ADVICE ON ESTIMATION OF THE RISK FREE RATE AND MARKET RISK PREMIUM

REPORT PREPARED FOR THE AUSTRALIAN ENERGY REGULATOR

12th March 2013

Final report

Submitted by:

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CONTENTS

1. INTRODUCTION

Cambridge Economic Policy Associates (CEPA) has been requested by the Australian Energy Regulator (AER) to review two issues linked to the determination of the Weighted Average Cost of Capital (WACC), namely:

- the relationship between the risk-free rate and the Market Risk Premium (MRP); and

- the role of broader market information.

While these questions were raised as separate points, we have decided to address the two questions in a single report as aspects of them are closely linked.

We have, however, addressed the two questions initially in separate sections – Part A considers the first question and Part B the second. Part C, however, draws together our findings from the first two parts and sets out an overall recommendation.

This paper benefited from discussions held with the staff and Board of AER. The views expressed here are, however, our own.

1.1. Remainder of this report

Before considering the two key questions raised by the AER we establish a set of criteria by which options can be assessed. These are set out in Section 2 of the report and builds on the obligations and requirements enshrined in legislation, the rules and guidelines (including those relating to better regulation).

Part A, which discusses the relationship between the risk-free rate and the MRP and the implications for the estimation of the WACC is structured as follows:

- Section 3 sets out a framework for considering the relationship between the risk-free rate and MRP and the implications for estimation options;

- Section 4 then considers evidence on one of the key issues in the relationship, that of the the stability of the relationship if one exists;

- Section 5 then considers the approach that AER has adopted and assesses this against our criteria; and

- Section 6 then concludes Part A.

Part B, which considers the availability, relevance and implications of broader market evidence is structured as follows:

- Section 7 provides a critical review of the market evidence presented by Ernst & Young as an input to the determination;

- Section 8 considers other possible sources of market evidence; and

- Section 9 concludes with our view of the role of broader market evidence.

Finally, Section 10 in Part C concludes the report.

2.   ASSESSMENT CRITERIA

To assess any of the various approaches for measuring the aspects of the WACC it is necessary to have clear and explicit criteria. This section outlines the criteria that we will apply in this report.

The basis of the criteria outlined below are:

- National Gas Act 2008 and National Gas Rules (especially Rule 87);

- Rate of return guidelines: Issues paper, AER, December 2012; and

- Regulatory best practice.

From these various sources we have been able to identify five main criteria. These are set out in Table 1 below.

Table 1: Criteria

Broad criteria	Measures	Comment
Impact on stakeholders	- Effect on WACC - Effect on cost efficiency - Effect on investment levels - Effect on prices	- Will the option lead to a positive or negative impact on WACC? This can both relate to whether the change is appropriate and whether it is material. - Is the approach likely to affect the incentives for cost efficiency? If so, how and to what extent? - Is the approach likely to encourage efficient investment or hinder/delay it? Important consideration given the AER's objectives. - If all the impacts are taken together, what is the likely impact on the prices paid by consumers? Again, are these impacts appropriate and/or material?
Accountability	- Consistent with theory - Supported by robust analysis - Have the pros and cons been identified	- Is the approach theoretically robust? - Is there robust analysis underlying the parameter estimates etc or are there concerns about volatility or variability in coefficients? Does a small change in the estimation period have a significant impact on the results? - Have all the positive and negative implications of the approach been identified? When thinking about weighing up the pros and cons is a consistent approach employed.
Consistency	- With previous decisions - With regulatory requirements - With overall regime	- Is the approach consistent with previous decisions? If not, is the rationale for change robust? - Is the approach consistent with prevailing conditions in the market for funds? - Is the approach consistent with the overall regulatory regime and its objectives?
Transparency	- Replicability - Simplicity	- Can the approach be easily replicated? For example, is all the data in the public domain? Are the calculations clearly set out and understood? - If the approach is complex, is it clear that the complexity is

Broad criteria	Measures	Comment
		required to provide a more accurate estimate?
Targeted	• Broader impacts	• Are there any implications for other aspects of the regulatory regime, or regulation more generally, of implementing the approach?

The table also provides some ideas on how the different criteria can be assessed. It is important that a clear and consistent approach to implementing the criteria is adopted.

There are probably too many criteria listed in the table. As such it is important to prioritise them. In our work we will place the greatest emphasis on:

- commensuration with prevailing conditions in the market for funds;

- the impact on consumers – noting that this covers aspects including whether changes in prices are appropriate and/or material and the impact on companies with respect to investment incentives;

- aspects of accountability, especially the theoretical and robust analysis elements; and

- aspects of consistency, especially relating to consistency with previous decisions.

Two of these points need further consideration. First, when thinking about whether the approach is commensurate with prevailing conditions in the market depends in part on the time horizon being considered. AER has tended to focus on a ten year time horizon while UK regulation has tended to focus on the life of the asset under consideration. This latter approach is a significantly longer time horizon and consequently can lead to different views about how markets operate – for example, the degree of mean reversion.

Second, the last criteria is, in our view, important when considering changes to how the WACC is calculated. While it is clearly important to get appropriate signals for investment, consumption etc, it is also important to consider what impact a change has on stakeholders, especially when deviations in one price control period may be cancelled out by deviations in another. This means any change to an approach needs to be placed in the context of previous and future determinations using both the original and new approaches.

Other stakeholders may take different views about the prioritisation of the criteria and the possible consequent implications about what the possible effect on the choice of approach would be.

PART A:

Risk-Free Rate and MRP

3.   THEORETICAL FRAMEWORK

This chapter sets out a theoretical framework that can be used to identify the presence and potential impact of any inconsistency in AER's use of the Sharpe-Lintner (SL) Capital Asset Pricing Model (CAPM).

The first section sets out the steps from the original SL CAPM formulation to the use of the market risk premium (MRP). The second section examines how inconsistency might arise in the application of the SL CAPM. The third section examines the underlying assumptions used in the estimation approach and whether these are internally consistent. The final section examines the impact of the relationship between the risk free rate and MRP on the potential for inconsistency.

3.1.   Practitioners and the SL CAPM

Equation 1 below is the SL CAPM.[1]

1)
$$E(R_i) = R_f + \beta . \left[E(R_m) - R_f \right]$$

$E(R_i)$ is the return on equity, R_f is the risk free rate, β is the equity beta, and $E(R_m)$ is the expected market return.

It is worth noting that it is entirely valid to reorganise this equation to clearly identify the risk free rate and the expected market return as separate components.

2)
$$E(R_i) = (1 - \beta) . R_f + \beta . E(R_m)$$

However, practitioners often choose to simplify the terms in square brackets of Equation 1 to a single MRP term. This simplification is shown in Equation 3.

3)
$$MRP = E(R_m) - R_f$$

Substituting the MRP into Equation 1 gives a third valid SL CAPM formulation where the risk free rate and the MRP are the components that a practitioner will estimate.

4)
$$E(R_i) = R_f + \beta . \mathbf{MRP}$$

Neither the expected market return nor the second risk free rate seen in Equation 1 is explicit in Equation 4. However, it accommodates estimates of the market risk, popular with practitioners. AER currently applies this approach.

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[1] Developed separately in "Sharpe, William F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk, Journal of Finance, 19 (3), 425-442" and "Lintner, John (1965). The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets, Review of Economics and Statistics, 47 (1), 13-37."

3.2.   How might inconsistency with the SL CAPM arise?

The formulation used by AER, as shown in Equation 4, is practical but its origins in Equation 1 should not be forgotten. The original highlights two requirements that might be lost if only the MRP approach is understood:

1. The risk free rate is important in its own right but also serves to identify the MRP.

2. For consistency, the two risk free rates in Equation 1 must be the same unless the MRP can be identified regardless of the risk free rate used to do so.

Therefore, in the case that the MRP is independent of the risk free rate (such as if it is constant over time and the expected market return moves in lock-step with the risk free rate), the SL CAPM formulation shown in Equation 4 can be restated as Equation 5 below.

5)
$$E(R_i) = R_f + \beta.MRP(.)$$

This is consistent with the SL CAPM as all elements are fully identified (i.e. not dependent on other variables in the equation). Because there is no interaction between the components, practitioners can choose the best estimate of each component without regard to the approach used for the other, and still have a result that is consistent with the SL CAPM.

However, when the MRP is not independent of the risk free rate (i.e. the value of the MRP depends on the value of the risk free rate), the equation will not be fully identified unless the risk free rate is the same as that used to identify the MRP (which in turn must be consistent with the expected market returns). In this case, the SL CAPM formulation shown in Equation 4 could be expressed as Equation 6 below.

6)
$$E(R_i) = R_f + \beta.MRP(R_f)$$

To be consistent with the SL CAPM under the formulation in Equation 6, the explicit estimate of the risk free rate and that implicit in the estimate of the MRP must be the same. For example, if there is a relationship and the MRP is calculated when the risk free rate was higher than its current level and this is added to the current risk free rate, the calculation is not valid as the impact of the lower current risk free rate has not been factored into the estimate of the MRP.

When there is a relationship between the risk free rate and MRP, consistency can only be achieved when the risk free rates are the same. This can be achieved if the risk free rate and MRP are calculated over the same timeframe.

Table 3.1 below summarises the consistency requirements dependent on whether there is any relationship between the components or not.

Table 3.1: Component consistency requirements

	Independent MRP and risk free rate	**Relationship between MRP and risk free rate**
"Top level" risk free rate	No requirement for consistency with other components	All components must be consistent with each other
Expected market returns	Only these components must be consistent with each other	
Risk free rate used to derive expected market returns		

The AER has characterised its approach as estimating:

- a 10-year forward looking risk free rate; and

- a 10 year forward looking MRP.

More detail on this approach is set out later in the report, but based on this characterisation, the AER calculates the risk free rate and the MRP over the same timeframe and therefore the approach is consistent.

