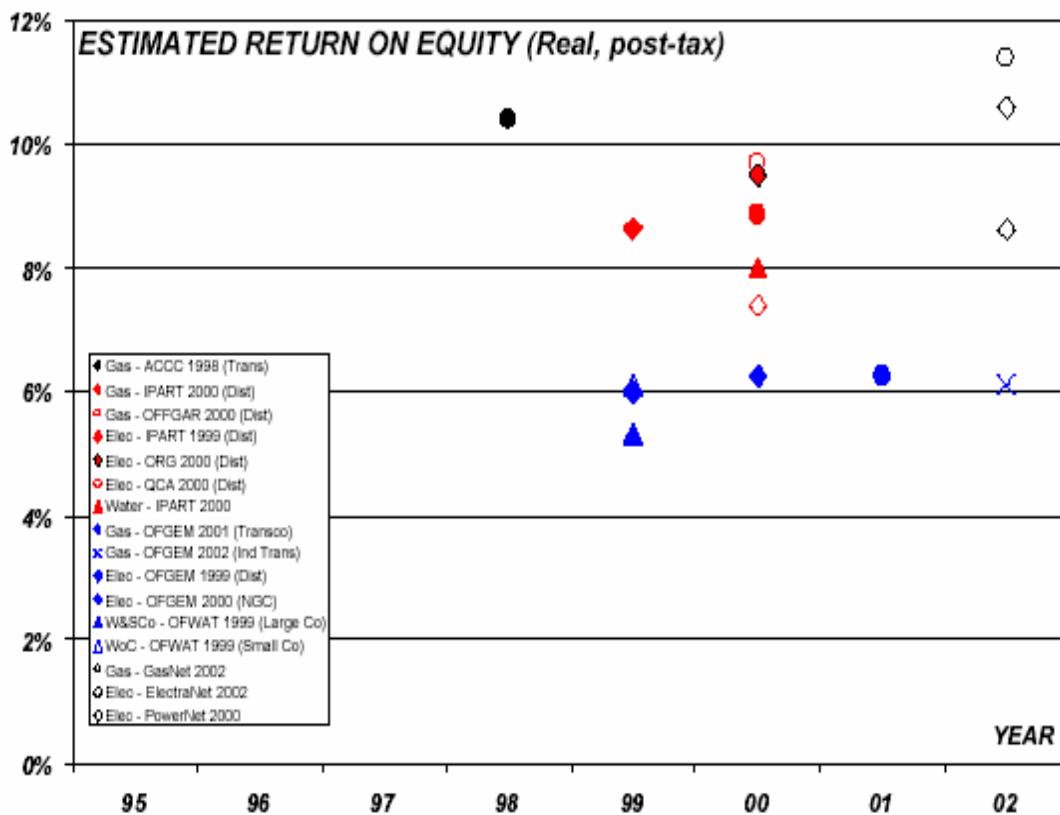


Figure 2 Comparison of estimated cost of equity from UK and Australian regulators' decisions.

[NB. The blue markers denote overseas decisions and sit on the 6% line; the black and red markers denote Australian decisions and range between 7.5-11.5%]

⁸ Pareto Associates Pty Ltd, The weighted average cost of capital for gas transmission services, June 2002, page 24

The Pareto Associates analysis also shows that the return on debt element of the WACC awarded by UK regulators exhibits a high degree of consistency with the equivalent returns awarded by Australian regulators, raising the issue as to why there is such a disparity with the allowed equity returns.

Other recent research carried out by other analysts involved in regulatory reviews confirms the conclusions from the Pareto analysis. For example:

1. NERA (2001)⁹ for the ACCC found that equity returns granted by Australian regulators are higher than those of overseas regulators in the UK and the USA. They state:-

“The Australian Competition and Consumer Commission (ACCC) commissioned NERA to survey declared post tax regulatory rates of return across various jurisdictions in the United Kingdom and North America.The results of this survey are summarized in the following two tables.

Table 1.0
Vanilla post-tax WACC's across jurisdictions

UK Regulators	Vanilla Post Tax WACC	US Regulators	Vanilla Post Tax WACC	Australian Regulators	Vanilla Post Tax WACC
Ofwat 1999	4.3-5.6% [*]	FERC 1995	8.11%	ACCC (MAP)	6.37%
CC 2000	6.45%	The California Public Utilities Commission 1998	5.93% & 6.52%	ACCC (CWP)	7.64%
Offer 1997	5.04-6.48%			ACCC (Transgrid)	6.86%
Ofgem 2000	4.77-5.17%	The Massachusetts Department of Public Utilities 1995	7.09% & 6.61%	IPART (AGLGN)	6.36%
Ofgem 2000	4.57-5.33%			ORG (EL DBs)	6.8%
MMC 1997	5.46-7.31%	National Energy Board 1999	5.43%		
Ofgas/MMC 1997	5.06-6.51%				

^{*}+small company premium + embedded debt premium

⁹ International comparison of utilities' regulated post tax rates of return in North America, the UK, and Australia, a report prepared by NERA, March 2001

Table 1.1
Average real post tax rates of return across jurisdictions

	North America	United Kingdom*	Australia
Return on equity	8.8%	6.9%	10.1%
Return on debt	4.8%	4.4%	4.6%
Vanilla WACC	6.6%	5.6%	6.8%

* Where a range has been given then the midpoint of that range has been used to calculate the average.

As can be seen from Tables 1.0 and 1.1, Australian regulators are, if anything, declaring higher vanilla post tax WACC's than in other jurisdictions examined. Purely based on the declared returns examined in this survey, Australian regulators appear to offer approximately the same or higher returns than North American regulators who in turn appear to offer significantly higher rates of return than in the United Kingdom.”

What the NERA analysis shows is to highlight that the jurisdictional differences are modest with regard to returns on debt, but the returns awarded by Australian regulators on the equity component of the CAPM formula are significantly higher, by between 15% and 45% higher in a relative sense. As Market Risk Premium (MRP) and Equity Beta (β_e) are the two variables determining the equity return element, it therefore follows that Australian regulators must be awarding a relatively higher value for one or both of these elements¹⁰.

2. Mercer Consulting (2002)¹¹ for the Essential Services Commission of Victoria (ESCoV) opined that MRP should be ~3% points. In their report to the ESCoV they stated:-

“For the purpose of this letter, having forecast long term Australian shares returns we have derived the *implied* ex-ante Australian shares ERP. Thus it is as an outworking of our forecast for Australian shares returns, we identified the arithmetic ERP to be 3.0%. We did not calculate a geometric ERP as we have carried over the preferred use of arithmetic shares return (when assessing an investment strategy). The calculation is summarized in the next table.

¹⁰ There have been assessments from those representing asset owners (eg Network Economics Consulting Group) disputing this NERA work.

¹¹ Letter to ESCoV July 2002 from Mercer Investment Consulting.

Equity Risk Premium	% per annum
Australian shares	9.4
less Australian government 10-year bond	<u>6.4</u>
Arithmetic ERP	3.0

If one were to make a provision for the impact of imputation, the estimation of the implied ERP would increase by the component of the Australian shares return reflected in the tax credits associated with personal taxation. Implied from our asset allocation modeling for institutional superannuation schemes, the appropriate ERP increases by 1% to 4%. The reason is that shares get a tax advantage over bonds relative to the pre-tax base case and a higher implied ERP is required to ‘solve’ the equation.”

Equity Risk Premium (with imputation)	% per annum
Australian shares	9.1
less Australian government 10-year bond	<u>5.1</u>
Arithmetic ERP	4.0

As to the outlook for future financial rates of return, Mercer concludes with the view that:-

“Our forecast of Australian shares returns *over the next ten years* is lower than that historically observed. We believe that a consensus of market participants agrees with this view.”

3. Network Economics Consulting Group (NECG) in its report¹² for Transend (the electricity transmission business in Tasmania) advises that there have been a number of recent studies into MRP with results ranging from 3.6 to 7.1 – the arithmetic average for MRP included in these studies is 5.1. Despite these results, NECG surprisingly recommended to Transend that an MRP of 7% should be sought from the ACCC.
4. The Energy Users Association of Australia/Energy Action Group submission¹³ to the ACCC regarding the Transend application extends the earlier Pareto Associates work to include regulated returns in the United States. Again the results show that much of the WACC differential is attributable to the higher returns on equity being permitted by Australian regulators.

¹² Weighted average cost of capital for Transend, Submission to the ACCC by the Network Economics Consulting Group, March 2003

¹³ Transend revenue application, submission to ACCC and report to NEM Advocacy Panel, EUAA/EAG, June 2003, appendix A

5. The Allen Consulting Group analysed equity betas for the ACCC (2002)¹⁴, and assessed that for Australian and international gas transmission companies equity beta ranged from -0.3 to 1.04, averaging 0.3 to 0.4. They summarized¹⁵ the results of their analysis as follows:-

“The re-levered equity betas (for a benchmark gearing assumption of 60 per cent debt-to-assets) are shown in Table 1.1 below. The figures represent the proxy equity betas obtained by taking the simple average of the asset betas derived for the individual firms in each of the markets and re-levered to the regulatory-standard gearing level (with the figures and parentheses showing the average if the negative equity beta observations are excluded).”

Table 1.1

RE-LEVERED EQUITY BETA ESTIMATES DERIVED FROM AVERAGE ASSET BETAS – 60% DEBT-TO-ASSETS

Beta Estimates	Tax Term Excluded from Levering Formula		Tax Term Included in Levering Formula	
	Debt Beta = 0	Debt Beta = 0.15	Debt Beta = 0	Debt Beta = 0.15
Australian Companies ³	0.69 (0.69)	0.66 (0.66)	0.68 (0.68)	0.66 (0.66)
USA Companies	0.16 (0.25)	0.10 (0.19)	0.17 (0.26)	0.10 (0.20)
Canadian Companies	0.02 (0.23)	0.02 (0.25)	0.03 (0.25)	0.02 (0.26)
UK Companies	0.15 (0.29)	0.06 (0.19)	0.14 (0.29)	0.05 (0.18)

It should be noted that, prima facie, gas transmission companies have a higher risk profile than electricity companies, as the Gas Code places some of the risk for usage volume with the gas pipeline company, whereas the Electricity Code insulates the business from such volume risk by awarding revenue caps, which are unaffected by volume.

6. Some regulators have acknowledged in recent regulatory decisions that an MRP at 6% could be at the high end of the acceptable range for MRP.

“Indeed, the evidence discussed above (including the new information received since the Draft Decision) would suggest that many market practitioners would adopt an assumption about the equity premium that is lower than the assumption of 6 per cent that the Commission has adopted in previous decisions and in the Draft Decision.”¹⁶

Whilst deciding not to change from the generally accepted level of MRP, the ESCoV concedes that:-

¹⁴ Empirical Evidence on Proxy Beta Values for Regulated Gas Transmission Activities, Report for the Australian Competition and Consumer Commission, July 2002 by Allen Consulting Group

¹⁵ *ibid*, page 5

¹⁶ Essential Services Commission of Victoria Review of Gas Access Arrangements Final Decision October 2002, page 336

“While such an assumption may be out of step with the assumptions now commonly adopted by market practitioners, the Commission does not consider this evidence to be sufficiently persuasive to revise its past assumption about the equity premium, *particularly when weight is placed upon the long-term consequences of the Commission’s decisions.*” (emphasis added)¹⁷

The import of the last observation seems to suggest that the (unspecified) concern the ESCoV has for the viability of the regulated businesses and their incentives to invest has outweighed the evidence that reducing the generally accepted level of an MRP of 6% has validity. Regrettably ESCoV failed to elaborate on the basis of its concern for the “long term consequences” of its past assumptions.

Summary of recent analyses

Overall, based on recent research by other (and widely disparate) parties, there is a strong view that the values of $MRP = 6\%$ and $\beta_e = 1.0$ currently used by regulators are too high when compared to the current business climate and, by implication, should be reduced.

¹⁷ Ibid, page 336

3. Market analysis and the CAPM formula elements

This Report postulates that Australian regulators have overlooked several important factors in choosing the values for certain key variables used in the CAPM.

Some of these factors are:-

1. Two world wars, with a number of significant other outbreaks of hostility.
2. A major depression and a number of significant recessions.
3. An extended growth period after WW2 during which it was Australian government policy to provide significant protection to Australian industry.
4. Faster travel and lower transport costs between countries eliminating the “tyranny of distance” that protected Australian industry until the latter stages of the 20th century.
5. CPI peaking at 22.4%, and 10 year bond yields reaching 16.40%¹⁸.

Against this backdrop, each of these influences will have had its impact on the returns that business in a competitive environment would have achieved. Thus, an approach using long term historic data to set the market parameters introduces significant distortions, and in effect uses CAPM elements which are not relevant to the regulatory period for which a forecast future return is being assessed.

It must be noted that the forecast period is generally for 5 years. For such a relatively short forward forecast, the recent past does provide a better and more realistic indication as to what may happen in the short term future in terms of the determination of key CAPM variables. The near past generally more closely represents the environment in which the regulated businesses will be operating, and so provides the basis for setting returns which more reasonably reflect the short term future.

The discontinuity referred to above is demonstrated by noting that Australian regulators were setting pre tax nominal WACC's in the range of 8-10% in the period 1998-2000¹⁹. Observed results from companies listed on the ASX (via the ASX 200 accumulation index) operating in the competitive environment at the same time as the regulatory decision were made, indicate that they did not, and have not since earned such rate of return. This point is elaborated upon later in this Report.

