



2007	2008	2009	2010	2011
8,043	7,028	6,001	5,182	1,063
612	298	350	307	9,332
12,289	11,195	10,089	9,506	5,611
7,175	8,892	7,429	6,186	478
2,432	1,399	2,121	1,044	15,47
21,896	21,486	19,639	16,736	10
13,122	12,498	10,993	10,222	
7,954	7,069	7,366	6,681	
	67	52	260	

*creating, capturing  
and communicating value*

## Comments on Market Risk Premium in Draft Decision by AER for Envestra February 2011

Dr Steven Bishop and Professor Bob Officer

March 2011

### Value Adviser Associates Pty Ltd

#### Melbourne

Level 2  
65 Southbank Boulevard  
Southbank VIC 3006  
tel 61 3 9626 4300  
fax 61 3 9626 4301

#### Brisbane

Level 20, AMP Place  
10 Eagle Street  
Brisbane QLD 4000  
tel 617 3221 4857  
fax 617 3221 6152

#### Adelaide

Level 2  
99 Frome Street  
Adelaide SA 5000  
tel 61 8 8111 4035  
fax 61 8 8111 4098

[www.vaassociates.com.au](http://www.vaassociates.com.au)

# Contents

<b>1.</b>	<b>Background</b> .....	<b>1</b>
<b>2.</b>	<b>Response to specific issues relating to the size of the MRP</b> .....	<b>2</b>
	2.1 Equity risk premium versus debt risk premium .....	2
<b>3.</b>	<b>Response to Specific Comments</b> .....	<b>6</b>
	3.1 The MRP has a 10 year horizon .....	6
	3.2 Variability in realised MRP .....	8
	3.3 Consideration of Imputation tax benefits .....	8
	3.4 Typographical Error .....	9
<b>4.</b>	<b>Conclusion</b> .....	<b>9</b>



## 1. Background

We have been asked by Envestra Ltd ["Envestra"] to express our opinion on the market risk premium assessed by the Australian Energy Regulator ["AER"] in a Draft Determination.<sup>1</sup>

The AER Draft Determination has assessed the MRP for the regulatory period 1 July 2011 – 30 June 2016 as 6.0%. This assessment of the market risk premium ["MRP"] represents a reduction from the May 2009 assessment<sup>2</sup> of 6.5% to 6.0%. The MRP is used to estimating the cost of equity under the Capital Asset Pricing Model ["CAPM"] in an assessment of the weighted average cost of capital.

It appears that the basis for the reduction is on the grounds that the impact of the global financial crisis on market risk ["GFC"] has passed and with it has passed the basis for the prior increase from 6.0% to 6.5%. As a consequence the AER has selected its prior estimate of the long term MRP of 6.0% as representing the appropriate rate for the regulatory period.

The view is captured on pages 81-82 of the Draft Determination:

*Market conditions since the time of the WACC review have significantly improved and now reflect a lessening of concerns about the potential ongoing impact of the GFC and a much more robust long term economic and financial markets outlook for Australia. This suggests a change in circumstances from those that justified the AER's departure from the long run MRP value of 6 per cent, in that the uncertainty regarding the impact of the GFC is no longer a characteristic of prevailing market conditions.*

The AER cite<sup>3</sup> the International Monetary Fund ["IMF"], the Organisation for Economic Co-operation and Development ["OECD"] and the Reserve Bank of Australia ["RBA"] as support for a recovery from GFC and therefore the conditions for increasing from the prior 6.0% to 6.5% is no longer present.

By contrast Officer and Bishop<sup>4</sup> have argued that a higher MRP with a glide path is more appropriate in current circumstances. The estimate to which the AER are responding was calculated in July 2010 as 11.9% for the first year reverting to a long term average of 7% during the 5 year regulatory period. This converts to an equivalent annual rate of 8% p.a. for the 5 years.

In addition, the AER have expressed a number of concerns with the use of the implied volatility approach (p282-3):

- Concern was expressed about the reliance on Doran et al as theoretical and empirical support for their case because they found short run volatility had a small impact of the medium term MRP
- Other research suggests option volatility is an unreliable estimator of the expected MRP e.g. Santa-Clara and Yan – who found option implied volatility is much higher than realised market risk and Chernov 'explained' why at-the-money options implied volatility is a biased and inefficient forecast of future realised volatility

---

<sup>1</sup> AER, "Draft Decision: Envestra Ltd, Access arrangement proposal for the SA gas network 1 July 2011 – 30 June 2016" February 2011

<sup>2</sup> AER, "WACC Review final decision" 1 May 2009

<sup>3</sup> AER, "Draft Decision: Envestra Ltd, Access arrangement proposal for the SA gas network 1 July 2011 – 30 June 2016" February 2011 p90 ff

<sup>4</sup> See for example Officer and Bishop, "Comments on the AER draft distribution determination for Victorian electricity distribution network service providers", July 2010



- Officer and Bishop did not consider the possibility that the implied volatility could be below the average in the 5 year period (p283)
- O&B consider a time period (5 years) that is inconsistent with the assumed 10 year period of the risk free rate (i.e. AER considers that they are using a 10 year horizon for the MRP “to maintain consistency within the CAPM, the MRP must be estimated for a 10 year investment horizon).