Based on the formulas set out above, the AER's characterisation could be set out as follows:

7)
$$E_{AER}(R_i) = E_{spot}(R_f) + \beta . E_{spot}\left(MRP(R_f)\right)$$

Consequently, if the approach were able to applied as suggested the first and second risk free rates in Equation 1 would automatically be the same for AER and this would lead to consistency in the application of the SL CAPM model.

3.3. How might internal inconsistency arise?

Internal inconsistency may arise where there are conflicts between the underlying premises of a regulator's approach to applying the CAPM model. It has been suggested by CEG that the definitions used by AER to select the component methodologies are inconsistent. Table 3.2 characterises and interprets the definitional inconsistency highlighted by CEG.

Table 3.2: Inconsistent definitions

	Risk free rate	**MRP**
What makes an estimate reflect prevailing conditions?	Expected future returns implicit in the prevailing spot price in the chosen averaging period i.e. Short term variations have valuable information	Expected future average spot market over ten years i.e. Short term variations if observable have no valuable information
What makes an estimate "long-term?"	Being based on a ten year maturity i.e. Still long-term even if we reflect short-term variations	Ignoring short term fluctuations i.e. The fact that equity is by nature long-term has no impact

However, CEG's characterisation of the AER approach differs significantly from the AER's own characterisation which involves estimating:

- a 10 year forward looking risk free rate;

- a 10 year forward looking market risk premium (MRP);

- consideration of the economic interdependencies between these parameters; and

- basing this analysis on prevailing conditions at the start of the regulatory period.

These premises, as characterised by the AER, are internally consistent and therefore it can be said that the AER's approach is internally consistent.[2] However, there may be some question about how to apply the approach in practice, particularly given issues in estimating the MRP other than on an historic basis. This is discussed in more detail later in the report.

3.4. Potential impact of interaction between components

In the case of independence between the risk free rate and MRP, each component can be estimated using the best approximation without the need for a consistent timeframe – we discuss the evidence on independence in the following section. However, this does not hold where there is interaction between the two components and this sub-section sets out the potential problems with such an approach in the absence of independence. As an example, let us take an hypothetical regulator who determines the return on equity as set out in Equation 8):

8)
$$E_r(R_i) = E_{spot}(R_f) + \beta . E_{historic}\left(MRP(R_f)\right)$$

Under this approach, the formulation will be inconsistent and may give distorted return on equity values.

As an illustration, let us assume that the MRP is a constant plus a linear relationship with the risk free rate as expressed in Equation 9.

9)
$$MRP = \alpha_0 + \alpha_1 . R_f$$

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[2] There are broadly two consistent routes to estimating the return on equity, a consistent spot estimate and a consistent historic rate estimate.

α_0 is a constant and α_1 is the strength of the relationship between the risk free rate and the MRP. If α_1 is zero, the MRP is stable and independent of the risk free rate. If α_1 is equal to minus one, then we assume that the market return is fixed and that any change in the risk free rate is completely compensated for by a change in the MRP.

Substitution of Equation 9 into Equation 8, with the assumption that α_0 and α_1 are known constants, gives Equation 10 as a generalised characterisation of the hypothetical regulator's approach.

10)
$$E_r(R_i) = E_{spot}(R_f) + \beta.\left(\alpha_0 + \alpha_1.E_{historic}(R_f)\right)$$

There are broadly two consistent routes to estimating the return on equity, a consistent spot estimate (Equation 11) and a consistent historic rate (Equation 12).

11)
$$E_{spot}(R_i) = E_{spot}(R_f) + \beta.\left(\alpha_0 + \alpha_1.E_{spot}(R_f)\right)$$

12)
$$E_{historic}(R_i) = E_{historic}(R_f) + \beta.\left(\alpha_0 + \alpha_1.E_{historic}(R_f)\right)$$

Both Equation 11 and Equation 12 are consistent because they use a single risk free rate.

The difference between the hypothetical regulatory approach and the consistent spot approach, for example, is shown in Equation 13.

13)
$$E_r(R_i) - E_{spot}(R_i) = -\beta.\alpha_1.\left(E_{spot}(R_f) - E_{historic}(R_f)\right)$$

However, were the regulator to assume that α_1 is equal to zero (i.e. the two components are independent), their approach would be equivalent to the consistent spot approach and there is no distortion. Hence the relationship (or otherwise) between the risk free rate and the MRP is important in determining whether a regulator's approach to estimation is appropriate.

If it is assumed that the relationship between the risk free rate and the MRP is non-zero and negative, then if (as under current market conditions), the current risk free rate is below the historic level, an approach as set out in Equation 10) will (due to inconsistency), calculate a return on equity that is lower than if they were consistent with the SL CAPM.

If the risk free rate were stable, these values would converge over time. However given that this is not generally considered to be the case,[3] there is a potential for an enduring bias to emerge from this inconsistency that may either over or under remunerate the companies

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[3] For example Smithers and Co (2003) state that for the UK at least "there is far less evidence of stability" in the real returns for bills and bonds, than there is for the real returns on equities.
Reference: Smithers and Co, A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K., 2003, p 34

for sustained periods of time.[4] This is not easily quantifiable and it may be small but it would exist in the case of inconsistency.

Table 3.3 below therefore summarises the impact of potential inconsistency on the return on equity calculation.

Table 3.3: Distortion under the hypothetical regulator's approach

Risk free rate (RfR)	MRP independent of RfR	MRP offset by RfR
Spot RfR > historic RfR	None	**Overestimate**
Spot RfR = historic RfR	None	None
Spot RfR < historic RfR	None	**Underestimate**

When the risk free rate is equal to its historic level inconsistency will not result in any difference from a historic level. However, as is the case now where the risk free rate has dropped significantly below its historic level,[5] there is potential for material distortions to arise if there is an offsetting relationship.

Where a regulator calculates the risk free rate and MRP on a consistent basis, e.g. both on a spot basis or both on an historic basis, the nature and existence of a relationship between the risk free rate and MRP does not affect the consistency of the estimation. However, were a regulator to estimate these components on a different basis then the relationship between the two factors becomes more important. We therefore use the following section of the report to investigate what empirical analysis has said about the relationship between the two components.

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[4] An enduring error could arise because the spot value of an unstable variable does not necessarily converge to a particular level over time. Therefore there should be no reasonable expectation of the spot and historic rates to converge over time.

[5] On 16th January the difference between the spot CGS yield and its ten year trailing average was 187 basis points. The difference between the ten year trailing average and a 20 day trailing average was only two basis points smaller.

4. EVIDENCE ON STABILITY OF THE COST OF EQUITY

The previous chapter explained that the independence of the market risk premium from the risk free rate is a requirement for approaches that apply different timeframes to the estimation of the risk free rate and the MRP to be both internally consistent and consistent with the SL CAPM.

The stability of the cost of equity is relevant to this analysis because stability in the overall cost of equity combined with the widely accepted lack of stability in the risk free rate would mean that the market risk premium moves to completely offset its movements as shown in Figure 4.1.

Figure 4.1: Implications for the market risk premium of a stable cost of equity
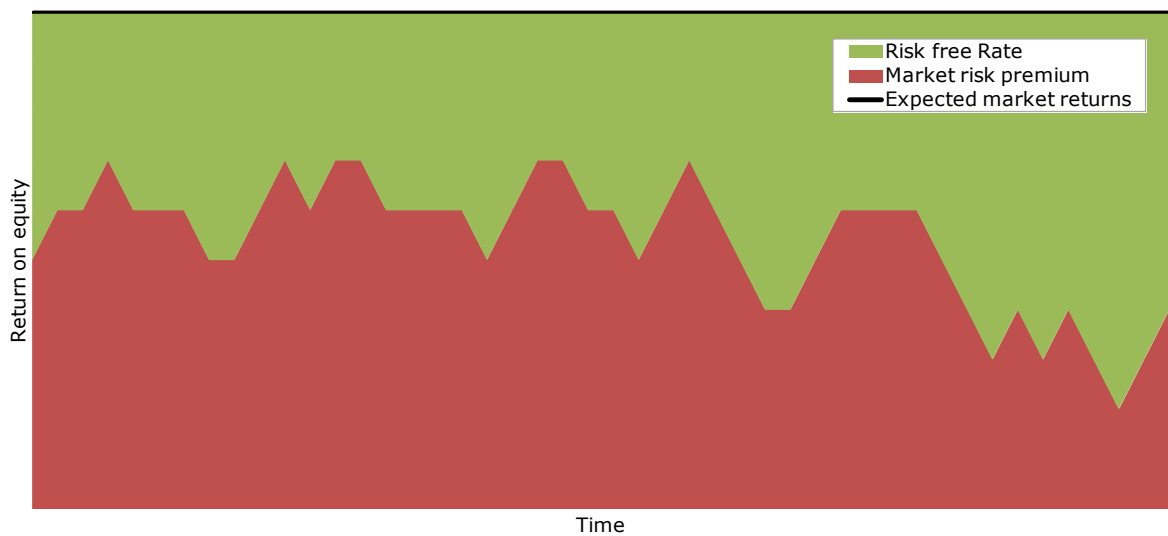
On the other hand if in fact the market risk premium is independent of the risk free rate as shown in Figure 4.2, we would not expect the overall return on equity to be stable over time.