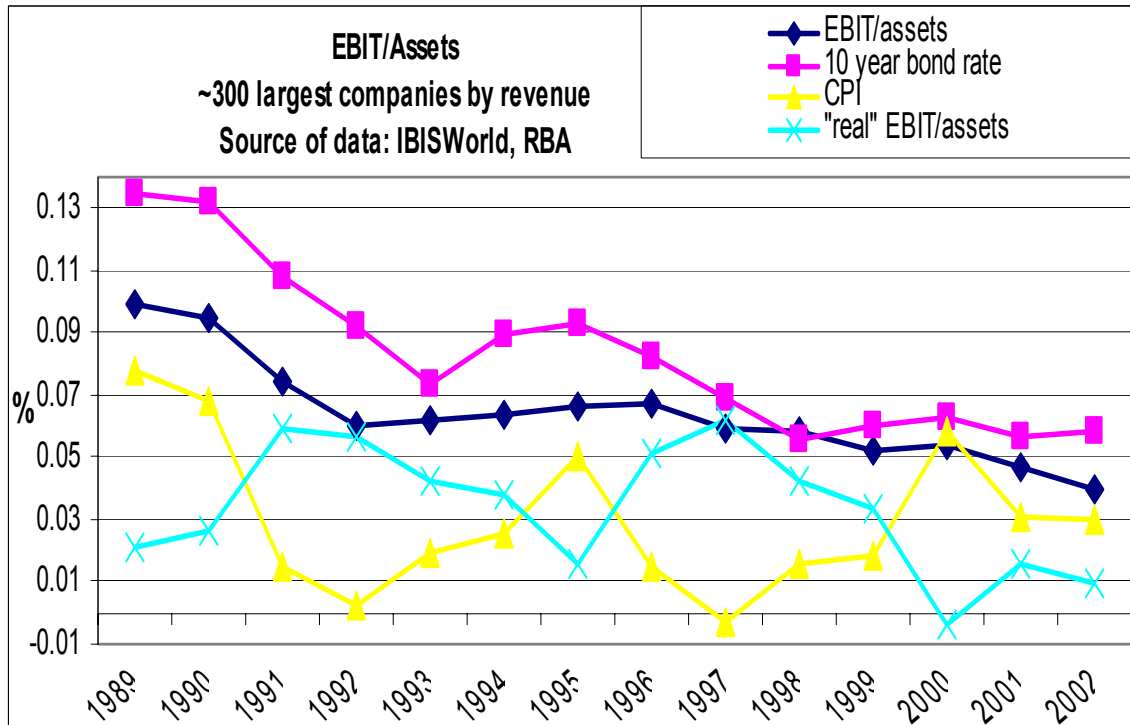
This observation has led us to systematically analyse the financial results over the past ten years of the largest (by revenue) businesses operating in Australia.

¹⁸ Source: RBA for the period from 1950.

¹⁹ See section 1, analysis by Pareto Associates

IBISWorld²⁰ was requested to collect and summarise the data submitted by public and private corporations as part of their annual reporting requirements²¹.

This data has been analysed and the following results identified.



This analysis shows that 10 year government bonds were a better investment over the past decade than investing in businesses and that “real” pre tax returns earned in the competitive market in the period 1989-2000 averaged perhaps 4%, (which should be compared to the “real” pre tax WACC’s awarded by regulators of 6-8%)

As noted earlier, the two CAPM elements most contentious are the equity beta and the market risk premium.

Regulated businesses have often stated that the WACC they should receive should be a “forward looking” assessment of returns, as the WACC is used to set the future revenue for the business. This view is unexceptional and is accepted by both regulators and consumers, with the result that many of the CAPM formula elements used in setting the WACC are generally agreed.

²⁰ Details about IBISWorld are included in appendix 3, and the structure of the information provided by them is detailed in appendix 2. The summarised results for all companies included in the sample is provided in appendix 7, and the summary of data appropriate to businesses with regulated assets is included in appendix 8.

²¹ Details of the data provided by IBISWorld, assumptions made and data manipulation is included in appendix 2.

For example, the setting of the nominal risk free rate uses the returns expected for Australian Government bonds for the period (or longer) of the regulatory revenue setting. This provides the most appropriate basis for an expectation of what is likely to happen with interest rates for the regulatory period. Similarly indexed bonds compared to nominal bonds provide a forecast of the likely movements in inflation.

There are a number of inputs to the CAPM formula. A typical listing and WACC derivation is taken from the ACCC regulatory decision for Murraylink²².

Parameters	
Gearing ratio (D/V) %	60%
Asset beta β_a	0.4
Debt beta	0
Equity beta	1.00
Debt margin (over Rf) %	0.86%
Market risk premium (Rm-Rf) %	6.00%
Nominal risk free interest rate (Rf) %	5.46%
Expected inflation rate (F) %	2.07%
Cost of debt $R_d = R_f + \text{debt margin}$ %	6.32%
Value of imputation credit	50%

From these inputs the ACCC calculated the following WACC levels:-

Nominal post tax return on equity	11.44%
Vanilla WACC	8.37%

There is general acceptance by consumers and regulated businesses of the way forecast inflation is estimated, debt beta and the value of imputation credits.

The aspects of most concern for the regulated businesses appear to be the duration over which the nominal risk free rate is set (5 versus 10 year Australian Government bonds) and the debt margin. There is an acceptance by them of the current levels of market risk premium and asset beta, although the regulated businesses indicate that an increase in the current levels would not be inappropriate.

Consumers, on the other hand, have benchmarked the WACC levels set by regulators against overseas regulated returns and local regulators have consistently set higher WACC's. Further, as pointed out earlier, attention has focussed on the cause of the higher WACC levels as being due to the level of the market risk premium and equity beta used by Australian regulators.

²² Decision by ACCC, Murraylink Transmission Company, Application for Conversion and Maximum Allowed Revenue, 1 October 2003, page xix

3.1 The observed discontinuity between regulated returns and the market

The market risk premium is an observed outcome of the returns achieved by Australian businesses over a long period of time. It is the premium between the return earned by businesses *on its equity element of the investment* and the “risk free return” that could be earned by investing in government bonds.

To use a ‘historical’ view of market risk premium runs counter to the notion of using forward looking parameters where possible. However, the market risk premium movements over the past 100 years or more are seen to follow a pattern²³ with the market risk premium falling over time. This is shown in the following table.

TABLE 5.3: HISTORICAL AUSTRALIAN MARKET RISK PREMIUM – 1882 to 2001

Time period	Market Risk Premium	Standard Deviation	Standard Error of the Mean
1882-2001	7.19%	16.97%	1.55%
Different Ending Point:			
1882-1950	8.00%	11.11%	1.34%
1882-1970	8.16%	13.70%	1.45%
1882-1990	7.40%	17.33%	1.66%
Different Beginning Point:			
1900-2001	7.14%	17.94%	1.78%
1950-2001	6.51%	22.60%	3.13%
1970-2001	3.37%	24.38%	4.31%

Source: ESC Gas Final October 2002

The change of the market risk premium in the different time periods shows that there has been a secular decline. Because of the apparent volatility of the figure, regulators have tended to discount the trend showing lower market risk premiums over time, but have neglected to identify the reasons why this trend of a falling MRP has been occurring. What is more disconcerting is that regulators are using historic data tracking back over centuries and not adopting more current trends. Regulators aver they are seeking forward looking inputs to the CAPM formula, but yet are neglecting to use the most current data (which provides a better forecast of the future).

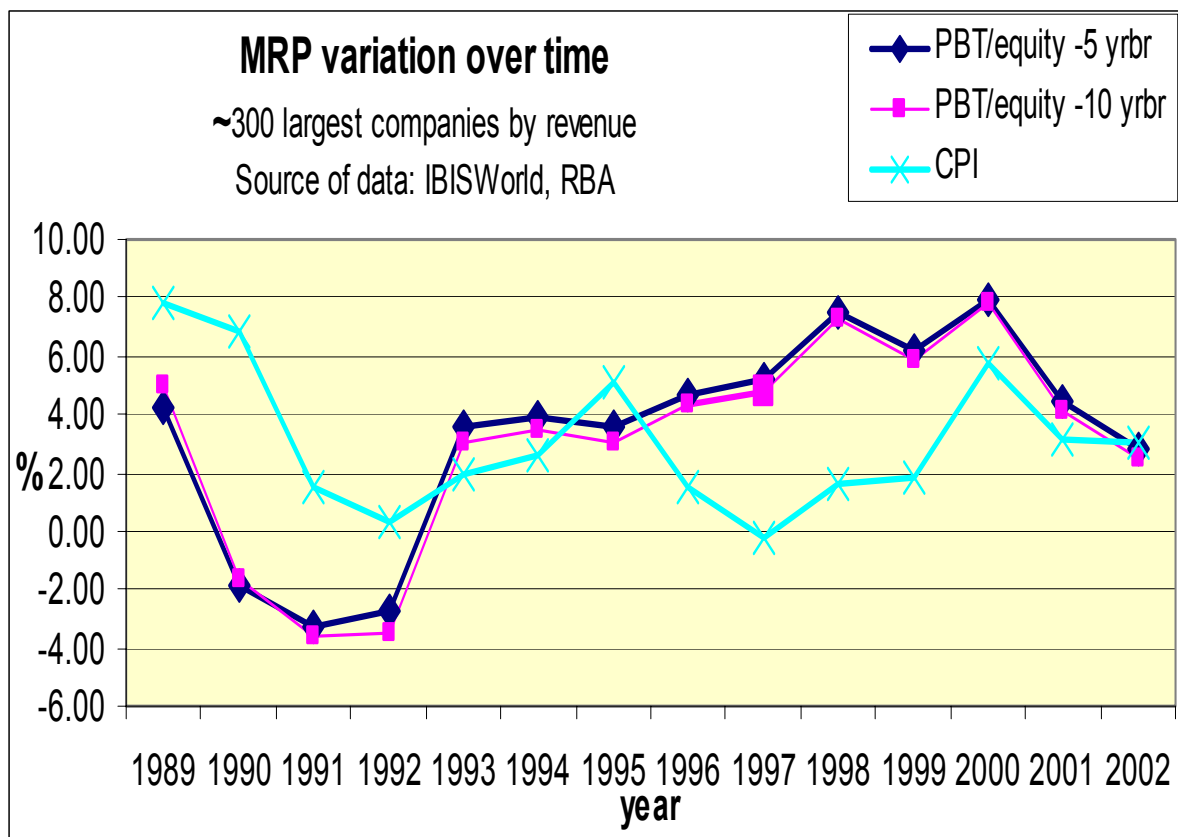
The most recent period (1970-2001) has been influenced by a number of major structural changes to the Australian economy including:-

²³ ESCoSA Electricity distribution price review: return on assets, discussion paper August 2003

- floating of the Australian dollar;
- banking and financial systems deregulation;
- integrating Australian industry into the world market by the virtual elimination of all tariff protection; and
- a major overhaul of the tax structure.

Thus to use market data based on a very long period of over a hundred years will have minimised the impact of these recent market changes and distorted the outlook for certain CAPM variables. It is obviously more appropriate to use more recent data on business market performance to provide a more realistic indication of future trends.

We have sought in this Report, to assess the current MRP trends, by analysing the financial performance of Australia's (private and public) largest 300+ companies ranked by revenue²⁴. This assessment shows that the market risk premium (PBT/shareholders funds less the "risk free return" as set by government bonds) over the past decade has moved over the range of -4% and +8%.



²⁴ See appendix 2

The average of the market risk premium over this period is 3.30% (as measured against 5 year bonds) and 3.03 (measured against 10 year bonds). Inflation over the same period averaged 3%.

The data analysed is in close agreement with the data developed by Prof R Officer²⁵ for the period 1970-2001, which is included in table 5.3²⁶ in the ESCoSA discussion paper on return on assets.

3.2 Equity Beta (β_e)

Regulated businesses are generally seen as conservative investments, and are marketed accordingly. This is illustrated by the following press statement:-

“TXU a conservative investment vehicle

The expected \$1.2 billion float of TXU Australia would create a conservative investment vehicle that would sit somewhere between Origin Energy and Australian Gas Light on the risk spectrum

The company is not a growth stock in the style of Origin, with its exposure to upstream gas production business and its heavy focus on energy retailing. But TXU has less exposure to gas and electricity networks than AGL. It also has a relatively large exposure to generation through its Torrens Island plant, South Australia’s generator, and contracts with Ecogen.”²⁷

Companies owing monopoly electricity and gas assets are generally seen as being conservative investments, much more so than the average of all companies listed on the ASX and this is reflected by ratings agencies. As can be seen from the above extract, AGL is viewed as a very conservative investment, with its relatively larger exposure to gas and electricity (regulated) networks. Regulated network companies are regarded as conservative because there is the expectation that the returns they earn will reflect the conservative (and effectively guaranteed) nature of their income stream and earnings. To assume that they have an investment profile equal to the average of all businesses operating in Australia does not reflect the view of the investment community.

A conservative business is reflected in the WACC formula by having a low (less than unity) equity beta.

²⁵ Sourced by ESCoV from original information published in Officer, R., ‘Rates of Return to shares, bond yields and inflation rates: An historical perspective’, in *Share Markets and Portfolio Theory; Readings and Australian Evidence*, 2nd edition, University of Queensland Press, 1992.