## 2. Response to specific issues relating to the size of the MRP

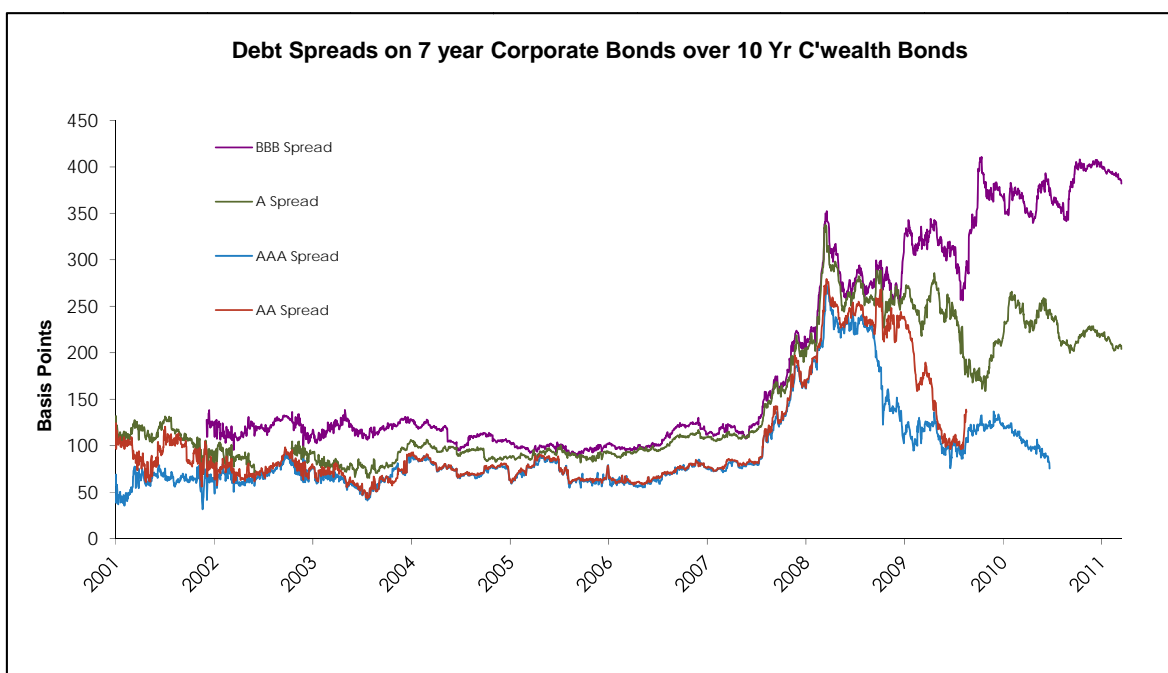
We refer to two items of market evidence that require reconciliation before reverting to the historical average for the MRP. These relate to:

1. the apparent inconsistency between the assumption that equity market risk has returned to ‘normal’ levels and the use of a well above ‘normal’ (or average) debt risk premiums; and
2. the forward view of market risk implicit in the implied volatility of options on the ASX 200 remains above the long term average, and has been rising in recent days..

### 2.1 Equity risk premium versus debt risk premium

We note that the AER have selected a debt risk premiums [“DRP”] for BBB remain well above recent historical experience, as is apparent from Figure 1. This suggests an acknowledgement that the capital market, particularly as it relates to the higher risk end of debt, has not returned to normal. Further, BBB is closer to equity than AAA debt so it would be reasonable to expect equity spreads to behave similarly.

Figure 1: Risk Spreads on Corporate Debt



On the other hand, the AER argues that the capital market, as it relates to equity, has returned to ‘normal’ and a premium above the long run average is not required. We struggle to understand how these two views can be reconciled and would be most interested in the explanation.