Figure 4.2: Implications for the return on equity of a stable market risk premium
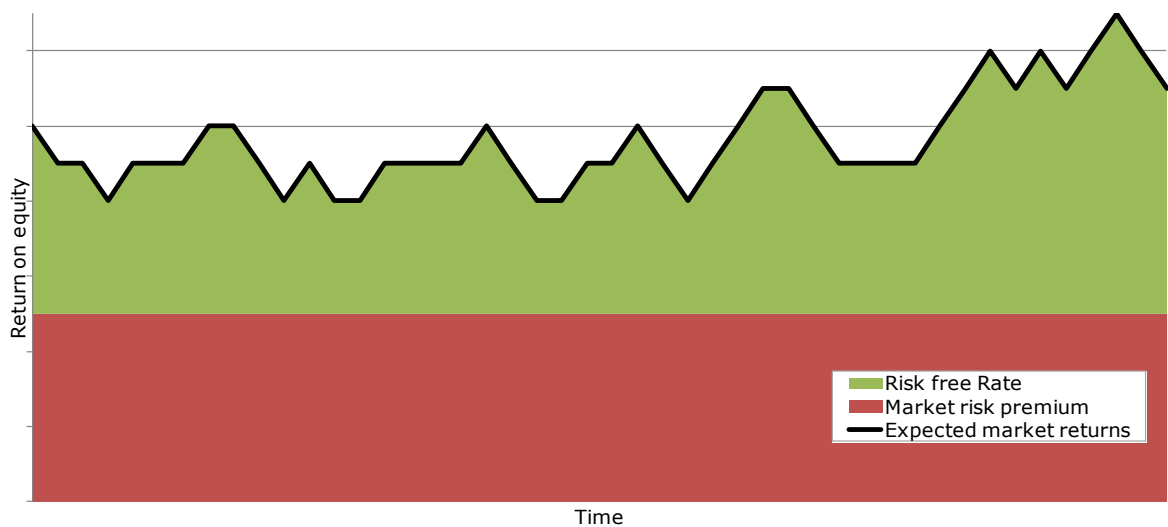
The figures above are of course only illustrative but underline the importance of the assumptions driving the use of the SL CAPM. The importance of this has driven a significant volume of research in this area.

Much of the work in the 1990s was concerned with explaining the apparent divergence between what theory suggests investors would expect ex ante and the way in which out-turn data could or should be used. Much of this focused on whether there were periods of stability in elements of the cost of equity. However, finding predictable components is difficult especially given the noise inherent in financial data. The strategy generally adopted by regulators in the UK to deal with this has been to make use of stronger evidence on the cost of equity over multiple decades, which may cause some large deviations over time but should provide the appropriate return over the life of long-lived regulatory assets. This however is not necessarily an option available to AER now, but should be considered at the next opportunity to reassess the regulatory regime.

This chapter addresses separately material on the stability of the cost of equity and the relationship between the market risk premium and the risk free rate. Each section sets out the issues in these areas and provides a literature review before reaching our considered position on each element. The chapter concludes with our assessment of the implications of this for AER's approach.

4.1.   Relevant Issues

4.1.1.   Definition of Stability

When discussing the stability of the cost of equity it is important to be clear exactly what we mean by "stability", and also the extent to which authors have concluded that the cost of equity is or is not stable. There are several potential definitions:

- In mathematical terms, stability can refer to a variable which has a constant long-run average (known as "mean reversion"), whereby fluctuations are temporary and the variable tends to the average value in the long-run. In the context of estimating parameters it is a very useful assumption, because if true, it allows policymakers to reliably infer the future values from long run historical trends.

- A more approximate approach to defining long run stability would be to plot a graph of the cost of equity over time and to observe that it does not fluctuate by much (or by as much as other variables), which would indicate a 'roughly stable' mean.

- Finally, policymakers may consider the cost of equity to be "stable" if setting a constant cost of equity would be a reasonable assumption based on the expected investor timeframe (e.g. 10 years).

Overall, it is useful to be aware at the outset that the available literature refers to the stability of the cost of equity with varying degrees of precision. It seems that most academics and regulators seem to refer to stability in a fairly general (or approximate) sense.

4.1.2. Absolute versus Relative Stability

However, the more important distinction within the literature is how stability is considered, namely whether the authors refer to absolute or relative stability. Absolute stability is defined in the section above (i.e. a constant mean over time), whereas relative stability would imply that the cost of equity has a mean which is <u>more stable</u> than the mean of an alternative variable (e.g. the equity risk premium).

For clarity, we understand that the Terms of Reference requires a review of "the stability of the cost of equity", which implicitly relates to the <u>absolute</u> cost of equity. This is important because a cost of equity which is stable in absolute terms may provide support for an inverse correlation between the MRP and the risk free rate.

However, for the purposes of this project we are not just interested in absolute stability, but also in the <u>relative</u> stability of the cost of equity. As discussed by Wright[6], if the overall cost of equity is more stable than the MRP then there is a strong argument that AER should alter its approach to estimating the CAPM parameters when setting the cost of equity.

Therefore, in considering the available literature on the stability of the cost of equity, the following sections aim to provide a distinction between arguments around the <u>absolute</u> cost of equity and arguments around the <u>relative</u> cost of equity.

4.1.3. Real versus Nominal Parameters

As requested in the Terms of Reference, a further issue to consider is the distinction between real and nominal parameters within the available literature. While most of the literature focuses on real parameters, a recent report by Professor Lally (2012)[7] considers how a report by CEG uses nominal values for the risk-free rate and MRP, and therefore it is important to clarify which should be used. As discussed below, our view is that Lally's comments may have been slightly misunderstood by other academics, and that it is generally undisputed that real parameters should be analysed.

4.1.4. Arithmetic versus Geometric Averages

When historic data is used to derive parameter estimates, an important decision is whether to choose arithmetic or geometric averages. According to Blume (1974) neither average measure appropriately depicts the MRP, so a blended measure must be used depending on the number of data points and time horizon.[8] In this case, a ten year horizon would give 92% weighting to the arithmetic mean and 8% weighting to the geometric mean. Cooper

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[6] Wright, S. (Nov 2012), Response to Professor Lally's Analysis
[7] <u>Martin Lally (July 2012) The Cost of Equity and the Market Risk Premium</u>, page 8

[8] $E(R_N) = \left[\left(\frac{T-N}{T-1}\right) * A_N\right] + \left[\left(\frac{N-1}{T-1}\right) * G_N\right]$

where T - number of data points used, N- time period, AN - arithmetic mean; GN - geometric mean.
Source: Blume, M.E. (1974) 'Unbiased estimators of long-run expected rates of return,' *Journal of the American Statistical Association*, 69:347, pp.634-638.

(1996) finds that the arithmetic error ignores estimation error and serial correlation in returns, but when unbiased discount factors are derived to correct for these effects, the corrected discount rates are "closer to the arithmetic than the geometric mean".[9]

The difference is made clear when considering DMS evidence for the Australian market. The premium of equities over bonds from 1900-2011 is 5.6% based on a geometric mean and 7.5% based on an arithmetic mean.

4.2. Literature Review on Stability of the Cost of Equity

There are several key documents particularly relevant for this report that have proposed the stability of the cost of equity, which are discussed in the following sub-sections. Our views on the relative strengths and weaknesses of these papers are discussed in the 'Conclusions' section, below.

4.2.1. Empirical Foundations

Siegel (1998)[10] argues that equity returns can be "very unstable in the short run" but "very stable in the long run". Siegel refers to phenomenon as "mean reversion", which is the tendency for equity returns to fluctuate in the short run but to revert to the mean in the long run.

Siegel argues this firstly by plotting a graph of various return indices (see Figure 4.3 below) and observing that market returns have followed a long run trend.

Figure 4.3: Siegel (1998)

Total Real Return Indexes, 1802 through December 2006

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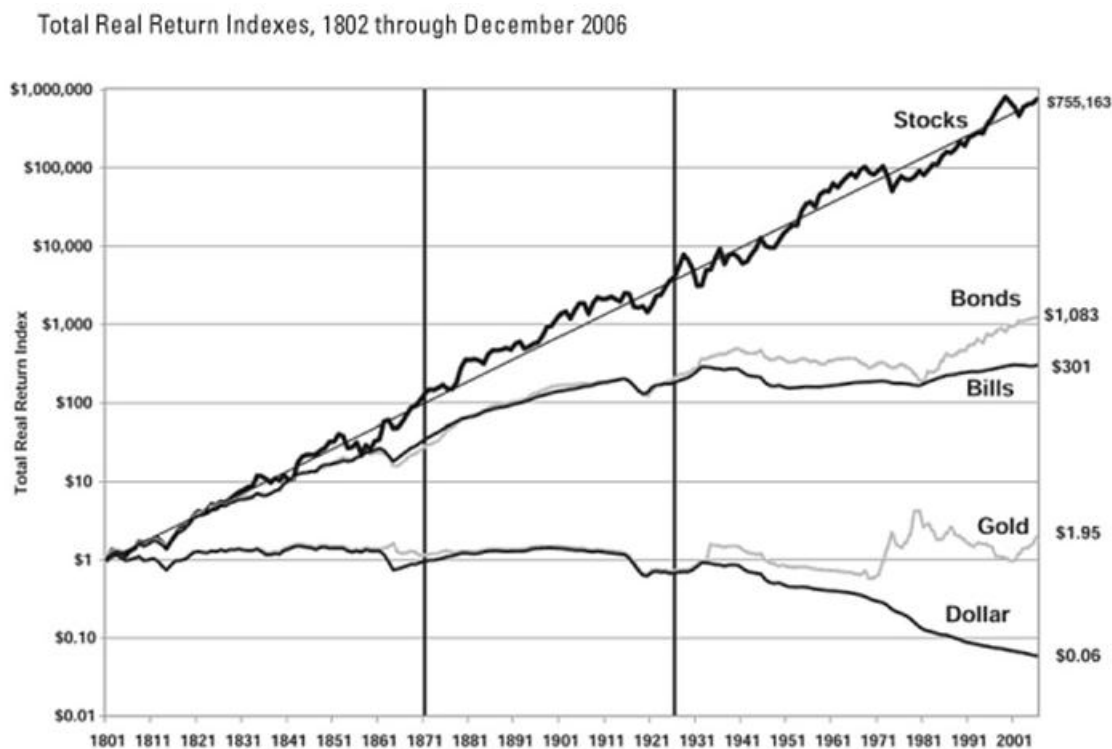
[9] Cooper, Arithmetic versus geometric mean estimators: Setting discount rates for capital budgeting (1996), p165.
[10] Siegel, Stocks for the Long Run (1998), p.13

Secondly, Siegel argues in favour of (implicitly absolute) stability based on long term averages. He finds that the total compound real stock market returns in U.S. stocks since 1802 remained remarkably constant over long periods: 7.0% during 1802-1870; 6.6% during 1871-1925; and 6.8% during 1926-2006.[11]

However, Siegel doesn't use any further statistical techniques or analysis to prove either the absolute or relative stability of total market returns.