²⁶ ESCoSA Electricity distribution price review: return on assets, discussion paper August 2003

²⁷ Source – The Age, 19 September 2003

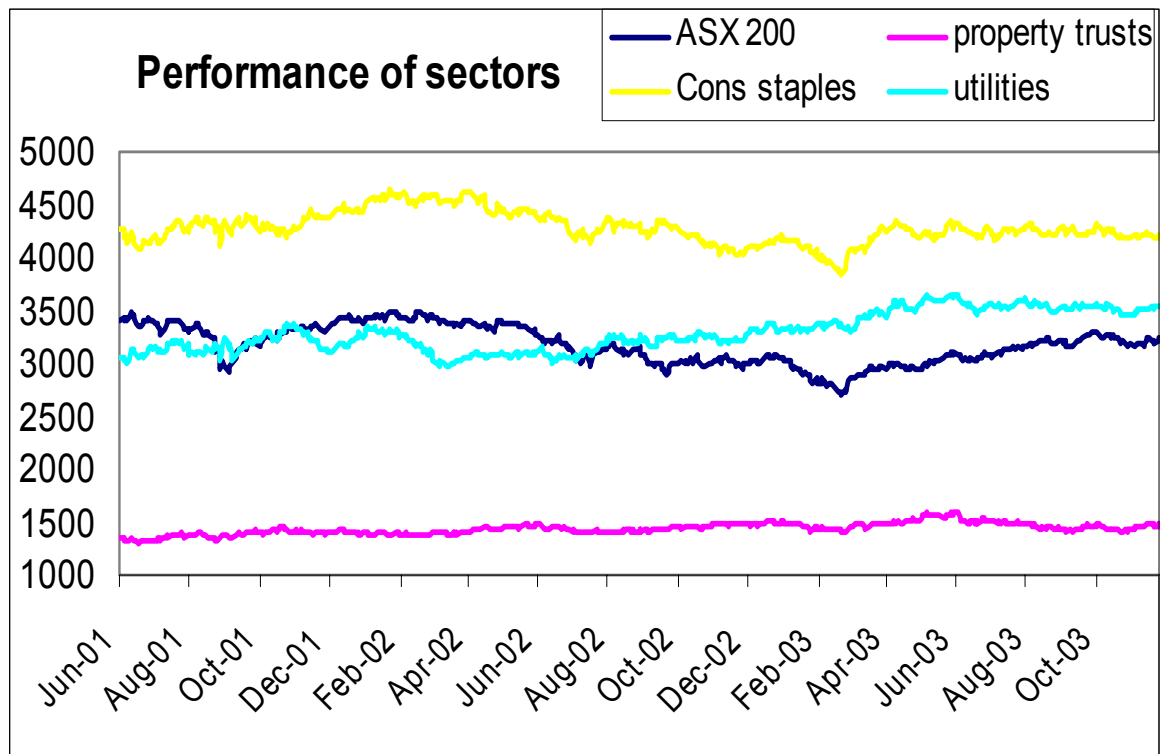
Equity beta provides the measure by which the returns of a specific company or industry will vary above or below the average equity return of all industries. A low equity beta implies that there is a low risk of the entity not achieving its returns and a high equity beta implies that there is a high risk of achieving the expected return associated with the company or industry. In practical terms, equity beta is an adjustment to the CAPM which recognises the risk profile associated with a specific enterprise or industry – it is a measure of the certainty of return.

Exclusion of the equity beta from the WACC formula would imply that all companies and industries have an equal risk of achieving the expected profit. The market as a whole has an equity beta of unity. Thus, to assign an equity beta of unity to a specific enterprise is to assume that it has the same risk as all enterprises in the market taken as a whole.

The Australian Graduate School of Management has calculated a range of equity betas for each of the ASX indices. These are shown in appendix 5. Regulators have used this listing as the basis for determining equity betas, assuming that the “Infrastructure and utilities” index closest approximated the risk profile of regulated gas and electricity companies. This decision may have been made without specifically examining which companies were included in the index and the risk profile of the activities of each of these companies.

Since this list was published the ASX has modified the construction of its industry indices incorporating the Standard and Poors (S&P) Global Industry Classification Standard (GICS). The new system has operated only since 31 March, 2000 for the main indices but from 1 July 2001 for the sector indices.

The companies included in the Utilities index are detailed in appendix 6, together with the daily movement of the index since its inception. The data in the following table is sourced from CommSec.



Analysis of the data reveals that the index is dominated by gas retail and transport companies, with AGL (retailer and distribution) comprising nearly 60% of the index, other gas transport companies comprising 30% of the index, and power generation and technology stocks comprise the remaining 10% of the index. The retailing and power generation functions of AGL further detracts from the applicability of the AGSM calculations²⁸ of equity beta being used as a guide to setting equity betas for the regulated element of the assets owned by these and other companies. This highlights the importance of the calculations of equity betas that have been carried out by the Allen Consulting Group²⁹ which were calculated for companies only with regulated assets.

A comparison of the relative performance of the Utilities index and the “average” ASX 200 index shows that the Utilities index has outperformed the average significantly, whilst at the same time demonstrating a greater stability in stock prices. More telling is that the Utilities index has outperformed the Property Trust and Consumer Staples indices, but shows a similar stability in pricing when compared to both indices. It must be remembered that the Property and Consumer

²⁸ See appendix 5

²⁹ Empirical Evidence on Proxy Beta Values for Regulated Gas Transmission Activities, Report for the Australian Competition and Consumer Commission, July 2002 by Allen Consulting Group

Staples sector groups have low equity betas³⁰, implying that the new Utilities sector group should have a similar rating to both of these sector groups³¹.

The Utilities index is heavily weighted to gas stocks, although the heavy weighting provided by AGL does provide some exposure to electricity retailing and electricity distribution assets. Notwithstanding this bias to gas stocks, the index and the comparison to the ASX 200 supports the analysis of Allen Consulting Group demonstrating that the equity beta for gas utilities should be considerably lower than the average of all stocks. The stability and outperformance of the Utilities index compared to the benchmark ASX 200 supports the contention that a value of unity for regulated businesses is too high.

As gas and electricity regulation follow largely the same pattern (using the building block approach), there is no reason not to use the equity betas from the gas transport industry to provide guidance for valuing equity betas for the electricity transport industry. There is an argument that as the Gas Code requires the business to accept some risk associated with volume (the Gas Code requires the regulator to set a tariff for transport thereby exposing the gas business to volume risk) which the electricity transport businesses does not (the Electricity Code requires the regulator to set a revenue cap, and allows the business to set tariffs to recover the approved revenue over the actual volume of energy transported).

This treatment thereby provides electricity transport businesses with greater certainty of revenue, implying a lower equity beta than would apply for gas transport businesses.

Further support for the need to reduce equity betas for regulated businesses comes from analysis of the data from IBISWorld which includes for the results of some regulated electricity businesses³².

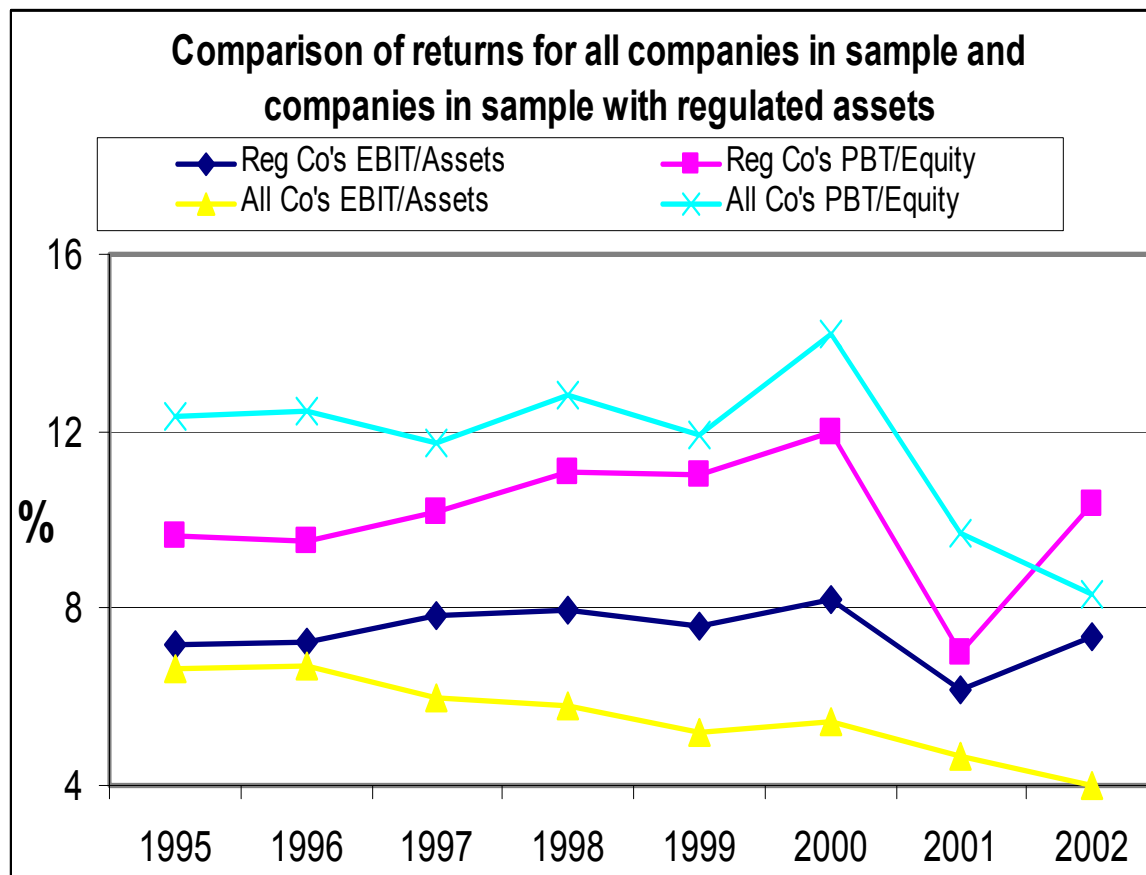
The data provided from IBISWorld is necessarily not as extensive for regulated electricity transport businesses³³ as for other businesses, as the disaggregation of the electricity businesses did not commence until the mid nineties. Accordingly, the research only includes data after 1995, and only covers between 6 and 14 companies in any one year of data. Further, it must be noted that the businesses are all electricity retailers as well as having regulated assets, which further distorts the returns, impacting the overall profitability of the integrated retailer/distribution business.

³⁰ Refer to the AGSM study of equity betas in appendix 5. The Consumer staples index incorporates the old Alcohol and tobacco and Food and household indices

³¹ Because of the close comparison between the performance of the Property and the Utilities sectors a closer examination of the points of likeness between property and regulated utilities is carried out later in this report.

³² This data is summarised in appendix 8

³³ Electricity transport companies in the sample which have regulated assets are AGL, Aurora Energy, Energex, EnergyAustralia, Enertrade, Ergon Energy, ETSA Utilities, Integral Energy, Origin Energy, PowerCor, TXU Australia and Western Power.



Notwithstanding the paucity and limitations of the data, there are a number of observations that can be made from the analysis.

1. The return gained on assets employed (EBIT/Assets) over the period by the businesses with regulated income (7.45%) exceeds that earned by all businesses in the sample (5.55%) by an average of 190 basis points.
2. The return gained on equity (PBT/shareholders funds) over the period by businesses with regulated income (10.1%) is lower than that earned by all businesses in the sample (11.7%), by an average of 160 basis points.
3. Average gearing (total assets less shareholder funds over total assets) of the businesses with regulated income averaged 55% whereas gearing of all companies averaged 77%.

Maintaining the return on assets at the same level but modifying the gearing to replicate that applying to "all companies" (ie 77%), the return on shareholder funds for businesses with regulated assets increases to 14.7%, exceeding the return on shareholder funds for "all companies" by 3%. As the equity beta for "all companies" must be unity (by definition) then the apparent equity beta granted for businesses with regulated assets is 14.7% divided by 11.7% or 1.26. Thus despite being awarded an equity beta of unity, these businesses when assessed on a

comparable basis to the average gearing of all companies are returning an equity beta well in excess of the awarded figure. This leads to the assumption that if regulated businesses are to be permitted to earn an equity beta of unity, then the regulator should use an equity beta in the CAPM formula of no more than 0.79.

However analysis of the financial results from the Annual Report of Integral Energy 2001/02 adds a further complexity to the comparison. The published results for Integral Energy give RoA and RoE values in the same range as for regulated companies in the sample of companies, of ~7% and ~10% respectively when using their regulated asset value. However when the asset revaluation reserve is discounted from the asset valuation (asset revaluation reserve is the difference between the DORC valuation and the DAC valuation for the company assets) the results give values for RoA and RoE of ~10% and ~25% respectively, well in excess of the returns earned by companies using the DAC method for asset valuation. This clearly demonstrates that the method for asset valuation needs to be considered when comparing the results of businesses with regulated returns and for using equity betas derived from assessing performance based on a DAC valuation for assets³⁴.

As most of the regulated companies follow a similar approach of using DORC for valuing assets, the issue of asset valuation methodology and its impacts is further developed in the ensuing section.

Overall, with regulated businesses being awarded equity betas of unity by regulators, this is in excess of those earned by comparable businesses operating in the competitive sector. The analysis of the data of competitive businesses bears out the analysis carried out by the Allen Consulting Group (referred to above in section 2 point 5 of this Report) which points out that the equity betas for regulated gas businesses should be lower than regulators have been providing, and in particular, confirms that equity beta for regulated energy transport companies should be 0.3 to 0.4 rather than at the level of unity used by regulators.

3.3 The implications of a depreciated optimised replacement cost (DORC) asset valuation

Annual reporting by businesses of their financial performance follows strict accounting rules. In particular, assets are normally valued at historic costs and if an asset is revalued then the profit or loss resulting from the revaluation is included in the profit and loss statement, increasing or decreasing the declared corporate profitability.

The implications of these standard accounting practices has a specific impact on the now almost universal approach taken by Australian regulators to use the

³⁴ This further research is outside the scope of this Report but clearly needs to be carried out due to the large impact it has when benchmark comparisons are made between awarded WACC's and RoA's achieved by competitive businesses.

depreciated optimized replacement cost (DORC) valuation method for establishing asset values against which the WACC is to be applied to establish the return on assets element of the “building block” approach to establish the allowed revenue. The Electricity Code is relatively silent on the required method for valuing assets, stating a preference for use of the Deprival Valuation method and the value placed on the assets by the jurisdiction. On the other hand, the Gas Code³⁵ specifically includes a listing of the various variables that are permitted to be used to set the value of the assets of regulated businesses and of the issues which may affect the final decision of the regulator. Estimation of the Deprival Value of assets is considered extraordinarily difficult and open to challenge, and as a result Australian regulators have elected to use the DORC valuation method for valuing electricity assets.

However, the stated approach taken by regulators to the regulation of monopoly businesses has been to replicate outcomes which would occur if the regulated business operated in a competitive environment. Thus, there must be consistency between the derivation of the various CAPM elements and the use of them in the CAPM formula.