The only attempt in the Draft decision appears to be on page 65 of the Draft determination:



*"The AER considers it is valid to assume that the return on equity would be higher than the return on debt and this has been the case in all of the AER's decisions. However, the AER considers there are valid reasons for why the cost of equity as defined by the AER was lower than the cost of debt in the period January to June 2009 (see appendix C). For instance, at this time the risk on long term bonds seemed real to most investors leading to a short term beta escalation for such securities."*

We suggest that there is no valid reason for the cost of equity to ever be below the cost of debt and the second statement raises important questions about whether it is the market risk premium, the beta of debt or some combination that is changing – the same issue arises with equity. If the beta of debt is rising for regulated businesses in the view of the AER then it would logically follow that the beta of equity would also rise.

Our approach provides a more consistent view of the debt premium and equity risk premium with both being above the long term average in current circumstances.

We note the analysis of Professor Bruce Grundy which suggests that under the benchmark gearing of 60% used by the AER and its predecessors in price determinations, the equity premium should be greater than 2.67 times the debt risk premium.<sup>5</sup>

The Grundy analysis is based on the following relationship:

$$\text{Firm Risk Premium} = \text{Debt Risk Premium } D/V + \text{Equity Risk Premium } E/V$$

This relationship can be derived by deducting the risk free rate from both sides of the plain vanilla WACC relationship.<sup>6</sup> Grundy re-arranges the relationship and substitutes the benchmark 60% for D/V to establish that for a given firm risk premium the equity risk premium must be greater or equal to 2.67 times the debt risk premium.

Figure 2 shows the equity market risk premium (assuming a beta of 1) less the debt risk premium for BBB corporate bonds using the 6% MRP until 7 May 2009 then 6.5% from 8 May 2009 – these dates broadly correspond with the AER final decision regarding the review of the weighted average cost of capital parameters.

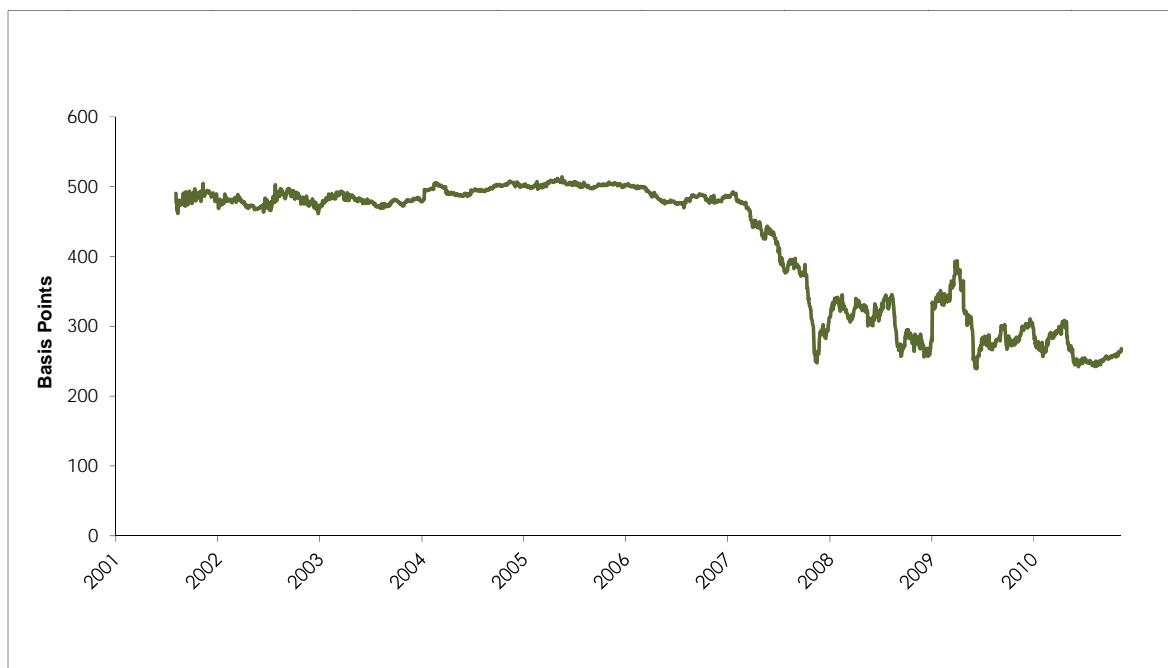
It is evident that there has been a narrowing of the risk premium on equity relative to the risk premium on debt since the crisis. Rather than a narrowing, we would expect the risk premium on equity would at least rise in keeping with the risk premium on debt since both instruments trade in the capital market. This would be in keeping with the logic of Professor Grundy's analysis.