Smithers and Co's seminal paper on the cost of capital (2003)[12] support Siegel's theory. They use Siegel's data to calculate a 30-year rolling average of stock returns, and on the basis of a graph of their results, conclude that "the thirty year stock return has moved within a relatively narrow range".[13] The graph is presented below in Figure 4.4.

Figure 4.4: Rolling 30 year average US stock returns on stocks, bonds and cash since 1830
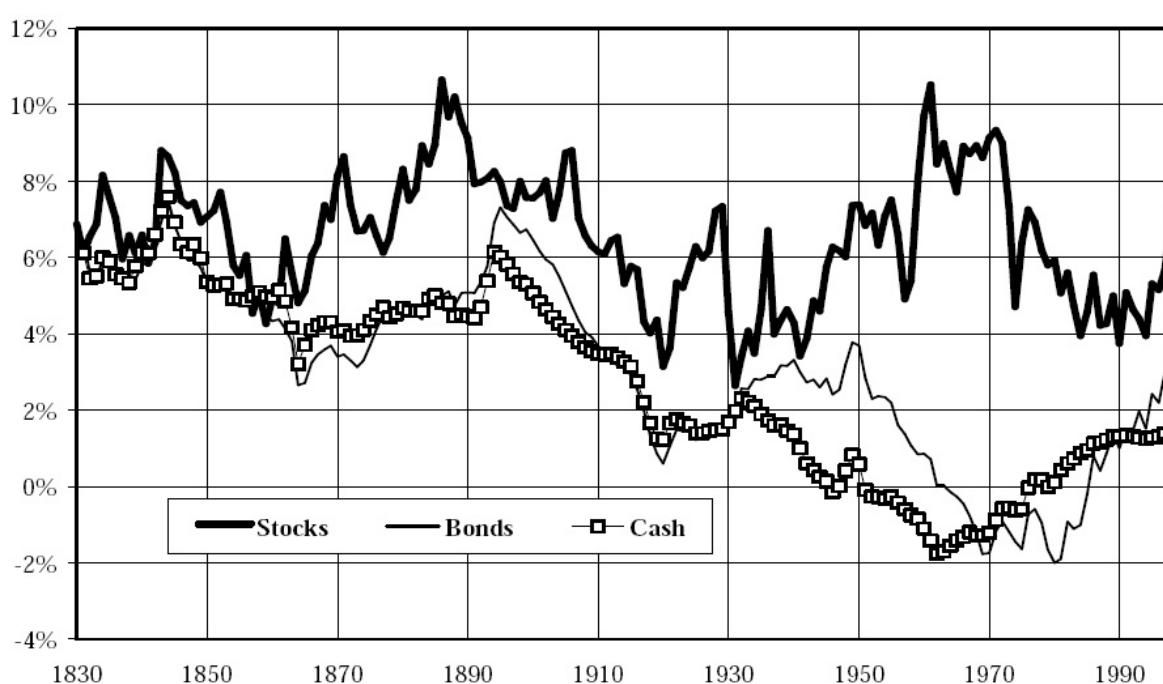
Source: Calculations using data from Siegel (1998)

They also propose that the cost of equity has been relatively more stable than the ERP. Again, considering Figure 4.4 above, Smithers and Co state that, based on the graph, "there is far less evidence of stability" in the real returns for bills and bonds, "and hence for the equity premium".[14]

4.2.2. Recent Academic Debate

Most of the recent debate has been in favour of stable cost of equity, at least in the 'long term' sense of the word stability. However, several commentators have extended this view

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[11] Siegel, Stocks for the Long Run (1998), p.12-13

[12] Smithers and Co - A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K. (2003)

[13] page 31

[14] Smithers and Co (2003), p34

of a long run stable cost of equity to propose that regulators should assume a stable cost of equity within the CAPM framework, which implies that the cost of equity is also *sufficiently stable* in the medium term to be treated as constant by policymakers.

Gregory (2012)[15] supports Smithers and Co's assertion of stable real market returns, by noting that their analysis considers both Siegel's US analysis (1998) and "explicitly" evidence in Dimson, Marsh and Staunton (2001). Gregory also considers conflicting views from a number of authors[16], and concludes that the *balance* of evidence points towards a stable expected market return, rather than a stable risk free rate or market risk premium.[17]

Wright (2012)[18] also argues in favour of the relative stability of the cost of equity. Firstly, he uses Mason et al (2003) to suggest that the realised real aggregate stock market returns and therefore the expected market return has been stable over time and across a wide range of markets. This is based on work by Siegel in *Stocks for the Long Run* and Dimson, Marsh and Staunton (2001).

Secondly, Wright considers stability from a policymaker's perspective, by considering whether it would be preferable for a regulator to assume either a constant cost of equity or a constant MRP.[19] Wright states that there is strong evidence that CoE has a relatively stable mean over time[20], and that there is relatively less evidence that the MRP has a stable mean over time.[21] Overall, Wright does not argue that the cost of equity is actually constant, but rather that the assumption of a constant CoE is a much better *assumption* than that of a constant MRP.

Specific Arguments from Professor Lally

It is worth providing a special mention to recent work by Professor Lally[22] as this has prompted some of the debate in this area. For example, Wright (2012) considers that Lally has assumed a constant MRP, and this motivates Wright to make the policy comparison between a stable cost of equity and a stable MRP. Furthermore, both Wright (2012) and Gregory (2012) are confused as to why Lally refers to nominal (as opposed to real) variables. However, it seems that Lally may have been slightly misunderstood, and actually there is not a huge amount of disagreement between the academics on the stability of the long run real cost of equity.

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[15] Gregory, A. (2012) "The Risk Free Rate and the Present Value Principle"

[16] Gregory notes the "considerable debate" in the academic literature concerning stability, particular in the differences of opinion expressed in the 2008 special issue of the Review of Financial Studies, where Cochrane (2008) and Campbell and Thompson (2008) take opposing positions to Goyal and Welch (2008).

[17] Gregory, A. (2012) "The AER approach to Establishing the Cost of Equity – Analysis of the Method Used to Establish the Risk Free Rate and the Market Risk Premium"

[18] Wright, S. (2012), Review of Risk Free Rate and Cost of Equity Estimates: A Comparison of UK Approaches with the AER

[19] Wright, S. (Nov 2012), Response to Professor Lally's Analysis

[20] He states that it is "generally not disputed" that the cost of equity has a relatively low volatility around the mean.

[21] Furthermore, if a constant MRP is assumed, this implies that the cost of equity is pro-cyclical (because the RFR is pro-cyclical). However, Wright suggests that fluctuations in the cost of equity tend to be counter-cyclical.

[22] Martin Lally (July 2012), The Cost of Equity and the Market Risk Premium

Firstly, Lally does not seem to disagree with the proposal that the cost of equity has been relatively stable over time, as he notes some evidence of long term stability.[23] However, Lally is more concerned with criticising the way that CEG *apply* the assumption of a stable cost of equity to propose a negative relationship between the MRP and risk-free rate, which he believes is unfounded.

Secondly, in relationship to nominal variables, Lally does not seem to be advocating the analysis of relationships between nominal parameters, but rather is criticising the way that CEG have *applied* the assumption of a stable *real* cost of equity to support the proposal of a negative relationship between the *nominal* MRP and the *nominal* risk-free rate.

4.3. Literature Review on Relationship between the MRP and the risk-free rate

There are several key documents that have discussed the relationship between the MRP and the risk-free rate, which are discussed in the following sub-sections. Our views on the relative strengths and weaknesses of these papers are discussed in the 'Conclusions' section below.

4.3.1. Theoretical Foundations

Professor Lally, although by no means an advocate of a negative relationship, notes that a negative relationship is "plausible" by following a few logical steps:[24]

- the market risk premium is compensation for bearing equity risk (Merton, 1980);

- equity risk (volatility) seems to be greatest in depressed economic conditions (French et al, 1987); and

- the risk free rate also tends to be lowest in depressed economic conditions.

However, it is important to note that the main theoretical arguments in favour of a negative relationship are primarily based on the *implication* of the stable cost of equity. i.e. if the cost of equity is a constant, then any increase in the risk-free rate will need to be offset by a reduction in the MRP of an equal amount (assuming an equity beta equal to one). Therefore, in contrast to the *empirically-based* arguments in favour of a stable cost of equity, the main arguments for a negative relationship between the MRP and risk-free rate are primarily theoretical.

And the implication of a negative relationship has only been formulated relatively recently. Siegel (1998) initially proposed the stability of the long run real cost of equity, but did not draw inferences from this regarding the relationship between the MRP and the risk-free rate. Secondly, Smithers and Co (2003) argued in favour of the stability of the long run real cost of equity, and use this to suggest that policymakers should *treat* the MRP and risk-free rate as perfectly offsetting, but did not go as far as to say that there is *actual empirical evidence* of a negative correlation.

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[23] Lally says the possibility that the MRP has risen in recent years "cannot be ruled out", so does not seem to be arguing for a constant MRP. However, his main point seems to be in dismissing CEG's supporting evidence as "not persuasive".