Return on equity (RoE) is the profit earned after payment of interest and is related to the value of shareholder funds. The value of shareholder funds is derived from the valuation of all assets less the liabilities of the corporation. In this very direct way RoE is a ratio of profitability derived from the valuation of assets used by the corporation. Almost universally, assets are valued on an historic basis for very sound reasons, particularly because there is an auditable derivation process for the value. One of the key drawbacks in using other asset valuation methods for audit purposes, is the very subjective nature of the derivation of the values. In particular, the regulators’ commonly used DORC valuation method for assets contains a high degree of subjectivity.

This subjectivity is clearly demonstrated by the recent debate over setting the asset value for Transend (Tasmania’s electricity transmission network). In this example, the declared depreciated actual cost of the assets as at June 2001 (as detailed in the Transend annual reports) was \$395.1m³⁶. Two specialist engineering companies valued the Transend assets on a DORC basis and arrived at two different amounts (SKM at \$563.2m and Meritec at \$521.6m³⁷). There is a clear auditable paper trail as to how the depreciated actual asset (DAC) value was established but experts have differed significantly as to what the DORC value might be.

³⁵ See appendix 4 for the relevant clauses from the Gas Code

³⁶ This amount excludes an asset revaluation reserve of \$37.6m as this revaluation amount was not taken as profit and therefore is an internal adjustment only.

³⁷ Both of these amounts were provided by Transend in 2003, as part of documentation supporting their application to the ACCC for a revenue cap. SKM and Meritec are well known engineering consultants.

This disparity and lack of audit trail exemplifies why businesses use historic cost valuation (DAC) for their asset valuation. Because the DAC values are auditable, they are used to develop the RoA and RoE ratios for businesses. This consistency is essential, because if less controlled methods for asset valuation were used then the use of RoA and RoE as comparators between similar businesses loses any significance. The importance of these comparators (RoA and RoE) cannot be overstated as they are essential elements of the suite of financial indicators used to base investment decisions³⁸.

If the RoA and RoE ratios are based on the historic cost of assets, then it follows that the derived market risk premium (the difference between RoE and the “risk free” return) is also derived from data based on historic costs. The clear implication of this is that historic market risk premium calculations are based on an asset valuation methodology which is not the same as the methodology used by regulators. This shows there is a clear uncoupling between the derivation of one figure (the market risk premium) and its subsequent use by regulators.

To demonstrate the importance of this point, by using the Transend asset values taken from the annual report (DAC value) and that assessed by the Tasmanian Government consultants Meritec (DORC value) as an example, the following anomaly arises.

- The regulator proposes a risk free rate of 6%.
- The regulator adds a MRP of 6% (derived from a depreciated actual cost of assets) to a risk free rate of 6% and applies the sum of the two to a depreciated actual cost valuation of \$395.6m, which provides a revenue of \$47.5m using directly related and derived indicators. There is a clear auditable trail through which all relationships can be verified. The outcome is consistent with the derivation of MRP.
- If the regulator adds a MRP of 6% (derived from a depreciated actual cost of assets) to a risk free rate of 6% and applies the sum of the two to a DORC valuation of \$521.6m, this provides a revenue stream of \$65.6m, an increase in revenue of 32%. However, there is now no direct and auditable link between the derivation of the MRP and its subsequent use. To provide such an auditable trail would require the MRP to be discounted so that it returns the same outcome that would apply if the auditable derivators were used.

It is quite clear that the asset valuation methodology must be consistent with the source of the inputs to the CAPM formula.

³⁸ It should be remembered in this context that there have been a number of attempts over the years to establish better methods than these indicators for assessing businesses financial performance but ultimately these new concepts have moved out of favour. A classic example of this was the ill fated flirtation with Current Cost Accounting during the 1980's

3.4 The impact of gearing

Gearing is the relationship between the amounts of *interest bearing debt* a corporation has in relation to its total assets. As gearing increases, so does the concern lenders have as to the ability of the corporation to manage the debt, to be able to generate sufficient earnings to service the interest and any capital repayments and to provide sufficient security so that if the corporation defaults on its agreement, for the lender to be able to recover the funds borrowed.

During the eighties, there was a major deregulatory process introduced into the banking industry. This resulted in many of the building societies taking out banking licences and international banks entering the domestic market. In this new competitive environment, the indigenous banks commenced an aggressive marketing campaign to retain market share. The results of this competition have been to increase the levels of gearing permitted *with no penalty from increased interest rates*³⁹.

The CAPM formula assumes that all of the funds used by an enterprise are either interest bearing debt or equity. The study of the top 300+ companies revealed an interesting aspect regarding this simplistic view. That is, that the assets held by a corporation are sourced from at least three key elements – viz. from equity, interest bearing debt and non-interest bearing debt. Cash retentions provide a source of non-interest bearing debt for the corporation and include provisions, depreciation, tax deferrals, reserves, the difference between amounts payable and receivable, and these liabilities are not included in the gearing assessed by lenders. There was a differential between the levels of interest bearing debt and equity which were observed in the analysis of the samples from IBISWorld and this differential is explained by the corporate usage of retained cash which is, in effect, non-interest bearing debt and this element should be included in the CAPM formula.

It is generally held that the level of gearing has at most a minor impact on calculation of the WACC, because it is assumed that as debt increases, the debt premium also increases, countering the impact of the resultant decrease in the equity element of the calculation. This observation arises from the general assumption that the financial structure of a business is such that it is carrying the maximum level of debt commensurate with the cost of the debt premium and the assessed ability of the business to support the debt repayments (usually referred to as the “interest cover”⁴⁰). Since debt is consistently a lower cost source of funding than raising equity, companies often seek to operate with as high a level of debt as reasonably practical.

³⁹ This can be readily seen by the banking approach to housing mortgages. Prior to banking deregulation, bank lending for domestic housing seldom exceeded 60% of the value of the property. The same banks now lend up to 80% of the property value for the same risk premium.

⁴⁰ Interest cover is a relation between the debt repayments and a discounted assessment of the expected profit before interest and tax (PBIT).

Regulators assume that the 60% gearing level is one which supports the highest rating level for debt (ie. the lowest level of interest), and then further assume that the impact of gearing is effectively “washed out” of the further assessment of the WACC calculation. However, observations of a number of regulated businesses show that they operate at levels of gearing well above the 60% assumed by the regulators (some water utilities in the UK operate at nearly 100% debt to assets and South Australia’s electricity distribution business, ETSA Utilities, operates with 100% debt).

This point is further reinforced by the demonstrated approach by governments of securing 100% debt funding for state owned electricity businesses, effectively underwritten by the people of the state. The cost of this high level of debt shows little or no increase in debt premium to that of the notional regulated business which operates at the nominal 60% gearing. It is the certainty of being repaid that sets the debt premium, and regulated electricity businesses have a high certainty of income which effectively guarantees the ability of the borrower to service the loans taken.

If gearing can be increased at little or no penalty, then this will axiomatically relate to allowing an increase in the rate of return on equity. Where there is a guaranteed revenue stream to underwrite the increase in debt, stand alone investments (even with non-recourse debt) usually operate at 70%+ gearing as this is the lowest cost way to raise finance. Until regulators assess the ability of a regulated business to access debt at a higher level than the nominal 60% gearing without suffering a debt premium, the assumption that gearing has little or no impact on the development of the WACC appears to be flawed and favour the regulated businesses.

Thus, there appears to be two issues that regulators have not sufficiently considered about the gearing levels used in the CAPM formula:-

1. The assumption that the funding is either interest bearing debt or equity, excludes the fact that non-interest bearing debt is a significant element of the business.
2. The assumption that 60% gearing is the maximum that debt levels are possible without increasing debt premiums.

Taking these two issues into account, the WACC calculation could and should be modified to allow for the proportions of interest bearing debt and equity to sum to an amount less than 100%, and to test the assumption that 60% gearing is the maximum that could be achieved by a regulated monopoly business without incurring penalties.

From the analysis of the results of Australia’s largest companies, their level of equity is not 40% of assets, but approximates less than 25% of assets.

Regulators have assumed that an appropriate (vanilla) funding structure on which to develop a WACC for regulated businesses should be based on assuming 60% of the asset value being sourced from interest bearing debt, and the balance being sourced from equity. Regulators have assumed that that there is no funding of assets from any other source, such as non-interest bearing debt.

However, after examination of the competitive market financial structures in the sample – which shows a significant element of the asset base being funded from sources of non interest bearing debt – the CAPM formula for regulated businesses should be modified to incorporate elements within the following ranges which reflect the actual experience of businesses in the competitive environment.

Interest bearing funding (debt)	60-70%
Non-interest bearing funding (internal)	15-30%
Shareholder funding (equity)	20-25%

3.5 Recapping the analyses

The analysis of the financial returns of the 300 largest companies operating in Australia provides an interesting insight into the errors that have crept into the use of the CAPM formula by regulators of energy company assets. In particular, the analyses show that:-

1. **Overall returns.** Nominal and “real” returns earned by companies operating in a competitive environment when related to the total assets employed are lower than the WACC’s awarded by regulators by as much as 200 basis points.
2. **Use of historical MRP.** The historical market risk premium has declined over recent times, due to fundamental changes occurring in the competitive environment now operating in Australia. As the CAPM is intended to be a forward looking method for setting regulated returns, use of average figures using data extending over 100 years ago, does not adequately reflect the current and expected future conditions. Accordingly, more recent data should be used as a more appropriate basis for setting forward looking rates of return.
3. **Current MRP levels.** Our analysis shows that over recent years the MRP has averaged 3.0-3.30. This is consistent with the recent work of Mercer Consulting.
4. **Equity beta.** The equity betas used by regulators assume that regulated businesses are “average”. Regulators are not accepting that by granting a regulated return the market accepts that the regulated businesses exhibit a “conservative” rating, recognising that while providing a lower return, there is enhanced certainty or return. Thus, the market assesses regulated businesses as exhibiting a

lower equity beta than unity. This Report favours a range of 0.5-0.7 as being more reasonable.

5. **Applying MRP to DORC asset values.** Market risk premium is assessed from rates of return generated using historical depreciated actual cost (DAC) values for assets. To apply an MRP generated on this basis to an asset value using a depreciated optimised replacement cost (DORC) valuation basis is inconsistent and results in a much higher value for return on assets than should apply.
6. **Impact of gearing.** Regulators have assumed that gearing comprises 60% debt and 40% equity. In fact, our analysis highlights that implied gearing is much higher (as high as 77%) but that this comprises a mix of interest bearing debt and non-interest bearing debt, with an equity element of 20-25% of total assets. Using a higher level of equity and not providing for non interest bearing debt in the CAPM formula (incorrectly) inflates the WACC calculation.

4. Further comparisons: the ASX accumulation index and the property market

Further comparisons can be made to assess the robustness of the conclusions reached earlier. This can be carried out by comparing the results of the sample of companies with the movement of the ASX index and the ASX accumulation index and by comparing the results of the sample with the property market which exhibits many similar features with energy transport businesses.

4.1 The ASX accumulation index

Public listing of companies

The public listing of corporations is the most common way for corporations to gain capital to maintain corporate operations or to raise funds for expansion. Initial purchase of shares in a company which is listing is classed as an investment and constitutes the equity invested in the company by the investor. Once publicly listed, such shares in companies can be readily traded between investors. Contrary to the issue of debt by a company where the lender has some security over assets held by the company, the shareholder in a company has no security that the purchase of the shares will either return a dividend or even retain their value. The 1929 stock crash classically demonstrated this feature of share ownership.

The Australian Securities Exchange (ASX) manages the trading of company shares of publicly listed companies and publishes daily the price at which investors are prepared to buy and sell the shares in any listed stock. It also requires those companies listed to follow certain information disclosure rules. Failure to comply with these rules results in the suspension or de-listing of the stock, to the disadvantage of the shareholder. The information provided by companies to the ASX as to their financial performance is used by investors to assist them in making investment decisions. This data is expected to provide the most accurate financial information on corporate performance made available by corporations.

To provide a service to investors the ASX also calculates and publishes a range of indices which provide an insight into the share performance of each of a range of class of shares to allow investors to identify how the shares of a particular company is performing against others of the same class. In addition to these sectoral classifications the ASX also publishes a series of indices indicating the share performance of groups of the larger companies. The best known is the "All ordinaries" index which measures the share performance of the largest ~270 companies (by market capitalisation) although more recently the use of the ASX 200 is becoming the more used benchmark. The ASX 200 indicates the share performance of the 200 largest companies on the stock exchange as measured by

market capitalisation. The composition of the index varies over time as the growth of companies within and just outside the index varies.

The ASX 200 (and the other similar groupings such as the ASX 20, 50, 100 and 300, and all ordinaries) is a measure of *the value of shares being traded at any one time*.

The ASX also calculates and publishes the yield of each company's share. The yield is defined as the dividend paid by the company for each share held, divided by the price for purchasing a share in the company.

Thus, the ASX provides two core measures of the return on an investment in a listed company – the change in the value of a share in each company and the return that the company dividend provides related to the purchase price of a share.