---

<sup>5</sup> AER op cit p 61 and Bruce Grundy, "The calculation of the cost of capital: A report for Envestra" 30 September 2010 p 17-18

<sup>6</sup> It is not clear to us whether Handley (Handley J "Peer Review of Draft Report by Davis on the Cost of Equity", memo to Kenny Yap, AR, 18 January 2011) is arguing that the relationship is dependent upon the Modigliani Miller (MM) Theorems holding or not. We assert that the plain vanilla WACC relationship per se does depend upon the MM theorems holding. The key assumptions are, in our view, that the plain vanilla WACC is constant across leverage (a function of business risk) and that the cost of debt is less than the cost of equity.

**Figure 2: Equity MRP as defined by AER less debt risk premium on BBB corporate bonds**



In our view the equity risk premium as proposed by the AER is inconsistent with the debt premium and the proposed equity premium is too low. Our approach based on market based equity risk data works towards a reconciliation of this difference.

We note that the AER quote IMF, OECD and RBA to support the claim that the impact of the GFC on the MRP has passed. The quotes provided in this regard (p90) from the IMF OECD and RBA relate to investment growth rather than market risk which drives the market risk premium. It appears that the link to market volatility expectations was made by the AER (p91) rather than by the quotes cited. This is apparent from page 91 of the Draft determination:

*"The robust economic outlook in Australia, as noted by statements from the IMF, the OECD and the RBA suggest that market conditions appear to have stabilised to the extent that investors are no longer factoring the substantial volatility experienced at the height of the GFC into their expectations of the future."*

By contrast we have examined the markets expectations more directly as provided by implied market volatility estimates from market prices. Figure 3 shows the implied volatility of 1 year options on the ASX 200. The data is not as comprehensive as the 3 month options as is evident by some missing observations. Also plotted on Figure 3 is the long term average market volatility of 14% that we derived from the long term historical volatility of the market.<sup>7</sup> These data suggest a reduction of market risk from the GFC peak and the volatility does appear to be returning to the longer term average, however it is currently still above the average and has increased again recently.

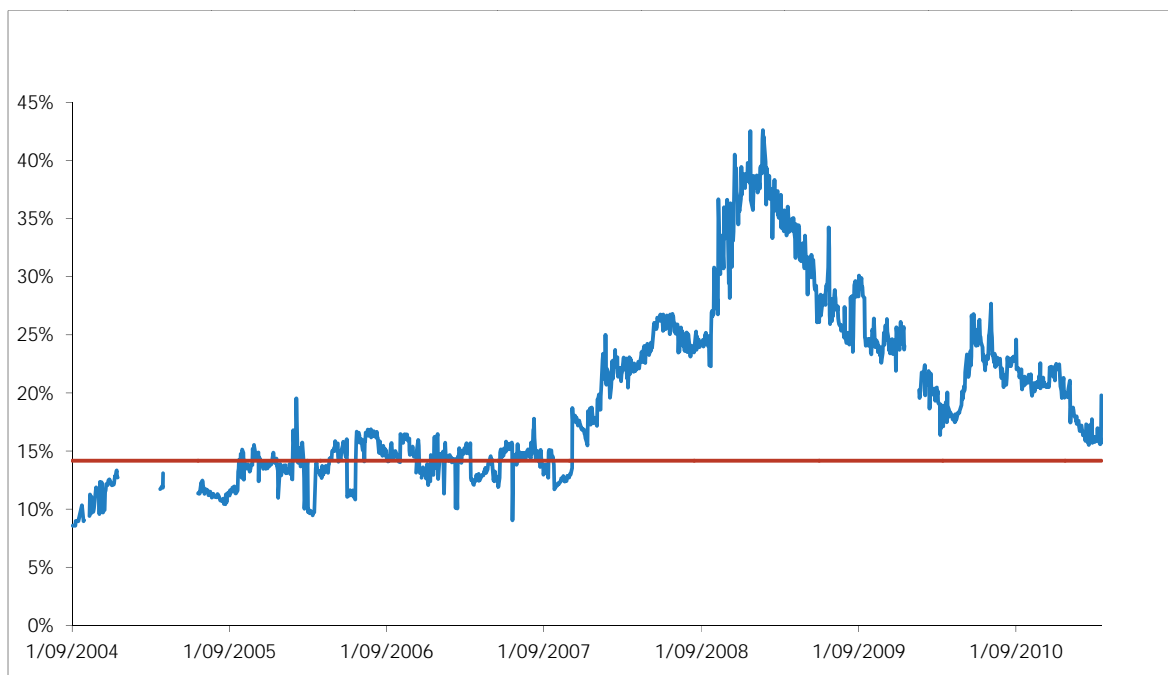
We note that the shorter term volatility has also increased recently (prior to 18 March 2011). This is evident in Figure 4 which plots the implied volatility of a 3 month maturing

<sup>7</sup> We found high correlation between the historically based volatility and the forward looking volatility and we also found the pre-crash average forward volatility was also around 14% -14% is the average of the annualised 90 day standard deviation of the ASA30 daily index from 1980 to end December 2009. The average volatility of the 12 month call option on the index prior to the crash was 13.6%.