[24] Martin Lally (July 2012) The Cost of Equity and the Market Risk Premium

4.3.2. Recent Academic Debate

Wright (2012)[25] initially makes a similar inference to Smithers and Co (2003). Based on strong evidence of the stability of mean returns, and the conclusion that a regulator should assume a constant cost of equity, Wright infers that the MRP and the risk-free rate should be *treated* as negatively correlated by policymakers.[26]

Wright goes further than Smithers and Co (2003) by providing some arguments (which he describes as "indirect evidence") that, specifically in recent years in Australia, there has been a reduction in the risk-free rate at the same time as an increase in the MRP.[27] He states that the Australian risk-free rate has fallen as, being a small open economy, its rates have been pushed downwards by the influence of international capital markets. For the MRP, Wright provides arguments to suggest that the equity premium has been rising, based on Cochrane (falling stock prices have caused increased returns) and Ludvigson and Ng (risk premia are counter-cyclical, which have risen due to depressed globally integrated financial markets).[28] However, Wright does not claim that his evidence is overwhelmingly strong, and acknowledges that his argument "does not rely on the assumption that... the market premium and the risk-free rate are perfectly negatively correlated".

Professor Lally notes that if there is a negative correlation, the "significant issue for regulatory purposes" is the strength of this relationship.[29] The implication is that it is important for regulators to account for this issue if the relationship is strong, but potentially less so if it is weak.

Specific Arguments from Professor Lally

Again, it is worth mentioning a specific issue in recent work by Professor Lally[30] as some academics seem to view Lally as disputing the idea of a negative relationship. It seems that Lally is not arguing against a negative relationship *per se*, but rather is making a specific criticism of the way in which CEG *apply* other academic research (i.e. evidence in favour of a stable real cost of equity) to propose a negative relationship between the nominal MRP and the nominal risk-free rate.[31] Although Lally does not support a negative relationship between the real parameters (MRP and risk-free rate), neither does he seek to make an argument against it on empirical grounds.

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[25] Wright, S. (Nov 2012) Response to Professor Lally's Analysis

[26] Under the assumption that the real market cost of equity is constant, Wright states that regulators should move the equity premium point-by-point in the opposite direction to the risk free rate.

[27] Wright, S. (2012) "Review of Risk Free Rate and Cost of Equity Estimates: A Comparison of UK Approaches with the AER"

[28] 2013 – 2017 GAAR, SP AusNet Response to AER's Draft Decision, Nov 2012, p14-16

[29] Martin Lally (July 2012) The Cost of Equity and the Market Risk Premium, p.7

[30] Martin Lally (July 2012) The Cost of Equity and the Market Risk Premium

[31] Lally highlights the origins of CEG's argument, namely from Siegel (1992, 1999) and Smithers and Co (2003), both of whom argue that real returns on equities are more stable than the real risk free rate, based on a historical analysis of 20th Century data. He states that Siegel / Smithers and Co's arguments in favour a stable real cost of equity did not extend to proposing a negative correlation between the (nominal) risk-free rate and the (nominal) MRP. Therefore, Lally implies that CEG's conclusion is not supported by the evidence that they have used.

4.3.3. Regulatory representations

The fall in the risk-free rates internationally since the start of global recession in 2008-09 has led to many companies proposing a necessary increase in the equity risk premium in order to maintain the cost of equity in regulatory determinations. Some company representations, in particular in Australia, are arguing that a negative relationship exists between the risk-free rate and MRP, either generally, or more specifically in the current economic climate.

For example, Chapter 5 of SP Ausnet's response to AER[32] provides evidence from independent experts that MRP estimates are typically higher when the risk free rate is below 4.5%, as shown in Figure 4.5 below. The chart shows that 57% of these reports adopt an MRP above 6% when the risk free rate is less than 4.5%, but this proportion falls to 26%-37% when risk free rates are above 4.5%. In conclusion, SP AusNet state that "in other words, the independent expert reports provide evidence that the MRP and risk free rate are negatively correlated".[33]

Figure 4.5 Histogram of MRP against risk free rate
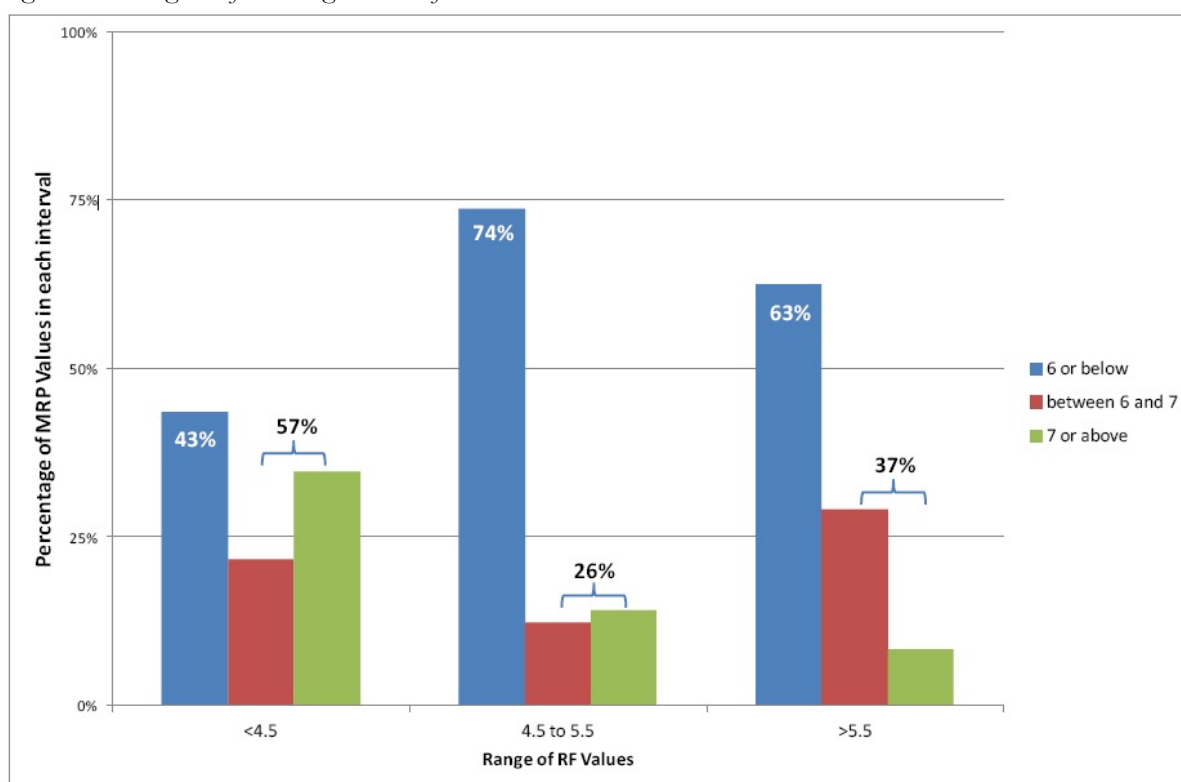
Source: SP AusNet analysis

4.4. Regulatory Applications

Regulatory determinations in both the UK and Australia have indicated that regulators place weight on long term average market returns when setting the cost of equity. More

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[32] 2013 – 2017 GAAR, SP AusNet Response to AER's Draft Decision, Nov 2012

[33] 2013 – 2017 GAAR, SP AusNet Response to AER's Draft Decision, Nov 2012, p29

recently, there has also been some consideration of a potential offsetting relationship between the MRP and the risk-free rate.

4.4.1. Stable cost of equity

In the Competition Commission's (CC's) determination for Bristol Water (2010)[34] CC state the assumption that the cost of equity is stable over time:. Firstly, CC suggest that there is evidence in favour of absolute stability: "Expected returns remain constant over time (in the long run) and hence that average realized returns reflect the expected return".[35] Secondly, CC propose that the cost of equity is more stable than the MRP: "We have considered real rather than nominal returns and the evidence tends to suggest that on this basis market returns are more stable than the ERP... as measured, for example, by the ratio of standard deviation to mean".[36]

In Ofgem's recent final proposals for RIIO-GD1 (December 2012), Ofgem proposed that it is "appropriate to rely on long-term estimates of the CAPM components to set the cost of equity assumption".[37] Tracing 18 months backwards to Ofgem's initial strategy paper, Ofgem specifically compare their proposal for the cost of equity (the sum of the risk-free rate and the equity risk premium) with the long-term market returns on equity identified in Smithers and Co (2006).[38] Although Ofgem do not seem to go as far as to explicitly state that the long run cost of equity is stable, their reference to long run market returns in the Smithers and Co (2006) paper implies that they consider the long run real cost of equity to be an important benchmark.

In Ofwat's most recent determinations for water and sewerage charges (July 2009), Ofwat considers that "it is most relevant to focus on the overall cost of debt and cost of equity", although it does also state the component parts of the cost of equity.[39] Although not explicitly mentioned, this may have contributed to Ofwat allowing an MRP in its 2009 determination at the very top of the range proposed by its consultants, particularly as Ofwat set a risk-free rate which was 0.8 percentage points lower than during the previous price control.

4.4.2. Offsetting relationship between MRP and risk-free rate

In the Competition Commission's determination for Bristol Water (2010), CC tentatively proposed that there may be a negative relationship between the MRP and the risk-free rate: "There is some evidence of the ERP being negatively correlated with Treasury Bill rates".[40]

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[34] Competition Commission, Final Determination Document, Feb 2010, Appendices

[35] Page N21

[36] Page N26 (footnote). This point is in response to some finance textbooks (e.g. Brealey et al.) which suggest that the *nominal* annual market return is not likely to be stable over time.