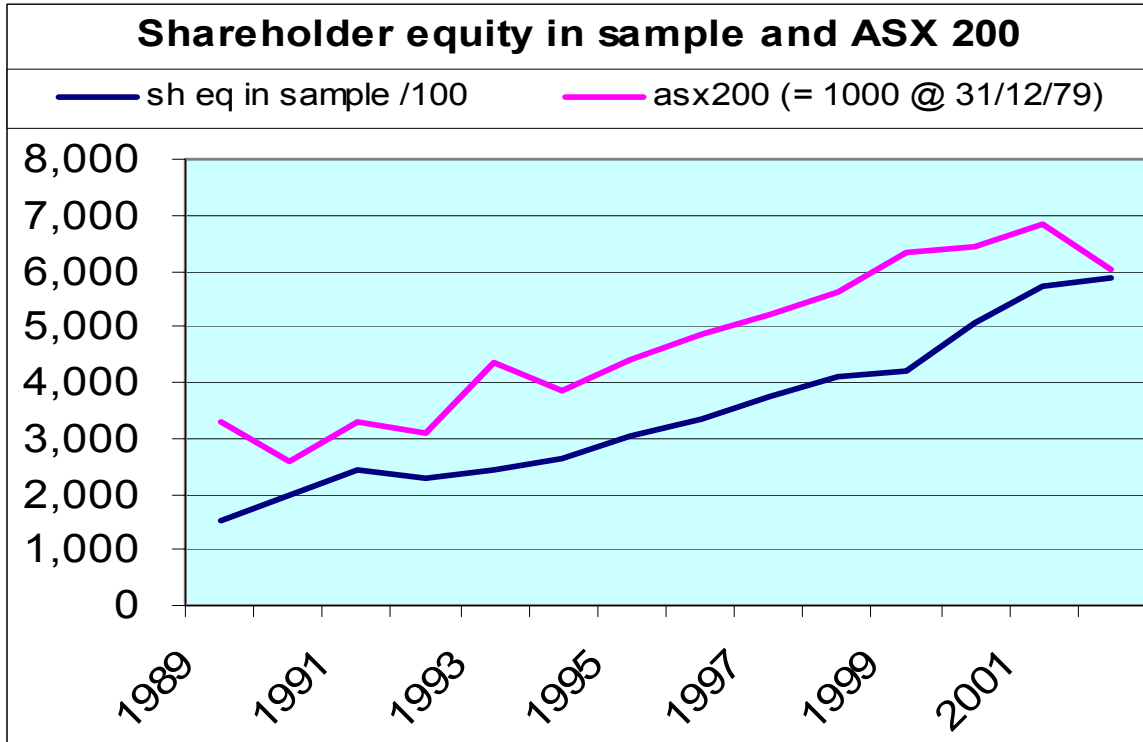
If the dividend is reinvested in the company each year, then the performance measure calculated by the ASX is the *accumulation index*. The accumulation index measures not only the change in the value of the shares of companies comprising the index, but includes the benefit of *the dividends* paid by each company to shareholders. Thus, the accumulation index calculates both the capital gain of the share value of the company plus the dividends paid as a result of the investment in the company.

In this way the accumulation index provides a calculation of the total return an investor in a listed company will make from the investment, *providing that the dividend is reinvested into the company*. If the dividend is retained by the investor, then the performance measure becomes the ASX share index. Appendix 9 includes a statement of the typical investment guidelines for an investment manager. Article III shows that the benchmark performance is required to be related to the ASX 300 accumulation index.

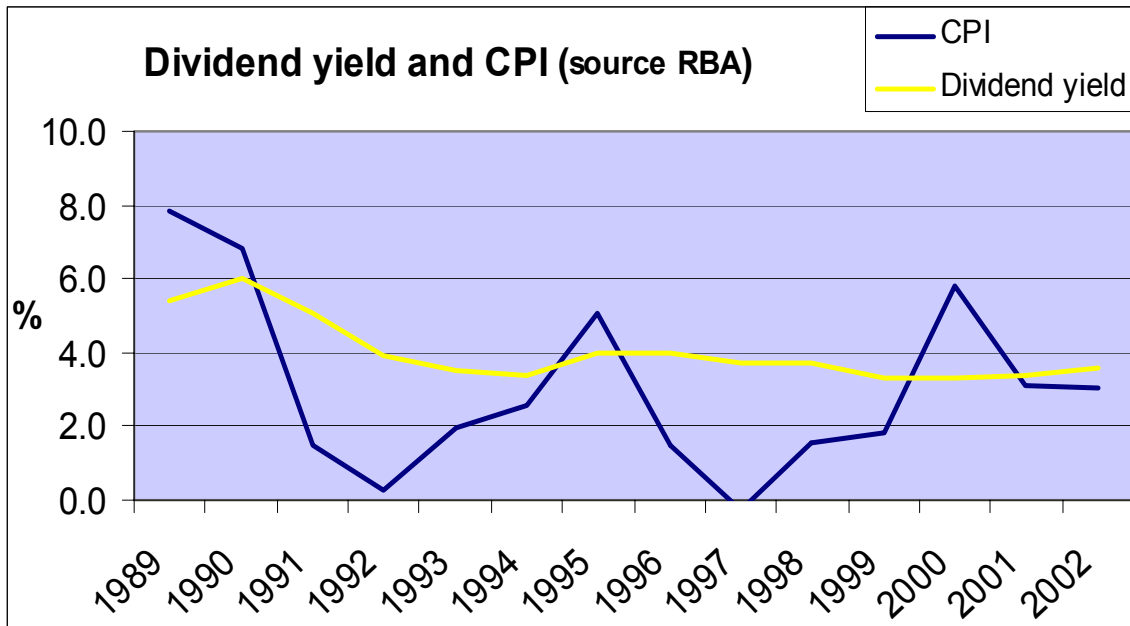
Analysis of the returns from listed companies

It is important to verify that our analysis of the sample of companies undertaken from the data from IBISWORLD is consistent with the market generally. The equity returns from the sample were plotted against the ASX 200 index, and a close correlation between these is established, confirming that the values in the sample are consistent with the market as a whole. This consistency provides confidence that the sample and the market provide similar outcomes, and that shareholder equity in the sample companies can be correlated to the ASX share index.

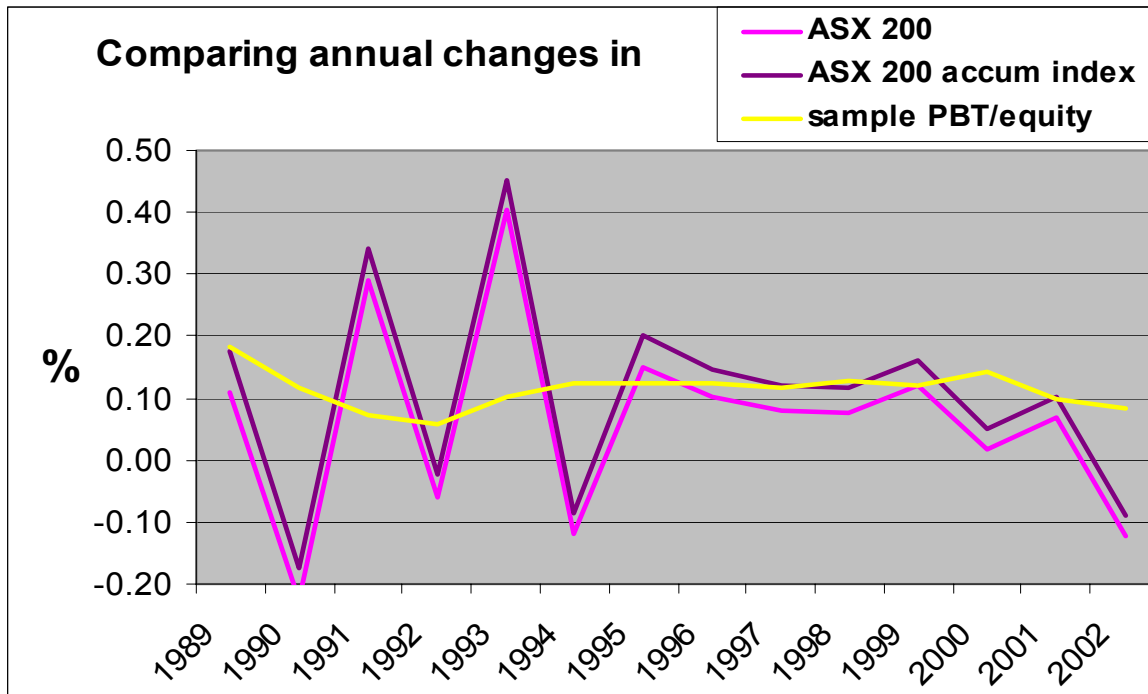
Assuming that the share index (using the ASX 200 as the basis) can be used as a surrogate for shareholder equity, then the dividend yield can be compared to the return on shareholder equity.



Using the same time period as the sample (ie since 1989) dividend yields have varied between 3.3% and 6.0%, averaging 4.0%. Thus, the return being made by investors in shares over the period, without the capital growth in the shares, has only marginally exceeded average inflation of 3%. In real terms the benefit investors have earned from investing in shares, has been predominantly from the growth in the share index.

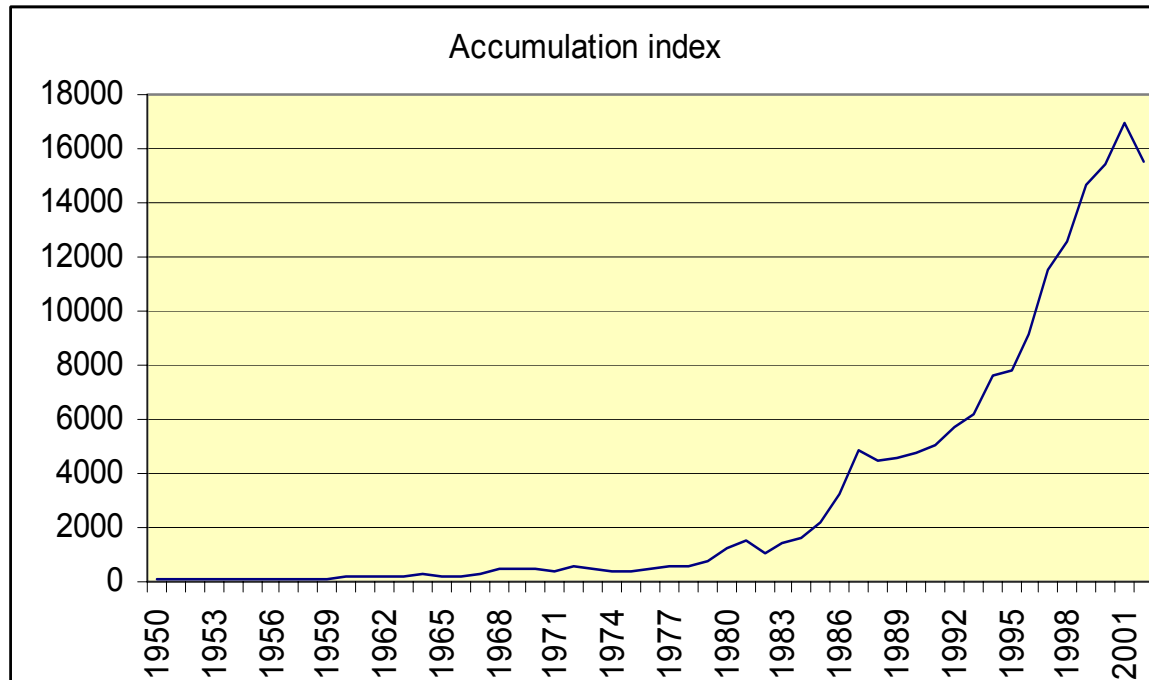


The ASX 200 has shown an average annual growth over the same period of the sample companies analysed of 6.4%, some 200 basis points below the sample “real” PBT/equity of 8.4%. The annual change in the nominal accumulation index average over the period of 10.7% equates closely to the nominal PBT/equity for the sample of 11.2%. Thus, there can be a conclusion drawn that the returns of the sample typically replicate the observations of the market in its entirety.



As the accumulation index is an indication of the total return earned by an investor over the long term, it is appropriate to assess the movements of this index over a long period⁴¹.

⁴¹ Source: RBA



This graph shows that the accumulation index generally rises over time, with downward corrections being observed in 1982, 1987 and 2003. The compounding growth of the index since 1950 shows that investment in the index would return a nominal annual return of 11.2%.

The calculation of return of 11.2% for the accumulation index over the long term compares favourably with the results from the sample of companies which show that the nominal pre tax return on equity earned by the companies was 11.4%.

Investment approaches

Much of the investment made by individuals and superannuation funds is subcontracted to specialist equity investment advisers. Almost universally such specialist advisers will offer to exceed the annual returns calculated from the benchmark ASX accumulation index by at least 200 basis points, and for carrying out this service, will charge an annual fee of 0.75% of the value of the funds invested. Thus by using specialist services, an investor can hope to exceed the benchmark performance by over 100 basis points. Actual results achieved by such investment specialists, however, do not support the expectation of out performance of the index.

A typical proposal for investment guidelines is attached as appendix 9.

This approach highlights that it is the ASX accumulation index that is used as the benchmark performance measure for investment returns in equities. It is therefore appropriate to use this same index as an industry wide performance measure of

return for equity investment and to accept that the results that are derived from using this benchmark performance can be extrapolated into the overall assessments of expectation of reasonable equity returns.

Recapping the analysis

1. There is close correlation between the equity returns of companies in the sample and the ASX200 accumulation index, implying that the index can be used as a proxy for the return on equity.
2. The analysis undertaken of the sample of companies replicates the performance of the publicly listed companies over the same period, providing confidence that the analysis is sustainable, and that the conclusions can be extrapolated into the wider equity market.
3. Dividend yields from listed companies over the sample period have barely matched inflation.
4. The accumulation index is widely used as a measure of return from the ownership of equity in companies and therefore can be used as a good indicator of the average returns possible from long term investment in a company.
5. Long term returns from investment in the accumulation index show that a nominal return on equity in Australian listed companies of 11.2% has been achieved since 1950, confirming consistency with the average return on equity of 11.4% calculated from the sample of companies.

4.2 The property market.

The property sector comprises four main groupings – offices, industrial, retail and residential. Each main sector has a number of subsectors.