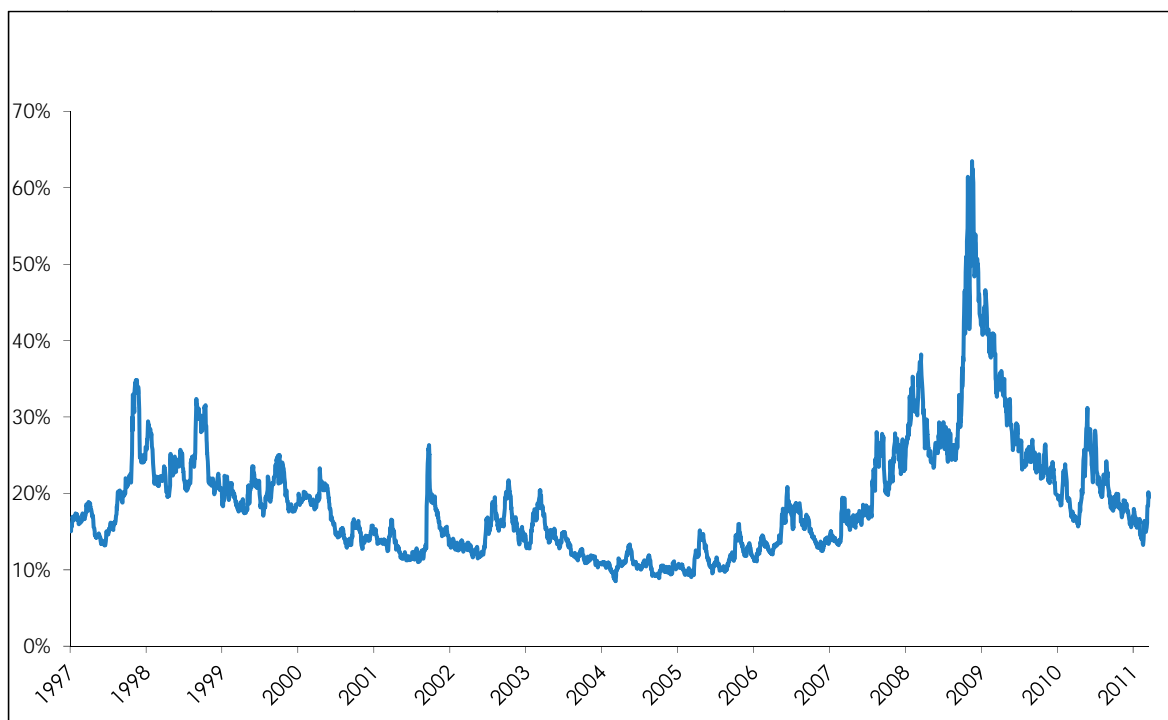


option on the ASX 200 index. Recent volatility has increased. This has also been the case for the 1 and 6 month options. We note that the increased risk in the shorter term options was not immediately reflected in the 12 month option data. Our hypothesis would be lack of liquidity in the longer term options. We would have expected all reflect the increase in volatility, largely on the grounds that the market index has fallen. This is consistent with the increased risk apparent from the shorter term options.