[37] Ofgem: RIIO-GD1: Final Proposals - Finance and uncertainty supporting document (December 2012), page 21

[38] Smithers and Co, Report on the Cost of Capital (2006)

[39] Ofwat, Future water and sewerage charges 2010-15: Draft determinations (July 2009), page 105

[40] Page N26

IPART (2012) note that "in the current market circumstances, there is some evidence to support the view that expectations for the MRP have risen as bond yields have fallen".[41] This is similar to Wright's view, that at the present point in time there may be a negative relationship. However we note that this stops short of proposing that this relationship holds *in general* (and/or in the long term).

Furthermore, IPART's review of electricity charges (March 2010)[42] sets an MRP of 5.5% to 6.5% which is based on "long term historical averages". Choosing the MRP based on long term historic averages, in tandem with a variable risk-free rate, results in a variable total cost of equity, and so IPART cannot be assuming either a constant cost of equity or a perfectly offsetting relationship between the MRP and the risk-free rate. Given these various comments from IPART, it seems as if they *may* have had regard to an offsetting relationship, but that this relationship is uncertain and/or not a one-for-one relationship.

4.4.3. General UK approach

Box 4.1 below provides an overview of the general approach taken by UK regulators when calculating the cost of capital.

Box 4.1: General UK regulatory approach

Overall cost of equity

UK regulators have generally adopted a CAPM model to calculate the cost of capital. They also tend to use a relatively stable market cost of equity, which implicitly assumes an inverse relationship between the risk-free rate and MRP. This decision is part of a package and individual parameters cannot be challenged in isolation, as would be the case for the AER. Due to the nature of this, the decision on the range adopted may be more sensible than analysing the point estimate chosen within regulatory determinations.

It is important to consider the objectives of the UK regulators, for example Ofgem. Their principal objective is to protect the interests of existing and future customers. A further target is to ensure that licence holders can finance activity which they are obliged to do.

In its final RIIO GD1 decision, Ofgem stated that "it is appropriate to rely on long-term estimates of CAPM components to set the cost of equity assumption". It should be noted that this is an eight-year price control, so over a longer term it may be expected to return more to historical trend than a period of shorter length. Ofgem also note that they use "sense checking against alternative approaches, information from transactions and regulatory precedent". The use of regulatory precedent and long-term estimates of CAPM parameters leads to the level of stability observed in UK regulated sectors.

Risk-free rate

The most utilised market evidence is setting the risk-free rate in the UK context is the ten-year index-linked gilt (ILG) yield. This is cross-checked to nominal data with adjustments for inflation, but there is no specified averaging period used. Research, for example from the Bank of England, is used to see the magnitude of factors impacting upon the risk-free rate, such as quantitative easing.

In Ofgem's RIIO strategy decision, a range of 1.7-2.0% real risk free rate was chosen, with the lower bound set using the ten year average of the ten year ILG yield and the upper bound set through regulatory

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[41] IPART, Weighted average cost of capital, Incorporating a return on capital in the 2013 electricity determination, Draft Methodology Paper, November 2012, p8.

[42] IPART: Review of regulated retail tariffs and charges for electricity 2010-2013 (March 2010), p241

precedent. In terms of the evidence in an Australian context, the ten-year CGS yields after indexing for inflation produces a spot rate of 1.08% at the end of 2012, with a trailing ten-year average of indexed yields at that point being 2.52% in real terms. This approach is not allowed for the AER though due to the NGR and precedent on the approach adopted in Australia.

One approach posited by NERA as an alternative to the ILG approach listed above is to use interest rate swap data, although this is not an approach that CEPA or UK regulators have utilised.

The below figure demonstrates the use of both the ten year ILG and regulatory precedent.

Figure A: Recent risk-free rate determinations in the UK
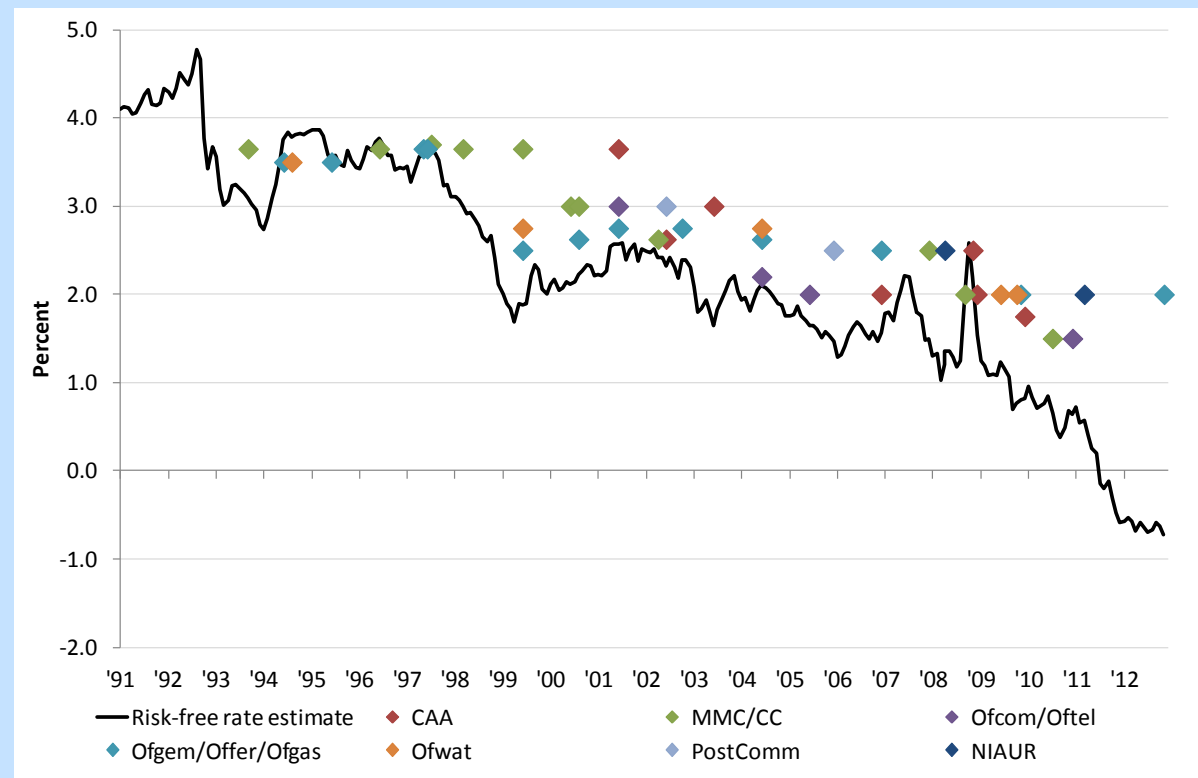
There is a clear downward trend in both the ten-year ILG risk free rate estimate and the regulatory determinations showing that there is change over time, despite adopting a longer-term approach. The most recent regulatory decision is for Ofgem's RIIO price controls, which as noted is for an eight year period and utilises an indexed cost of debt.

Figure B: Australian risk-free rate estimate in 2012
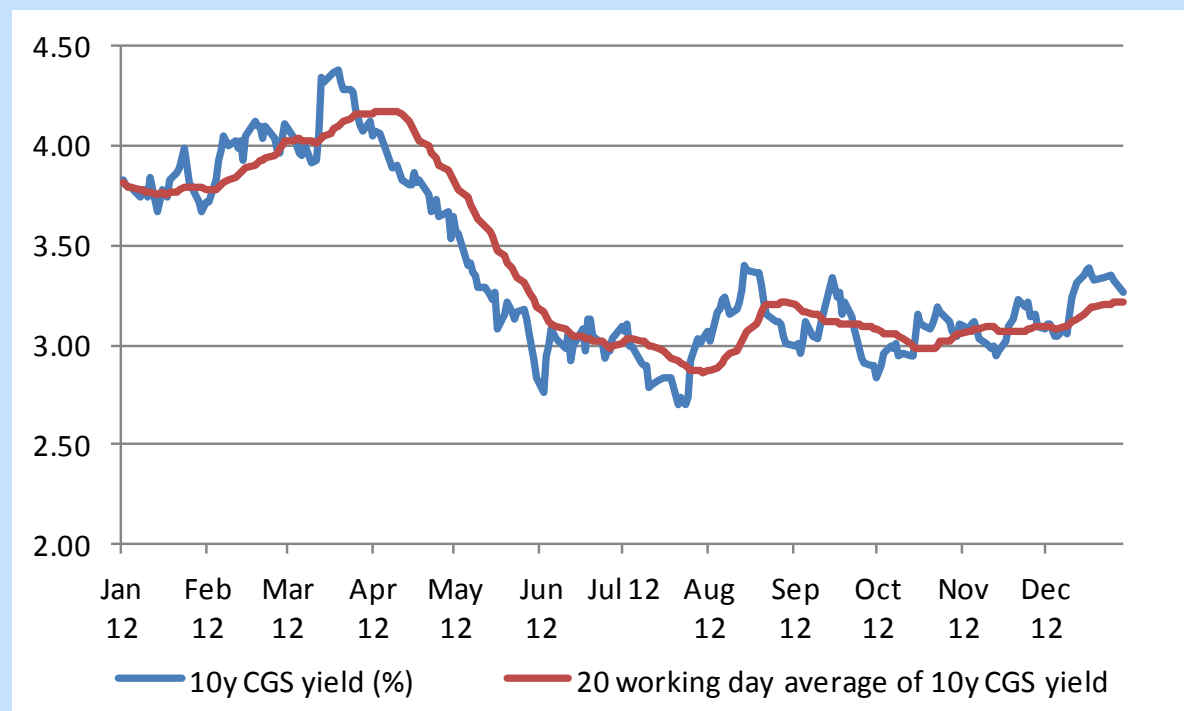
Source: RBA, CEPA analysis

Market risk premium

This is a measured by comparing the total returns on the market with returns on risk-free assets. The MRP should also be determined based upon the risk-free rate chosen within the regulatory setting. It is not comparable to calculate the MRP on a very low prevailing risk free rate, but then to adjust the risk free rate significantly upwards.