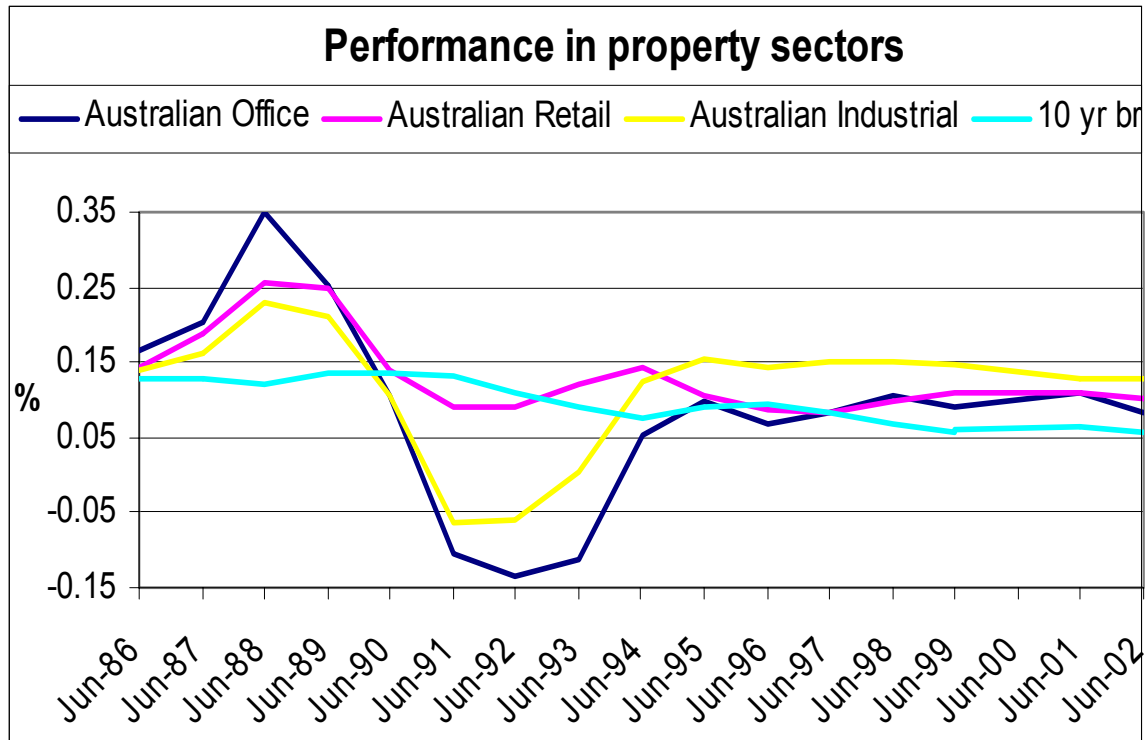
The Office sector comprises Premium, A and B and is further delineated into geographic areas (city, CBD, suburban centres eg St Kilda Road, North Sydney). Each of these subsectors recognises unique features of the location and the likelihood of securing quality rental income.⁴² The most secure rental income comes from CBD premium offices⁴³, but even these properties have no guaranteed income.

A review of the long term investment performance of each of the sectors compared to the 10 year bond rate over the same term shows that the property market risk premium is quite modest. Average residential house price growth shows a compounding return over 20 years of 8.5%⁴⁴.

⁴² See appendix 10 which provides a breakdown of the investment yields for the various property types

⁴³ See appendix 11 for a description of what constitutes “premium” office

⁴⁴ Derived from information provided by Real Estate Institute of Australia and RBA, and published in the AFR 13 Dec 03



Source: Property Council of Australia, RBA

Analysis of the nominal sectoral results over the time shows that office returns were 8.9%, industrial property investments returned 11.8%, and retail investments returned 13.2%. Over the same period the 10 year bond rate averaged 9.3%, implying a property market risk premium ranging from 2% to 4%, based on an equity beta of 0.4⁴⁵ and gearing of 60%.

Comparison of property investment to regulated energy transport businesses

There are many similarities between property and energy transport businesses, and interestingly a few disadvantages incurred by property but not by energy transport businesses. Energy transport businesses would seem to have no disadvantages when compared to property.

1. Both are high capital investment businesses
2. Both have relatively modest operating costs
3. Both are long term investments
4. Security of investment of both is recognised by lenders allowing gearing of both investments to a similar extent
5. Both operate on long term firm income streams
6. Both have a high degree of certainty of income stream in the medium term (property rentals are typically for 5-15 year periods)

⁴⁵ Based on an equity beta for property trusts similar to that calculated by the AGSM – see appendix 5

7. Both face similar environmental constraints during development and operation
8. Investment in both is effectively secured by the increasing population

Notwithstanding these similarities energy transport businesses have certain benefits over property investments

1. Property values can and do fall in the short term but do recover in the medium term giving medium term confidence in value maintenance. Once valued, regulated electricity transport businesses have their asset values maintained by use of indexation.
2. Property has the risk of failure of its tenants leading to the need to secure a replacement income stream. Regulated electricity transport is granted a revenue cap insulating them from the risk of loss of income
3. Investment in property is highly competitive, whereas there are significant barriers to new entrants in the regulated electricity transport industries
4. Existing property has to compete with a wide range of existing properties and new developments, whereas the regulated energy transport businesses have little or no real competition as each energy type has unique features which the others
5. Electricity has its future income stream effectively underwritten by large numbers of consumers and a stable energy demand. Conversely, property investment is highly competitive

When compared in this way, it is quite clear that at worst regulated electricity transport should be compared to property investments, but in all fairness there is a greater level of security available to investors in regulated energy (electricity and gas) transport businesses than is available to investors in property. The closest property classes in similarity to regulated energy transport would be the premium CBD offices, with their more limited competition due to location (less land availability), high entrant costs and high capital investment. Returns from this class of investment show an average nominal yield of ~6%⁴⁶, implying a market risk premium of ~0.5% when compared to the average bond rate of over 8% for the same period (and an equity beta of 0.5 and gearing at 60%).

Whilst residential property exhibits a similar capital growth to the return earned by “Offices” this class is dominated by owner/investors with a need for shelter, which does not replicate the decision for investment seeking a return.

Recapping the analysis:

1. Comparisons between the benefits of investment in electricity transport assets and property show a similar high degree of security, with perhaps electricity transport enjoying a greater level of security than property.

⁴⁶ See appendix 10

2. Returns from property investment show that returns from this class of investment shows a property market risk premium is in the range of 0 to 2%, with the MRP from the more secure property investment being at the low end and from the speculative investment area being about 2%.
3. Based on the returns for premium CBD property, an equity beta of 0.5 and a MRP of 2% are appropriate settings for current returns on this class of investment. Comparing the various classes of property, it would appear that electricity transport businesses could be equated to the premium CBD office property class. The returns for MRP and equity beta for this class of investment are consistent with the returns calculated from the sample of companies investigated, supporting the conclusions reached.

5. Other regulatory issues

5.1 The Risk Free Rate - 5 or 10 year bond rates

“The Tribunal is satisfied that the use by GasNet of a ten year Commonwealth bond rate to determine a Rate of Return on equity under [s 8.30](#) of the Code was a correct use of the CAPM and was in accordance with the conventional use of a ten year bond rate by economists and regulators where the life of the assets and length of the investment approximated thirty years in the MRP calculation and the risk-free rate. The use of the CAPM with these inputs in the Tribunal's view, produces a Rate of Return on equity which [s 8.31](#) treats as one commensurate with the relevant market conditions and risk for the purposes of [s 8.30](#).”⁴⁷

There is continuing debate as to whether long dated bonds should be used for setting the “risk free rate” used in the CAPM formula. One argument is that the regulator should use long dated bonds as this “should ensure proper matching with the life of the underlying assets.” The counter argument (used by the ACCC on the advice of Lally⁴⁸) is that the risk free period should replicate the regulatory period, as the period used for the risk free rate closest approximates the expected risk factors which will apply over the regulatory period.

It would seem from the decision of the Australian Competition Tribunal that it supports the view that the risk free rate should be the 10 year bond rate as this follows “the conventional use of the ten year bond rate by economists and regulators”. However the Tribunal does not comment on the what adjustments should be made to the other factors which modify this basic risk free input, such as the debt margin, the market risk premium, the debt beta and equity beta.

There are two issues that arise from the analysis on what risk free rate period should be used.

It is alleged that long dated bonds are needed to reflect the life of the asset. This matter has been debated extensively, with the ACCC firmly taking the view that the use of bonds equating to the regulatory period is the most appropriate approach, as to do so best reflects the risks expected during the regulatory period. To use an instrument which is mismatched incorporates into the CAPM formula a risk profile which does not apply to the period in question. Analysis shows that the difference between the five year and ten year bond rates averages over the past 12 years, some 25 basis points, with the ten year rate always the highest. Thus, to use the 10 year bond rate for a five year regulatory period increases the calculated WACC.

⁴⁷ AUSTRALIAN COMPETITION TRIBUNAL, Application by GasNet Australia (Operations) Pty Ltd [2003] ACompT 6, clause 48

⁴⁸ “Determining the risk free rate for regulated companies” a paper for the ACCC, July 2002, by Assoc Professor Martin Lally, School of Economics and Finance, Victoria University of Wellington.

Adequate benchmarking of the awarded returns by the regulator would identify whether the use of the long dated bond has permitted the regulated business an excessive WACC. Accepting the decision of the Australian Competition Tribunal, to ensure the regulators do not award returns which are not in keeping with benchmarking requires adjustment to the other input parameters to the CAPM formula.

The second issue that needs attention is the fact that the bond rate used for the risk free rate should be the same as that used in the calculation of the market risk premium. As has been seen from the analysis of market data, the market risk premium varies with the risk free rate used to develop the market risk premium. As the forward bond yield curve is historically rising, the market risk premium based on the 5 year bond rate is larger than the market risk premium used for the 10 year bond rate. There is no doubt that consistency must apply. If the 5 year bond rate is to be used for the risk free rate, then the market risk premium associated with the shorter bond duration should also be used. Providing both inputs used arrive from the same analysis, the equity element of the WACC calculation will be unaffected by the choice of the long or short term risk free rate.

However, using the shorter term risk free rate will have an impact on the interest bearing element of the WACC calculation. Thus the regulators should, after benchmarking the calculated return, assess whether the debt margin and debt beta should be adjusted to ensure the calculated outcome is consistent with actual market outcomes.

5.2 Regulation circularity

The class of equities for “regulated energy businesses” in Australia is too small to permit an independent assessment and what volume in the class there is, is too recent to be able to deliver a clear message as to the benefit that high returns awarded by regulators have delivered to the regulated businesses. However, the work done so far indicates a classic case of “regulation circularity”.

There are relatively few Australian electricity transport businesses. Consistently the energy regulators only benchmark each of these businesses against its Australian peers, making allowance for the differences between the business under review to the very few other equivalent businesses. The regulator then provides an assessment of what is considered appropriate to the review. There is no involvement in assessing the performance of the Australian regulated business against international best practice. The approach taken by regulators basically allows the regulated businesses to maintain average performance, without the driving imperatives inherent in competitive enterprises to strive for best practice – ie to operate in the lowest cost quartile.

This circularity of review of returns prevents any acceptance by regulators of new evidence. The following statement by the Essential Services Commission of Victoria typifies this.

“While ... an assumption [of an MRP of 6.0] may be out of step with the assumptions now commonly adopted by market practitioners, the Commission does not consider this evidence to be sufficiently persuasive to revise its past assumption about the equity premium, particularly when weight is placed upon the long-term consequences of the Commission’s decisions.”⁴⁹

This decision by the ESCoV is predominantly based on the weight of its earlier review and acceptance of the decisions of other Australian regulators rather than the facts applying at the time. Further, its concern that reducing the returns might impact on the future investment by the regulated businesses has obviously overridden the import that there is clear doubt that the allowed returns should remain at the current high level.

This means that regulators have made little or no attempt to benchmark the proposed inputs to the CAPM formula, other than to slavishly use numbers used by other Australian regulators. The impact is that the results of the WACC development become self-fulfilling. By utilising RoA amounts developed, in theory, as stand alone at the beginning of a regulatory cycle and then using the actual results achieved over the regulatory period to substantiate the use of the initial numbers is clearly a circular activity and does not allow the development of any independent assessment.

In a further example the ESCoV in its 2002 decision on gas distribution states:-

“In the Draft Decision, the Commission accepted a proxy equity beta (for an assumption of 60 per cent gearing) of approximately 0.7 to be consistent with the most recent market evidence on the beta for the regulated activities of the Victorian gas distributors. This proxy equity beta was derived as the simple average of the estimate of the raw equity beta for the comparable Australian entities discussed above, adjusted for leverage.

The Commission also had regard to beta estimates for the comparable US and UK firms discussed above. These betas were also much lower than those obtained for the Australian firms, with the re-levered (for 60 per cent debt-to-assets) simple average of the beta estimates approximately 0.40 for

⁴⁹ From the Review of Gas Access Arrangements, Final Decision of the Essential Services Commission of Victoria, October 2002, page 336

the UK firms, and 0.2 for the US firms, *but which was not accorded significant weight.*"(emphasis added)⁵⁰

The ESCoV went on to say that the Commission finally decided to adopt

"... a proxy equity beta of 1 for the Victorian gas distributors' regulated activities, for an assumed gearing level of 60 per cent. It emphasised that this estimate is well above that which would be derived exclusively with reference to the latest market data. That is, in deriving this proxy beta, the Commission placed considerable weight on the desirability of continuity between regulatory decisions, and the long-term consequences of the Commission's decisions for the Victorian gas industry. However, it noted that additional evidence from the capital markets should be available at future reviews, at which time the Commission envisaged placing far more weight on the latest empirical estimates than it did in the Draft Decision."⁵¹ (underlining added)

What is overlooked in this analysis is that the returns for the Australian gas businesses that the ESCoV subsequently measured were effectively set in previous regulatory decisions using equity betas of unity and market risk premiums of 6%. Thus, when analyzing past performance of Australian regulated businesses, the outcome should replicate the inputs of the previous regulatory review. Further, the ESCoV elected to disregard substantial evidence to the contrary and continues to use estimates out of step with current market conditions, overtly favoring the business to the detriment of all consumers, including businesses in the competitive environment.

This clearly shows that what is required is a "circuit breaker" analysis which shows that the results of using the CAPM approach with the commonly used by regulators in earlier decisions rather than assessing the merits of new evidence, fail to provide a result consistent with the risk profile of the enterprise, recognizing the fact that regulated businesses are insulated from true competition, have an essentially guaranteed return and do not suffer the commercial rigors of operating in a competitive environment.