**Figure 3: One year forward volatility derived from options on the ASX 200**



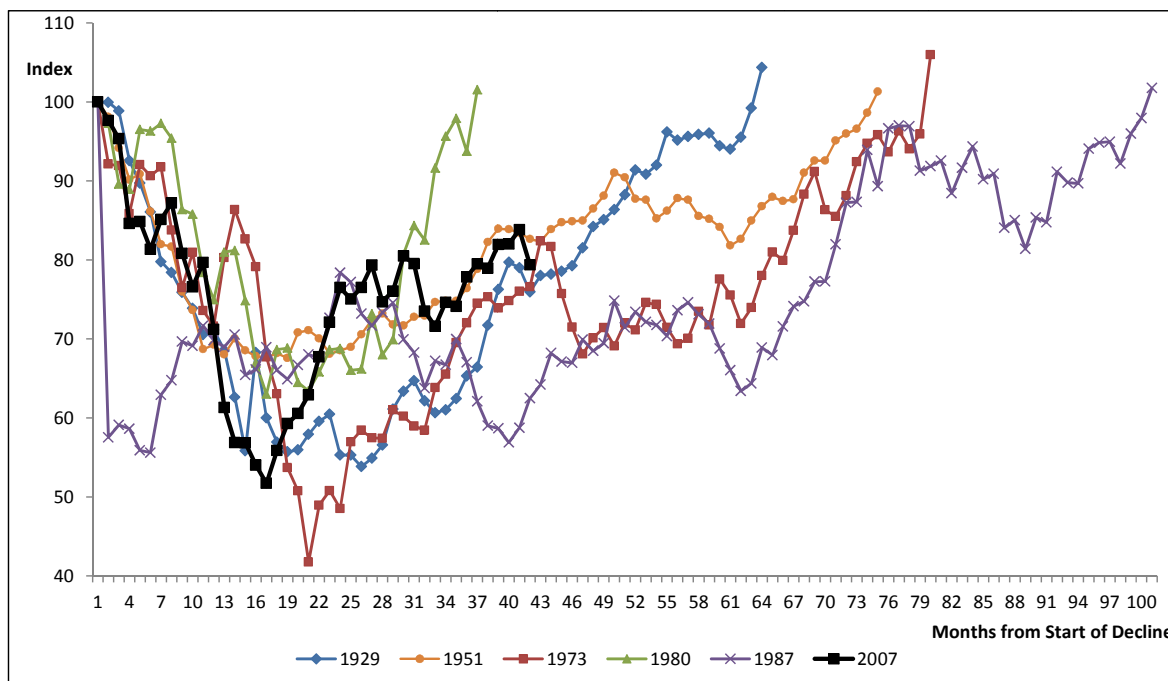
**Figure 4: Three month forward volatility derived from options on the ASX 200**



We also note that the stock market has not returned to pre GFC levels. The current situation can be contrasted with prior crashes. Figure 5 shows the current status of the

market relative to the level pre-crash relative to other stock market crashes in Australia. As at the end of February 2010, it had recovered to approximately 80% of the pre-crash level. This suggests that there remains some time to pass before the market has recovered from the crash.

**Figure 5: Time to recovery of index from pre-crash levels**



### 3. Response to Specific Comments

In this section we comment on a number of particular comments passed by the AER.

#### 3.1 The MRP has a 10 year horizon.

The Draft determination makes numerous references to the MRP being estimate for a 10 year horizon. For example on P78 the AER state:

*“The AER has accepted the use of the yield on 10 year CGS. To maintain consistency within the CAPM, the MRP must be estimated for a 10 year investment horizon.”*

This quote suggests the reason for the MRP being a 10 year horizon is because the 10 year yield on a Commonwealth Government Security is used as a proxy for the risk free rate.

We have a different view as previously expressed.<sup>8</sup>

When assessing a MRP, the objective is to select a risk free rate that serves as a minimum rate to ‘anchor’ one end of the distribution of risks. This enables the determination of a price per unit of risk that is essentially dimensionless but the generally accepted practice is to both calculate and express it as an annual rate.

The ten year bond yield, expressed as an annual rate is typically used as the risk free rate because it is likely to have the lowest liquidity premium (it is traded in a well-attended market) and provides an annual rate taken in the context of long term investments. Once used to estimate an annual MRP, it is important that the risk free rate used as the first term

<sup>8</sup> Officer & Bishop, “Comments on AER Draft determination for Distribution in SA”, 25 November 2009