The general approach of UK regulators assume a degree of stability in the market return on equity, so taking away the risk free rate estimate from the total market return. Furthermore, the overall regulatory package and regulatory precedent are also taken into account when setting the MRP. For example, Ofgem concluded within their RIIO GD1 initial proposals that their "experience from previous price controls shows that looking beyond short-term volatility is a prudent approach to take when setting the cost of equity assumption for network companies".

However, UK regulators also tend to estimate the market risk premium directly, and consider this estimate alongside analysis of the total cost of equity. When directly estimating the MRP, the starting point is often historic data from the Credit Suisse Global Investment Returns Yearbook, produced by Dimson, Marsh and Staunton (DMS). Forward-looking estimates are often used as cross-checks for the DMS estimates, but are sometimes used more to check the reasonableness of the figure than set such a figure. This includes the Dividend Growth Model (DGM) and Residual Income Model (RIM). The Bank of England present for example a multi-stage DGM, but this leads to greater volatility over time.

Applying this to the Australian context, the premium of Australian equities over bonds for 1900-2011 from DMS is 5.6% based on a geometric mean and 7.5% based on an arithmetic mean. The report notes that Brailsford, Handley and Maheswaran suggest that dividends prior to 1958 were overstated. Looking at a time period of 1950-2011 for Australia gives a geometric mean of 4.7%, while the time period 1960-2011 gives a geometric mean of just 2.7%.

4.5. Conclusions

4.5.1. CEPA Conclusion on Stability of the Cost of Equity

Overall the available academic literature contains more evidence in favour of a stable real long run cost of equity than against it, and therefore we consider this to be a reasonably robust proposition. This includes graphical analysis by Siegel (1998) and Smithers and Co (2003), albeit based on US returns data, several academics who support the conclusion of a stable long run real cost of equity based on this analysis (e.g. Gregory and Wright), and CC's proposition that market returns have a lower volatility than the ERP.

Out of the academic studies which we reviewed, only two did not necessarily support this, although neither of these proposes a strong argument for instability. The main opponent is Brealey et al. who propose that the nominal cost of equity is not stable (or at least is less stable than the ERP). However, the Competition Commission rejected that argument in one of their recent determinations, noting that evidence tends to suggest that real market returns are more stable than the real ERP. The other potential opponent is Lally who it seems is considered by other academics (Gregory and Wright) to be proposing a non-stable cost of equity. However, he actually quotes evidence in favour of a stable cost of equity (e.g. Siegel and Smithers and Co), so it seems that he is simply being critical of the way that CEG have incorrectly *applied* this evidence.

In addition, despite the caveat that the real cost of equity may not be stable in the shorter term (see Siegel 1998), there is recent precedent both in the UK (the Competition Commission) and in Australia (IPART) of regulators making the assumption of a constant long run cost of equity.

However, Dimson, Marsh and Staunton writing in the 2013 Credit Suisse Global Investment Returns Yearbook recently expressed doubts on the existence of the relationship, at least in terms of whether there is meaningful "mean reversion" that could be exploited by investors over the long-run. They question whether previous academic research has relied on "optical illusions that employ perfect hindsight" and whether there is in fact greater uncertainty in returns over the long run rather than less. They considered that given that we do not have perfect foresight, the evidence of mean reversion in equity returns is weak.

On balance, our judgement is that there is *reasonably* strong evidence that the real cost of equity is stable in the long run, both in absolute terms and in relation to the ERP. Although the evidence is not *overwhelmingly* strong, given a choice that the long run real cost of equity is either stable or not stable in absolute terms, we would assume the former. This choice would be slightly more clear-cut if it were considering whether the real long run cost of equity is more or less stable than the ERP.

In general, CEPA's approach to the cost of capital is to utilise long-term estimates for these components based on market evidence, which would include the cost of equity. However, we note that this approach would need to be tested with Australian data to ensure that this approach would be fit-for-purpose in AER's context.

4.5.2. CEPA Conclusion on Stability of the relationship between the MRP and the risk-free rate

In terms of the theory behind a negative relationship, it could be plausible for the MRP and risk-free to be negatively correlated. In times of recession the risks to equity returns tend to be high (e.g. French et al, 1987) whilst risk free rates tend to be low. However, in determining whether a negative relationship exists in reality, it is important to distinguish between a *statistically significant* negative relationship and the implication that policymakers should treat these variables *as if* they are negatively correlated.

The latter has been implied by several authors (e.g. Smithers and Co, Wright) on the basis that the real cost of equity is stable in the long run, and so if a regulator allows for an adjustment in the risk-free rate (based on observable data) it must therefore also make an equal and opposite adjustment to the MRP in order to keep a constant MRP (assuming an equity beta of 1). Given our assessment above on the arguments in favour of a stable long run real cost of equity (which we consider to be reasonably strong), we consider that this argument is reasonably logical.

However, this leads us on to the former point, which is whether a negative relationship is supported by *empirical* evidence. Unfortunately, this relationship is difficult to test empirically as the MRP is unobservable and any regressions would rely on developing a robust/consistent time series of investors' expectations. As such, the arguments presented by academics, regulators and companies have tended to be more indirect, and conclusions have therefore been presented in more uncertain terms.

Wright proposes a negative relationship, but this is based on the Australian context, and in particular for recent years. Therefore, although it may be true that the MRP and risk-free rate have been correlated in recent years, in our view this does not support the theory that they are negatively correlated *in general*, which is therefore a weaker argument. Furthermore, company representations are always likely to involve some degree of opportunism, and whilst recent empirical analysis may provide some support for the offsetting relationship (see SP AusNet), this evidence relatively is based on recent (short term) data. Having said that, we do attribute weight to recent regulatory precedent, and particularly the views of Competition Commission and IPART who both recently state that there is "some evidence" to support a negative relationship.

Overall, we do not think that there is enough evidence to justify making a firm conclusion about the relationship between the MRP and risk-free rate. Our research indicates that there *may* be a relationship, but that we have been unable to conclude either that this relationship *definitely does* or *definitely does not* exist.

4.6. Implications for Regulatory Approach

The relationship between the MRP and risk-free rate is crucial to considering the consistency of AER's approach. As stated in section [ ], if there is a relationship between the risk free rate and market risk premium, consistency can only be achieved when the risk free rate specified in CAPM is the same as the risk-free rate used to calculate the MRP.

On the one hand, there is reasonably strong evidence to suggest that the cost of equity is stable in the long run, which could imply a negative relationship between the MRP and risk-free rate. However, as discussed above, evidence of this relationship is generally inconclusive. If there were a relationship, AER's approach would be inconsistent, and if AER is risk-averse to this scenario it should consider adjusting its approach. However, AER may wish to view the objective of consistency alongside other objectives (i.e. to be commensurate with prevailing conditions in the market for funds) in order to determine whether it should change its approach in the future.

The apparent stability of the long run cost of equity gives some weight to a holistic approach to setting the cost of equity, by considering the overall value rather than focusing on the risk-free rate and MRP in isolation. However, as discussed above, there is limited evidence that stability holds in the short to medium run, and so regulators cannot necessarily assume that the cost of equity is stable either over a standard investor timeframe (e.g. 10 years) or over a standard asset lifetime (e.g. 30-50 years). Given that AER is concerned with the prevailing conditions in the market for funds, which by definition is a short run consideration, the stability of the *long run* real cost of equity does not provide AER with any particularly useful policy implications.

5. CHARACTERISATION AND ASSESSMENT OF AER'S APPROACH

This section provides more detail on the AER's approach and then provides an assessment of the approach in light of the findings presented in Sections 3 and 4:

5.1. The AER's approach

Before assessing the AER's application of the CAPM in determining the cost of equity, we set out the AER's stated approach. This characterisation is based on the National Gas Rules, AER's draft decision for Envestra Ltd[43] and discussions with AER staff.

5.1.1. Conceptual approach

Under Section 87 of the National Gas Rules the AER needs to calculate a rate of return on capital that is:

> *"commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services."[44]*

Other requirements for determining the rate of return under the National Gas Rules applying to this determination include the assumption that the service provider meets benchmark levels of efficiency and uses a financing structure that meets the benchmark standards for gearing and other financial parameters. In addition, the AER's approach should use a well-accepted approach such as the WACC and a well-accepted financial model such as the CAPM. With those broad requirements in place, the AER's current approach to specific elements of the cost of equity is set out below.

In meeting the requirements of the National Gas Rules, the AER suggests that its theoretical approach contains the following components:

- a 10 year forward looking risk free rate;

- a 10 year forward looking market risk premium (MRP);

- consideration of the economic interdependencies between these parameters; and

- based on prevailing conditions at the start of the regulatory period.

5.1.2. Estimation

While the AER's approach is to estimate the risk free rate and the MRP on the same basis it noted in the Envestra Draft Decision that:

> *"both the risk free rate and the MRP are forward looking estimates, although estimated using different types of data".[45]*

We look at the components of the AER's approach in more detail below.

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[43] AER (2012) "Access arrangement draft decision: Envestra Ltd 2013-17", accessed at http://www.aer.gov.au/sites/default/files/Envestra_0.pdf

[44] See http://www.aemc.gov.au/gas/national-gas-rules/historical-versions.html

[45] Ibid., at p.139

Risk free rate

The estimation of the risk free rate reflects the AER's view of what an appropriate 10 year forward looking risk free rate would be. The practical approach to estimation of the risk free rate and the reasons for that approach are set out in Table 5.1.