We consider that a circuit breaker analysis has been provided by the returns determined by overseas regulators and by the further evidence on the operation of the Australian equities markets. Australian regulators continue to use inappropriate CAPM inputs without referencing the source of such data and make no attempt to benchmark their calculated outputs against any external overseas benchmark.

Until regulators commence the practice of benchmarking returns, there is every expectation that regulators will consistently award excessively high returns in the fear that they may have made a determination that is too low and so be accused of

⁵⁰ Review of Gas Access Arrangements, Final Decision of the Essential Services Commission of Victoria, October 2002, page 342.

⁵¹ *ibid* page 356.

sending a regulated business into financial default or causing a constriction in the amounts needed to be invested in the monopoly assets.

6. Conclusions

Based on recent research by a number of separate parties there is a strong view that the values of MRP = 6% and $\beta_e = 1.0$ currently used by regulators are too high when assessed against the *current* business climate and should be reduced. The research establishes that MRP = 3% and $\beta_e = 0.3-0.7$ are more appropriate for the current business environment for regulated networks.

Analysis of the largest 300 companies operating in Australia for the period 1989-2000 – which shows the lower return earned compared with those determined by regulators for regulated businesses - provides an interesting insight into the problems that have crept into the use of the CAPM formula by regulators of energy company assets.

In particular, the analysis shows that:-

1. **Overall returns.** Nominal and “real” returns earned by Australian companies operating in a competitive business environment when related to the total assets employed are lower than the regulated WACC’s awarded by regulators by as much as 200 basis points.
2. **Use of historical MRP.** The historical market risk premium has fallen over recent times, due to fundamental changes in the business environment now operating in Australia. As the CAPM is intended to be a forward looking method for setting regulated returns, use of average figures using data from over 100 years ago, does not accountably reflect the current and expected future financial environment conditions. Accordingly, more recent data should be used as a more appropriate basis for setting forward looking rates of return.
3. **Current MRP levels.** Our analysis shows that over recent years the MRP has averaged 3.0-3.30. This is consistent with the recent analysis from Mercer Consulting.
4. **Equity beta.** The equity betas used by regulators assume that regulated businesses are “average”. By adopting this assumption the businesses are gaining a higher return than need be the case. Regulators are not accepting that by granting a regulated return the market accepts that the regulated businesses exhibit a “conservative” rating, recognising that returns from them, while providing a relatively lower return (than other riskier businesses), offsets this by providing certainty of return. Thus, the market assesses regulated businesses as exhibiting a lower equity beta than unity. This Report has found that equity betas for regulated electricity transport businesses should be in the range of 0.5-0.7
5. **Applying MRP to DORC asset values.** Market risk premium is assessed from rates of return generated using historical depreciated actual values for assets. To apply an MRP generated on this basis to an asset value using a depreciated optimised replacement cost (DORC) basis (as used by

regulators) is fundamentally flawed, and results in a much higher value for return on assets than should apply.

6. **Impact of gearing.** Regulators have assumed that gearing comprises 60% debt and 40% equity. Our analysis highlights that implied gearing is much higher (as high as 77%) but that this comprises a mix of interest bearing debt and non-interest bearing debt, with an equity element of 20-25% of total assets. As regulators use a higher level of equity and do not provide for non interest bearing debt in the CAPM formula they have, inflated the WACC calculation

When checking the outcomes from our analysis of the 300+ companies with the ASX 200 accumulation index and the property market a number of conclusions can be reached.

1. There is close correlation between the equity returns of companies in the sample and the ASX200 accumulation index, implying that the index can be used as a proxy for the return on equity
2. The analysis undertaken of the sample of companies replicates the performance of the publicly listed companies over the same period, providing confidence that the analysis is sustainable, and that the conclusions can be extrapolated into the wider equity market
3. The accumulation index is widely used as a measure of return from the ownership of equity in companies and therefore can be used as a good indicator of the average returns possible from long term investment in a company
4. Long term returns from investment in the accumulation index show that a nominal return on equity in Australian listed companies of 11.2% has been achieved since 1950, confirming consistency with the average return on equity of 11.4% calculated from the sample of companies
5. Comparisons between the benefits of investment in electricity transport assets and property show a similar high degree of security, with perhaps electricity transport enjoying a greater level of security than property.
6. Returns from property investment shows that returns from this class of investment shows a property market risk premium is in the range of 0 to 2%, with the MRP from the more secure property investment being at the low end and from the speculative investment area being about 2%.
7. Based on the returns on various classes of property, an equity beta of 0.5 and a MRP of 2% are appropriate settings for current returns on property and could also apply to similar types of investment such as electricity transport assets.

Overall, the analyses carried out on the capital markets provide further evidence that values that have been adopted by regulators for monopoly network business for MRP = 6% and $\beta_e = 1.0$ are too high and that the values of MRP = 3% and for $\beta_e = 0.5$ are more appropriate. These values confirm earlier assessments carried out by a wide range of independent and reputable analysts. Further, this new work

also confirms the view, of at least the ESCoV, that the values for MRP and β e regulators currently use might well be reduced in light of current trends.

Appendix 1**The capital asset pricing model⁵²**

Clause 6.2.2 of the code requires that one of the key outcomes that the revenue regulatory regime administered by the Commission, must provide for is:

a sustainable commercial revenue stream, which includes a fair and reasonable rate of return to *Transmission Network Owners* and/or *Transmission Network Service Providers* on efficient investment, given efficient operating and maintenance practices.

Schedule 6.1(2.2.2) of the code states that various methods can be applied to estimate the return on equity (R_e) component—for example, prices to earnings ratios, dividend growth model and arbitrage pricing theory. However, the code states that the CAPM remains the most widely accepted tool applied in practice to estimate the cost of equity.

The CAPM calculates the required return given the opportunity cost of investing in the market, the market's own volatility and the systematic risk of holding equity in the particular company. The CAPM determines the rate of return from the perspective of the investor measured in cash flow terms. This includes the returns from year to year and any net appreciation in the capital.

The CAPM formula is:

$$R_e = R_f + \beta_e(R_m - R_f)$$

where:

- R_f = the risk free rate of return—usually based on government bond rates of an appropriate tenure
- $(R_m - R_f)$ = the market risk premium (MRP)—the return of the market as a whole less the risk free rate
- β_e = the relative systematic risk of the individual company's equity

The CAPM expresses the rate of return as the post-tax nominal return on equity. This can be adjusted to allow for debt to derive the corresponding return on assets, otherwise known as the WACC.

Key parameters

The key parameters relevant to WACC/CAPM analysis are:

- the risk-free interest rate (R_f)
- the expected rate of inflation (F)
- the cost of debt (R_d)
- the market risk premium (MRP)

⁵² ACCC Decision South Australian Transmission Network Revenue Cap 2003-2007/08
Date: 11 December 2002 File No: C2001/1094, pages 16 and 17

- the likely utilisation of imputation credits (γ)
- the likely level of debt funding (D/V)
- the equity beta (β_e) of the company
- the effective tax rates on equity (T_e)

Below is a table⁵³ presented in the ACCC Final Decision on ElectraNet showing the comparison between claimed WACC elements and awarded elements of the WACC calculation for ElectraNet. Of particular note is that levels of MRP and β_e between claimed and awarded do not show a marked difference, despite the fact that these two elements have a major impact on setting WACC at levels above those achieved by business in a competitive environment.

Table 3.6 Comparison of cost of capital parameters proposed by ElectraNet and the Commission

Parameter	Final decision	Draft decision	ElectraNet's proposal
Nominal risk-free interest rate (R_f)	5.17%	5.41%	5.90%
Expected inflation rate (F)	2.07%	2.30%	2.34%
Debt margin (over R_f)	1.22%	1.30%	1.72%
Cost of debt $R_d = R_f + \text{debt margin}$	6.39%	6.71%	7.62%
Market risk premium ($R_m - R_f$)	6.00%	6.00%	6.50%
Debt funding (D/V)	60%	60%	60%
Value of imputation credits γ	50%	50%	50%
Asset beta β_a	0.40	0.40	0.45
Debt beta β_d	0.00	0.00	0.00
Equity beta β_e	1.00	1.00	1.12
Nominal post-tax return on equity	11.17%	11.40%	13.66%
Post-tax nominal WACC	6.07%	6.39%	8.66%
Pre-tax real WACC	7.17%	7.12%	8.46%
Nominal vanilla WACC	8.30%	8.59%	10.03%

⁵³ ACCC Decision South Australian Transmission Network Revenue Cap 2003-2007/08
Date: 11 December 2002 File No: C2001/1094, page 41

Appendix 2 – Source of core data

The data used in the evaluation of the 300+ largest Australian public and private companies was provided by IBISWorld. The data was requested to be provided in the format which gave ten years of financial performance of the 300 largest companies operating in Australia, based on revenue. In all 4423 results were provided over the period 1989 to 2003. The data provided included annual results in the following categories

Business name and industry
Revenue for the year
Net profit before tax (NPBT)
Interest paid
Total assets
Shareholders funds
Abnormal items
Extraordinary items

Where sufficient data was not provided for the needs of the analysis, those companies and the results were excised from the sample. Year 2003 was not included

Averaging has been based on weighting related to volume for each year, and then averaged across all years in the sample to generate average returns over the period

As companies have different accounting cut-off dates, results were allocated into calendar years

EBIT was calculated by the addition of NPBT and interest paid

Pretax nominal return on assets was calculated as EBIT/total assets

Pretax nominal return on equity was calculated as NPBT/shareholders funds

As the CAPM assumes all assets to be the sum of debt + equity and allocates gearing as $\text{debt}/(\text{debt} + \text{equity})$, the analysis assessed gearing as $(\text{assets} - \text{shareholder funds})/\text{assets}$.

Comparative data on interest, bond yields and CPI were sourced from the Australian Bureau of Statistics website and the Reserve Bank of Australia website, as were ASX indices for ASX 200 growth, ASX Accumulation and dividend yields.

“Real” returns were calculated by subtracting coincident inflation (CPI) from the calculated nominal returns

Other data. Other data, such as on inflation, bond rates, share indices were sourced for the website of the Reserve Bank of Australia, and on specific shares and sectoral share indices were sourced from CommSec, a division of the Commonwealth Bank of Australia

Appendix 3

Details of IBISWorld, provider of the core source data for this research

IBISWorld has its origin in the formation of IBIS Research Services in 1971 operating as a successful market research organization. *IBISWorld* later specialised in the long range forecasting of industries and the business environment at large, with an emphasis on providing information for strategic planning and research purposes.

For the last 12 years, *IBISWorld* has produced many award winning searchable databases using the latest technology at each stage. The latest version of the *IBISWorld* web site went on-line in February 2001.

IBISWorld is now building a worldwide network of unique and comprehensive business intelligence information. With partners in Taiwan and Indonesia, and plans to expand to the US and Europe, *IBISWorld* is poised to offer a truly global information solution in the years to come.

IBISWorld extensively covers every industry, the major enterprises in those industries and the business conditions they face for selected economies, providing valuable strategic and tactical business environment information. It uses reliable source material as well as professional insights, within a consistent structure, to provide your business with the power of information

For nearly thirty years, *IBISWorld* has been providing corporate researchers librarians and analysts with high value-added information on companies, industries and economies as a resource base for the preparation of sophisticated submissions, presentations and strategic recommendations.

It provides sales and marketing executives with vital intelligence information on companies, industries and economies enabling effective identification of key prospects and providing for strategic and accurate target marketing.

Its systems provide added assistance for access, monitoring and analysis of information on companies and their respective business environments, enabling effective risk management and strategic business development.

Appendix 4

NATIONAL THIRD PARTY ACCESS CODE FOR NATURAL GAS PIPELINE SYSTEMS

8.10 When a Reference Tariff is first proposed for a Reference Service provided by a Covered Pipeline that was in existence at the commencement of the Code, the following factors should be considered in establishing the initial Capital Base for that Pipeline:

- (a) the value that would result from taking the actual capital cost of the Covered Pipeline and subtracting the accumulated depreciation for those assets charged to Users (or thought to have been charged to Users) prior to the commencement of the Code;
- (b) the value that would result from applying the "depreciated optimised replacement cost" methodology in valuing the Covered Pipeline;
- (c) the value that would result from applying other well recognised asset valuation methodologies in valuing the Covered Pipeline;
- (d) the advantages and disadvantages of each valuation methodology applied under paragraphs (a), (b) and (c);
- (e) international best practice of Pipelines in comparable situations and the impact on the international competitiveness of energy consuming industries;
- (f) the basis on which Tariffs have been (or appear to have been) set in the past, the economic depreciation of the Covered Pipeline, and the historical returns to the Service Provider from the Covered Pipeline;
- (g) the reasonable expectations of persons under the regulatory regime that applied to the Pipeline prior to the commencement of the Code;
- (h) the impact on the economically efficient utilisation of gas resources;
- (i) the comparability with the cost structure of new Pipelines that may compete with the Pipeline in question (for example, a Pipeline that may by-pass some or all of the Pipeline in question);
- (j) the price paid for any asset recently purchased by the Service Provider and the circumstances of that purchase; and
- (k) any other factors the Relevant Regulator considers relevant.