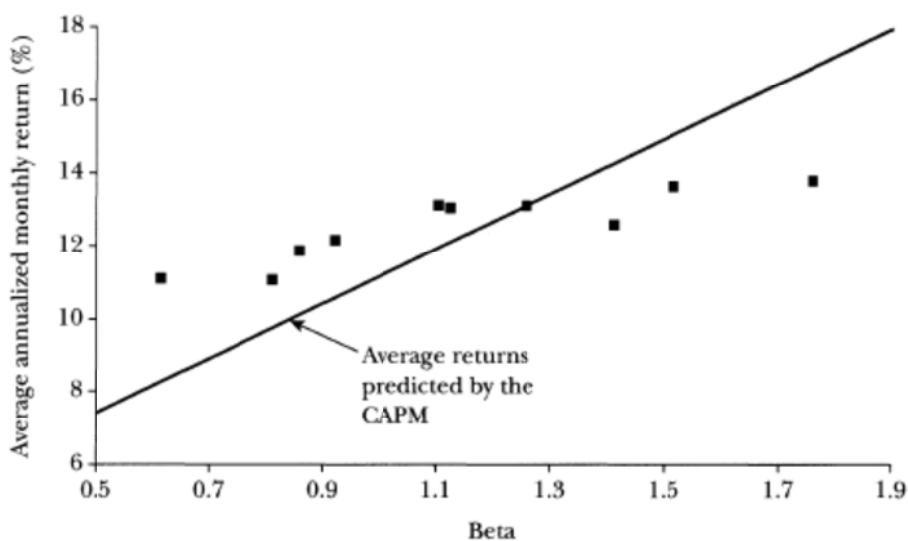




in the CAPM also be a 10 year rate. This is the consistency requirement rather than a view that the outcome is a 10 year MRP. The MRP estimated in this way is widely used for investments of various expected lives however we anticipate most asset investment decisions under regulatory regimes are long term.

An additional reason for using the 10 year rate to provide an annual risk premium is that it is higher than the short term rates, thereby providing a 'flatter' security market line, in keeping with empirical findings of the CAPM relative to the theoretical CAPM i.e. the empirical evidence suggests the SML is flatter than would be the case using short term rates. – see Grundy p3 and the graph extract from Fama and French<sup>9</sup> below, called Figure 6 here.

**Figure 6:**  
**Average Annualized Monthly Return versus Beta for Value Weight Portfolios Formed on Prior Beta, 1928–2003**



In both our historical examination of the MRP and our forward estimate of the MRP we have estimated an annual MRP, not a 10 year MRP. As noted it is anchored in an annual risk free rate derived from a 10 year Commonwealth Government Bond. Even if a 5 year term was used for the risk free rate when estimating the MRP, the outcome would still be an annual rate applicable for however many years were of interest albeit 1, 2 5 10 or any other number of years.

We argue that if investors were to invest in an alternative investment opportunity with equivalent risk to the regulated distribution business they would require a return based on our 5 year 'glide path' for the first five years and one based on the long term average MRP for the subsequent 5 years. If the regulatory period was 10 years then we would argue the return profile should behave correspondingly i.e. a higher return in the first five years. Since the regulatory period covers the first 5 of these years then the return provided should be consistent with the risk experienced over these first 5 years regardless of whether the annual MRP is derived using a 5 year or a 10 year risk free rate. The next 5 year period would update the MRP for events current at the time – which and the MRP could be above or below the long term average.

<sup>9</sup> Fama E & K French, "The Capital Asset Pricing Model: Theory and Evidence", Journal of Economic Perspectives, Vol. 18, No. 3, Summer 2001 pp25 – 46.



### 3.2 Variability in realised MRP

The AER argue that we have not considered the possibility that the realised MRP could be below the long term estimate of the MRP and, we assume by implication, our recommended MRP of 8% geometric equivalent over 5 years is flawed. The statement by the AER on page 283 is repeated below.

*As discussed in chapter 5 and outlined in figure 5.1, realised excess market returns fluctuate significantly between a positive and a negative MRP. It is quite possible that in one year realised excess market returns will be below their long term estimate of 7 per cent (or 6 per cent), but this is not considered in Officer and Bishop's analysis. All that is considered is a level of implied volatility measured as at July 2010, which trends downwards to a long term historical estimate. However, the realised MRP could be below long term estimates in some years (for example, below 6 per cent). Officer and Bishop do not take this into account in their 'glide path' analysis. The AER considers that the significant variability in the short term MRP derived from implied volatility measures makes such estimates an unreliable source of evidence when setting a MRP for a 10-year investment horizon*

We make two points in relation to all but the last sentence. We address the last sentence separately. Firstly, when estimating the MRP we are interested in a forward view not the realised MRP. As we argue, the forward view is above the long term average and we anticipate it will revert over time in keeping with our analysis of historical reversion in prior commentary. In this sense we do not need to entertain the realised MRP in our analysis. The second point is that the realised return being less than the average is built into the mean MRP to which our estimate reverts over time. We argue that the high market risk brought about by the GFC, including the higher that average debt yields require particular recognition if replacement and expansion investment in the regulated infrastructure assets is to be facilitated. There may be unusual events whereby risk is substantially below the long run average and we advocate an MRP below the long runs average and an associated glide path back to the long run average.

The argument by the AER that the volatility in the short term implied volatility measures makes such estimates an unreliable source of evidence holds little ground. The AER statement is contained in the last sentence of the paragraph above. It is based on an apparent premise that there are more reliable grounds for estimating the MRP. We question this. One only need look at the large confidence interval associated with historical estimates presented in Table 5.4 of the AER document. The 95% confidence interval for the period 1958 – 2010 is 0.4% to 12.9% which is reflective of the large volatility in historical estimates in Figure 5.1 of the draft. It is important to recognise there is no moral or theoretical high ground from which to argue our method is less reliable than the historical average because of short term volatility.