Appendix 5**Average equity beta by industry listed on the ASX**

Industry index	Average Equity Beta
Property trusts	0.366
Alcohol and tobacco	0.420
Food and household	0.424
Transport	0.463
Diversified industrials	0.719
Engineering	0.756
Building materials	0.857
Paper and packaging	0.953
Developers and contractors	0.954
Banks and finance	0.967
Infrastructure and utilities	0.983
Tourism and leisure	1.084
Chemicals	1.128
Investment and financial services	1.131
Retail	1.269
Mining and energy	1.305
Insurance	1.394
Other metals	1.502
Miscellaneous industrials	1.568
Diversified resources	1.571
Gold	1.678
HealthCare and bio-technology	1.899
Media	2.076
Telecommunications	2.772

Source: Australian Graduate School of Management centre for research in finance; risk measurement service

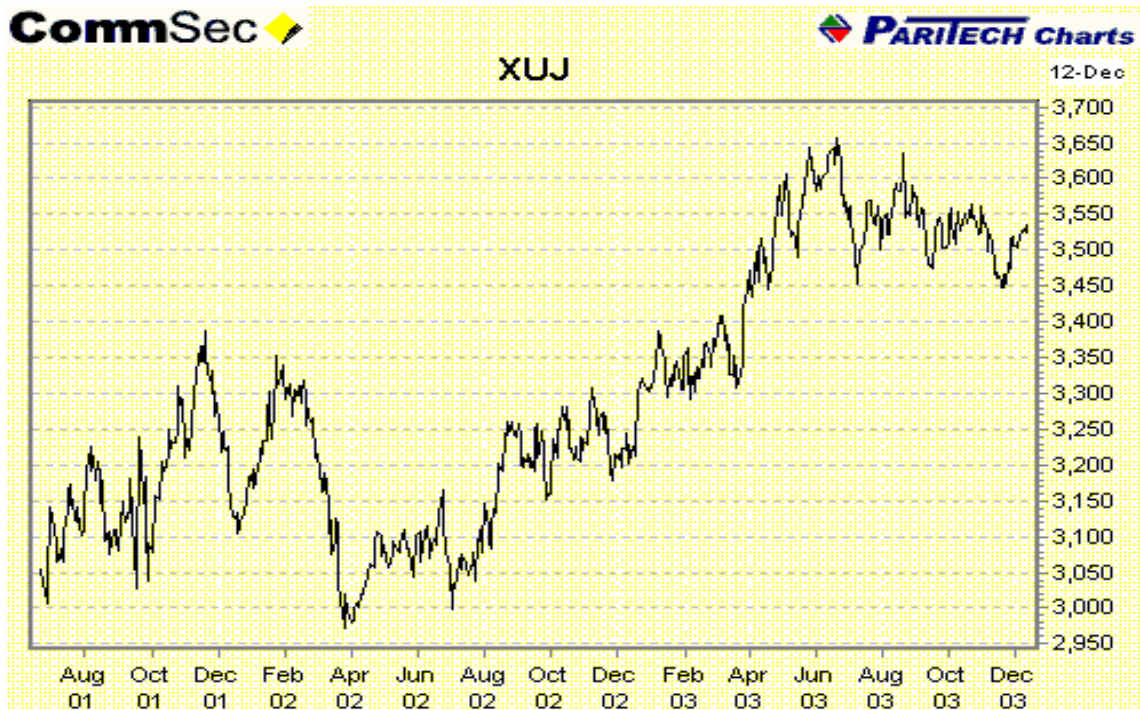
Appendix 6

Companies comprising the "Utilities" sector of the ASX

Source of data: Australian Financial Review and CommSec

Company	Type	Market cap
Advanced Energy	Energy technology	\$10m
Australian Energy	Electricity retailer	\$34m
Energy Developments	Electricity generator/ developer	\$319m
Energy World Corp	Electricity and gas reseller	\$22m
Envirovision	Developer of renewable energy	\$7m
Geodynamics	Developer geothermal power systems	\$59m
Horizon Energy	Investor in power generator (25% of Loy Yang A)	\$23m
Pacific Energy	Power generation	\$4m
Pacific Hydro	Power generation using renewable energy	\$377m
Solar Energy	Manufacturer solar powered equipment	\$8m
Alinta	Gas and electricity distribution	\$1040m
AGL	Gas and electricity retailing and distribution	\$4995m
Australian Pipeline Trust	Gas transmission	\$627m
Envestra	Gas distribution	\$720m
GasNet	Gas transmission	\$291m
Novera	Developer of renewable energy	\$46m

Daily movement of ASX "Utilities" Index since inception



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Appendix 7**Summarized data from IBISWorld on Australia's 300 largest companies****Bond rates sourced from Reserve Bank of Australia**

year	# companies in sample	Total Revenue (\$k)	NPBT + Interest Paid = EBIT (\$k)	NPBT (\$k)	Total Assets (\$k)	Shareholders Funds (\$k)	gearing	ebit/assets = RoA	npbt/sh funds = RoE	5 yr br	10yr br
1989	195	\$272,086,585	\$65,877,091	\$28,083,907	\$666,027,839	\$152,501,071	0.77	0.0989	0.1842	14.16	13.43
1990	209	\$302,853,859	\$76,950,353	\$22,525,531	\$809,739,707	\$194,989,165	0.76	0.0950	0.1155	13.40	13.20
1991	226	\$321,032,703	\$67,136,356	\$17,618,332	\$898,147,819	\$245,337,386	0.73	0.0747	0.0718	10.51	10.79
1992	233	\$318,628,535	\$54,492,781	\$12,721,193	\$912,329,034	\$225,488,260	0.75	0.0597	0.0564	8.42	9.19
1993	246	\$333,503,234	\$61,443,052	\$25,429,451	\$995,020,709	\$244,675,403	0.75	0.0618	0.1039	6.79	7.37
1994	262	\$370,843,850	\$65,735,202	\$32,401,678	\$1,034,827,778	\$262,331,583	0.75	0.0635	0.1235	8.47	8.93
1995	278	\$412,114,901	\$77,723,735	\$37,325,228	\$1,169,267,665	\$302,274,802	0.74	0.0665	0.1235	8.79	9.30
1996	296	\$457,740,980	\$87,121,323	\$41,677,871	\$1,303,634,581	\$333,778,082	0.74	0.0668	0.1249	7.85	8.20
1997	300	\$518,205,020	\$93,961,336	\$43,740,231	\$1,575,832,119	\$372,893,255	0.76	0.0596	0.1173	6.49	6.94
1998	316	\$571,811,373	\$103,627,999	\$52,851,412	\$1,782,738,995	\$412,609,034	0.77	0.0581	0.1281	5.26	5.53
1999	329	\$623,612,954	\$98,486,941	\$50,115,556	\$1,896,700,488	\$420,211,182	0.78	0.0519	0.1193	5.72	6.02
2000	343	\$724,771,154	\$130,855,168	\$71,661,622	\$2,417,818,364	\$504,909,504	0.79	0.0541	0.1419	6.27	6.32
2001	352	\$774,611,037	\$123,897,950	\$55,555,240	\$2,647,728,589	\$571,480,648	0.78	0.0468	0.0972	5.23	5.62
2002	326	\$777,349,401	\$103,817,759	\$49,176,073	\$2,614,218,520	\$588,629,242	0.77	0.0397	0.0835	5.53	5.84

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Appendix 8**Summarized data from IBISWorld on Australia's 300 largest companies****Companies with regulated assets,**

Electricity transport companies in the sample which have regulated assets are AGL, Aurora Energy, Energex, EnergyAustralia, Enertrade, Ergon Energy, ETSA Utilities, Integral Energy, Origin Energy, PowerCor, TXU Australia and Western Power

Year	# companies in sample	Total Revenue (\$k)	NPBT + Interest Paid = EBIT (\$k)	NPBT (\$k)	Total Assets (\$k)	Shareholder funds (\$k)	gearing	ebit/assets = RoA	npbt/sh funds = RoE
1995	6	\$8,713,017.00	\$1,411,239.00	\$894,777.00	\$19,631,936.00	\$9,260,059.00	0.53	0.0719	0.0966
1996	8	\$12,363,713.00	\$1,878,912.00	\$1,134,705.00	\$25,955,877.00	\$11,922,739.00	0.54	0.0724	0.0952
1997	8	\$15,598,119.00	\$2,136,111.00	\$1,294,945.00	\$27,172,499.00	\$12,705,265.00	0.53	0.0786	0.1019
1998	8	\$13,351,311.00	\$2,093,541.00	\$1,441,987.00	\$26,232,698.00	\$13,008,262.00	0.50	0.0798	0.1109
1999	10	\$15,503,372.00	\$2,284,447.00	\$1,429,160.00	\$30,008,449.00	\$13,000,967.00	0.57	0.0761	0.1099
2000	13	\$18,602,523.00	\$2,881,217.00	\$1,799,692.00	\$35,227,887.00	\$15,022,585.00	0.57	0.0818	0.1198
2001	14	\$19,528,612.00	\$2,679,703.00	\$1,202,020.00	\$43,334,505.00	\$17,117,793.00	0.60	0.0618	0.0702
2002	13	\$19,495,935.00	\$3,119,283.00	\$1,901,152.00	\$42,426,453.00	\$18,347,939.00	0.57	0.0735	0.1036

Appendix 9 - Typical Investment guidelines**SCHEDULE 2****INVESTMENT OBJECTIVES AND INVESTMENT GUIDELINES****Investment Objectives****I. Objectives:**

The objective is to outperform the benchmark index by % per annum., before fees, over rolling three year periods.

Investment Guidelines**II. Investment Process;**

The portfolio will be managed using the "Global Thematic" investment process. The thematic approach is based on identifying underlying secular trends whose outturn will impact the pricing of equities over the medium term. The thematic portfolio is built by populating the portfolio with securities of companies favorably exposed to these themes and whose prices do not already discount this information.

The fund manager will promptly notify the Client of any significant change made to the process.

III. Benchmark:

The portfolio return will be compared with the Standard & Poors, ASX 300 Index, with net dividends reinvested [*the ASX 300 accumulation index*], in Australian dollar terms or such other benchmark determined by the Trustee in accordance with the definition of "benchmark" in the deed.

IV. Currencies:

The currency of the portfolio is Australian Dollars.

V. Investment Universe

The Investment Universe is limited to investment in Australia

VI. Permitted Investments

Permitted Investments are Eligible Equity Investments, Cash and Eligible Derivatives.

VII. Portfolio Restrictions

1. Up to 100% of the portfolio may be invested from time to time within the Investment Universe,

Appendix 10. – Average yields on property sales.

2003 Research by Tony Crabb

AVERAGE ANNUAL INVESTMENT YIELDS

September 1988 – June 2003

		Grade	Average %	Average Range (%)
Melbourne Industrial	North West	Prime	9.34	9.00 – 12.00
	North West	Secondary	11.26	10.50 – 15.00
	City Fringe	Prime	9.16	7.50 – 12.00
	City Fringe	Secondary	10.53	9.50 – 13.50
	South East	Prime	9.00	8.00 – 11.00
	South East	Secondary	10.86	10.00 – 13.75
Melbourne CBD Office		Premium	6.00	5.00 – 7.75
		A	6.66	4.75 – 9.00
		B	7.31	6.5 – 9.5
St Kilda Road Office		A	7.97	7 – 11
		B	9.75	8 – 14
Suburban Office		A	8.73	7.50 – 11
		B	10.95	10 – 14
Brisbane Industrial	Northside	Prime	10.00	9.13 – 11.00
Brisbane CBD Office		Premium	7.07	5.40 – 8.30
		A	7.74	6.50 – 8.63
Sydney Industrial	Inner West	Prime	9.41	8.75 – 12.00
	South Sydney	Prime	9.38	8.25 – 11.75
Sydney CBD Office		Premium	5.67	4.50 – 7.00
		A	6.42	5.10 – 8.25
		B	7.64	6.13 – 10.13
North Sydney Office		A	7.57	7.35 – 9.63
		B	8.27	7.50 – 10.15
Chatswood Office		A	8.21	7.50 – 10.75
		B	9.14	8.50 – 11.50
Parramatta Office		A	8.95	7.75 – 11.75
		B	9.63	8.75 – 12.00

Source: FPD Savills Database

Appendix 11 – Office grade definitions.

Source Property Council of Australia

Grade	Size	Floorplate	Finish	Technical Services
Premium	Sydney & Melbourne CBDs generally >30,000 sq.m. Other CBDs generally >20,000 sq.m.	>1,000 sq.m. largely column free	A landmark office building located in major CBD office markets which is a pace setter in establishing rents and includes: <ul style="list-style-type: none"> • ample natural lighting; • good views/outlook; • prestige lobby finish; • on-site undercover parking; • quality access to/from an attractive street setting; and, • premium presentation and maintenance. 	State of the art technical services will typically include the following: <ul style="list-style-type: none"> • Heating, Ventilation and Air-condition System - Multiple zones of approximately 70 sq.m. with around 25 watts per sq.m. for tenant equipment. The system should also have a supplementary fresh air system, auxiliary condenser water loop for tenant use and capacity for tenant exhaust risers. • Lifts – Waiting interval not to exceed 25 seconds, handling capacity in excess of 15% and a high quality ride with low noise. At least one dedicated goods lift. • Power – Minimum of 25 watts per sq.m. load capacity. Dedicated data risers should be available. • Lighting – High quality ultra low brightness fittings. • Building Intelligence – High quality building automation system, 24 hr access (card key), after hours air-conditioning dial-up, energy and stand-by power management, manned control room, perimeter security, and closed circuit TV. • Standby Power – Full power for all essential services and ventilation and at least 50% power for lighting and lifts.
Grade A	Sydney & Melbourne CBDs generally >10,000 sq.m.	> 600 sq.m. largely column free	High quality space including: <ul style="list-style-type: none"> • good views/outlook; • quality lobby finish; • on-site undercover parking; • quality access to/from an attractive street setting; and, • high quality presentation and maintenance. 	High quality technical services will typically include the following: <ul style="list-style-type: none"> • Heating, Ventilation and Air-condition System - Multiple zones of approximately 100 sq.m. with around 15 watts per sq.m. for tenant equipment. The HVAC should have an auxiliary condenser water loop for tenant use. • Lifts - Waiting interval not to exceed 30 seconds, handling capacity around 14% to 15% and a good quality ride. • Power – Minimum of 15 watts per sq.m. load capacity. • Lighting – Lower quality ultra low brightness fittings. • Building Intelligence – Direct digital controls, 24 hr access with card key and off site alarm monitoring, key switch after hours air-conditioning. • Standby Power – Full power for essential services and full ventilation.