### 3.3 Consideration of Imputation tax benefits

The AER once again misquote our position on the treatment of imputation tax credits when assessing the MRP in past price determinations. The AER state on page 85

*Officer and Bishop have previously stated the main reason for adopting an MRP of 7 per cent over an MRP of 6 per cent was due to the value of imputation credits, which they stated had not been considered by Australian regulators in the past.*



We include our prior response to this misquote in the Appendix rather than repeat it in the body of our commentary.

### **3.4 Typographical Error**

In passing we note what we assume to be a typographical error in the Draft determination p86 and repeated on p282. The AER quoted our volatility estimate as 11.9% however this 11.9% was our estimate of the one year forward view of the MRP. The implied volatility at that time was 23.7%.

## **4. Conclusion**

In our view the evidence from the debt market is that market risk has not returned to normal. This current high level of risk can reasonably be expected to exist in the equity market and manifest in a higher than average equity market risk premium.

In a well-functioning integrated capital market we would expect economic forces to affect both the expected return on debt and the expected return on equity. We are not of the view that there are impediments across the debt and equity markets that lead to these being segmented.

One method of gaining improved consistency in the behaviour of the risk premiums on debt and equity under current volatile market conditions is to use a forward market risk premium derived from the implied volatility of options written on the ASX 200 index combined with an assumed constant required return per unit risk.

Current volatility of 20% for the more liquid options reverting to a long term average MRP of 7% under a number of different decline scenarios supports an average 8% MRP over the regulatory period.



## APPENDIX 1

This Appendix repeats our prior response to the misquotation by the AER of our position on the treatment of imputation tax benefits. The AER state on page 85 of the Draft determination:

*Officer and Bishop have previously stated the main reason for adopting an MRP of 7 per cent over an MRP of 6 per cent was due to the value of imputation credits, which they stated had not been considered by Australian regulators in the past.*

Our response was contained in Officer and Bishop, "Market Risk Premium: An estimate for 2010 to 2015. Prepared for ETSA" June 2009 commencing page 15 and is repeated below.

"The AER pass comment that by implication Officer and Bishop made incorrect statements about whether the historical series used in earlier regulatory decisions were adjusted for imputation tax credits.

We repeat the relevant quote from Officer and Bishop (2008) below with our comments about the historical MRP series highlighted.

*"While the entire series 1883 forward is the longest time period and ideally the most relevant, challenges with the earlier data (pre 1958) meant the primary focus was on later periods. The initial input to the ORG paper (CSFB) examined 1947 – 1991 / 1992. The Officer data provided an average MRP of 7% for this period. Another period of interest was 1955 – 1992 where the average was 6.6%. In addition regard had to be made to exponential and rolling averages, not just a simple average. It should also be noted that the market returns did not contain imputation tax adjustments for the relevant period.*

*Consideration of these matters, **recognising that the historical data did not adjust for imputation tax benefits** and examination of the data prior to price determinations led Officer to use 6% as a matter of course." p10*

We have not argued whether the 6% decision by the ESC did or did not consider imputation tax benefits. Instead we argued that the historical MRP at that time did not adjust for imputation tax benefits. As we stated in the conclusion of our report:

*"The market risk premium of 6% was originally based on evidence that excluded any explicit consideration of a component to reflect any value of imputation tax benefits **in the historical MRPs.**" [emphasis added]*

We note the following comment by the AER:

*"Accordingly, in its explanatory statement, the AER considered it was clear that the JIA's assertion (and that of Officer and Bishop) that the MRP of 6 per cent was originally based on evidence that assumed a value of imputation credits of zero appears incorrect." P 184*

We invite the AER to provide evidence that the historical MRP had been adjusted for imputation credits. While as reported, Davis had regard to imputation credits in the dividend growth model, we have not seen any data provided to show how the historical MRP had been adjusted for imputation tax credits. To our observation Davis does not provide any such data. Without this evidence, the AER's assertion above with regard to



historical evidence is clearly wrong. Certainly Professor Officer, who was advising the ESC at the time, did not see (nor provide) any such data. Officer and Bishop were referring to the historical series.

We also refer to the claim of the AER:

*"The AER noted that these 'grossed-up' historical excess returns **were first estimated** by Brailsford et al and Handley and Maheswaran, which both 'grossed-up' estimates over different time periods ending in 2005." [emphasis added] p 207*

This clearly contradicts the view that the historical MRP in the early decisions were adjusted for imputation tax credits and is consistent with what we quoted from our report above."