Table 5.1: Basis of the risk free rate calculation

Components of the approach	AER's reasons for approach
Yields on 10-year CGS	- CGS are low risk - The CGS market is liquid and functioning well - Advice from the Reserve Bank of Australia that CGS yields are the most appropriate measure
Short averaging period as close as possible to the start of the regulatory period	- The prevailing risk free rate is the benchmark that the expected return must exceed - Prevailing 10 year CGS yields reflect the risk free rate over the 10 year forward looking investment horizon - CGS yields are market determined i.e. the return investors are looking for in current market conditions - Promotes the objective that the present value of the expected revenue should match the present value of expected revenue - Consistent with the use of the building block model - Consistent with the use of CAPM - Unbiased method for determining the risk free rate - Based on advice from relevant academics

Source: AER (2012)[46]

Market risk premium

The MRP is also intended to be a 10-year forward looking estimate that is commensurate with prevailing conditions in the market for funds. In its practical approach to estimating the MRP, the AER recognises that the evidence is imprecise and therefore a wide-range of evidence is used. The range of evidence applied by the AER is set out in Box 5.1.

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[46] Ibid., at pp.121-128

Box 5.1: Range of evidence used by the AER to estimate the MRP

- Historical excess returns calculated on an arithmetic mean basis and on a geometric mean basis
- Evidence from academics
- Approaches of other Australian regulators
- Surveys of market practitioners
- Dividend Growth Model (DGM) estimates
- Other approaches suggested by consultants, such as:
  - CEG approaches
  - Capital Research DGM estimates
  - NERA method - regime switching model
  - SFG method - implied volatility, credit spread and dividend yield
  - VAA method - implied volatility glide path approach
- Market commentary
- Reasons for departing from the WACC review

Source: AER (2012)[47]

Despite the approach being to generate a forward looking estimate of the MRP, AER acknowledges that while its use of historical excess returns is not strictly forward looking, these returns:

> *"have predominantly been used to estimate the MRP on the assumption that investors base their forward looking expectations on experience."*[48]

Relationship between the risk free rate and the market risk premium

The AER uses the CAPM to estimate the cost of equity as part of determining the WACC, in line with the requirements of the National Gas Rules. However, Envestra proposed the use of a long term historical average for the risk free rate and the MRP, partly based on a contention in a report by CEG that the MRP and the risk free rate are not independent and in fact that there is a negative relationship between the two and that CEG had characterised the AER's approach as one where the timeframe for estimating the two elements was different. The AER is mindful of the need to consider any interdependencies between the risk free rate and the MRP and acknowledged:

> *"a possible theoretical case for a negative relationship between the risk free rate and MRP in certain circumstances."*[49]

However, the AER felt that the empirical evidence in support of this relationship over the regulatory period was inconclusive. Given this conclusion, the AER therefore suggests that:

> *"Maintaining the integrity of each parameter promotes rigour and robustness in the estimation of each parameter. But addressing a problem with one parameter by adjusting another parameter*

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[47] Ibid., at p.129,

[48] Ibid., at p.130

[49] Ibid., at p.140

introduces subjectivity. The AER is unaware of any well accepted method for making such adjustments without introducing subjectivity or greater regulatory risk."[50]

Due to the purported relationship between the risk free rate and MRP, Envestra proposed that the WACC determined by the AER was not the best estimate. Envestra characterised the AER's approach as applying an MRP based on long-term averages and a risk free rate based on current market conditions. However, the AER does not accept this characterisation but rather contends that its approach estimates:

"the risk free rate and the MRP...at the beginning of the period (or rather, as close as is practicably possible) and reflects expectations for the investment horizon".[51]

As noted above, however, the AER does acknowledge that the practical application of its approach requires using different methodologies and data sources. Estimation of the risk free rate is relatively straightforward with a directly observable proxy (i.e. yields on 10 year CGS) that can be estimated with current market data. However, estimation of the MRP is more difficult and according to the AER use of current market data may not necessarily reflect forward looking expectations and is highly dependent on any assumptions made. For this reason, a broader set of evidence is used, including the estimation of historical excess returns. However, the AER does not think that this equates to estimating the MRP on the basis of a long-term average.

5.2. Assessment of the approach

The findings in Sections 3 and 4 of this report inform a series of filters to narrow-down the options for what would be a reasonable approach for AER:

1. Consistency with the SL CAPM;

2. Efficiency of estimate;

3. Possibility of calculation; and

4. Reflection of current market conditions.

The options considered are the:

1. current AER approach (spot risk free rate with spot MRP);

2. consistent historic approach (historic risk free rate with historic MRP); and

3. special case (a spot risk free rate with an historic MRP).

The consistent spot option and the second option were presented by the companies as alternatives to the current AER approach.[52] The third approach, listed as a 'special case', is how some companies have interpreted the AER's approach. This Section provides analysis of a well applied version of each model and does not delve into the detail of exactly how they calculated their component values.

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[50] Ibid., at p.138

[51] Ibid., at p.139

[52] Although the AER's approach as characterised above had been misinterpreted.

The following sections apply these filters to each option considering what would be the outcome where there are different levels of offsetting between the MRP and risk free rate.

5.3. Filter 1: Consistency with the SL CAPM

By definition, the consistent spot and historic approaches are consistent. However, what is important about the nature of their consistency is that it is invariant to the presence or strength of any MRP offsetting. The consistency of the third approach above however is reliant on their being no offsetting. This sensitivity is shown in Table 5.1.

Table 5.1: Consistent SL CAPM models

MRP behaviour	Consistent spot/AER	Consistent historic	Special case
Full offsetting			Inconsistent
Partial offsetting	Consistent	Consistent	
No offsetting			Consistent

Therefore, if consistency with the model is paramount, a conservative approach to consistency can be achieved by aligning the risk free rate and the MRP, as is done in the AER's approach.

5.4. Filter 2: Efficiency of estimate

While a consistent application of the SL CAPM will be a true application of the SL CAPM, the predictive power of each consistent approach must be considered before settling on an approach.

A consistent historic application will be preferred when there is full offsetting and a constant overall return on equity, but a consistent spot application will be preferred when it is either partial or there is none. When there is no offsetting, a consistent spot approach is equivalent to the special case. Table 5.2 summarises the sensitivities based on MRP offsetting.

Table 5.2: Consistent and efficient SL CAPM models

MRP Behaviour	Consistent spot/AER	Consistent historic	Special case
Full offsetting	Less efficient	Preferred	Inconsistent
Partial offsetting	Preferred	Less efficient	
No offsetting	Preferred		Preferred

Some judgement therefore must be used to choose an efficient, consistent option as we expect full offsetting over the long-run but may need to entertain the possibility of less clear-cut movements en route.

5.5. Filter 3: Possibility of calculation

The analysis so far suggests that when any concern exists that the risk-free rate and MRP are not independent then a consistent approach requires either a full spot or full historic

approach be adopted for a consistent value to be estimated. It is also the case that the spot rate, as used by the AER, will provide a more appropriate value than the historic rate if the degree of interaction between the risk free ate and MRP is less than unity.

Given these findings it would then be logical to determine that when independence is not believed to exist, use of a spot rate would be the approach most consistent with the SL CAPM. However, this finding while theoretically robust poses some implementation problems.

While establishing a short-term estimate of the risk-free rate is relatively straight-forward, estimating the short-term MRP is much less so (unless the short-term and long-term/historic values are aligned). If the short and long term MRP values are different then we need a consistent and theoretically robust way of estimating the short-term MRP.

Deriving a credible estimate of the short-term MRP requires clarity about what additional return investors are demanding relative to the risk-free rate for holding the whole portfolio of risky assets. Even when simplified to just cover equities this is not a simple thing to measure. Evidence presented as part of the recent review has focused on an ex post measure of the MRP. This may not be a reliable measure of what investors actually require, rather it is a measure of the outcome from the volatile markets.

This is recognised in the AER's approach where the spot MRP is estimated through reliance on a number of different measures. For example, while weight is placed on historical excess returns, the AER also examines evidence from academics and other regulators; surveys from market practitioners; the Dividend Growth Model; and approaches suggested by consultants during the review process. However, it is possible that the AER's reliance on historical estimates (for reasons of practicality) may introduce some inconsistency into the application of the approach.

Overall, it should be acknowledged that estimating what investors actually expect or require is a difficult task. Over a long time horizon it is possible that the volatility in markets will even itself out and an ex post measure of the MRP provides a good estimate of an ex ante MRP. But over a short-time horizon there is much less reason to believe that this relationship will hold. This is evidenced by the volatility in the estimates for the short-term MRP that have been put forward. Consequently, either some form of expectations adjustment must be made – as used by commentators like Jenkinson in the UK in the mid- to late-1990s – or the focus should be on the historic more stable estimate.[53]

Given the state of academic and practionner debate about appropriately estimating short-term MRPs we think it difficult to derive a credible short-term MRP estimate. Consequently, a focus on historic values may provide a more robust or easily estimated value if the assumption of independence is breached.

Table 5.3 presents the surviving options following this filter.

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[53] *The cost of equity finance: conventional wisdom reconsidered*, Jenkinson, 1993, Stock Exchange Quarterly (Autumn edition).

Table 5.3: Consistent and possible SL CAPM models

MRP Behaviour	Consistent spot/AER	Consistent historic	Special case
Full offsetting	**Possibly less efficient**	**Yes**	**Inconsistent**
Partial offsetting			
No offsetting	**Preferred**	Less efficient	**Preferred**

While the consistent spot approach might solve some problems, we consider that calculation problems mean that it should be used with care and consideration of the consistent historic value may be warranted.

5.6. Filter 4: Reflection of current market conditions

Reflecting current market conditions is a difficult requirement for approaches to meet. While the consistent spot approach would be able to do this, as discussed above, there are concerns over how a robust estimate is derived. The historic approach is a good one but cannot be realistically said to reflect prevailing conditions.[54] This filter would not be a concern where there is no offsetting.. Table 5.4 shows the impact of this filter.

Table 5.4: Consistent and possible SL CAPM models

	Consistent spot/AER	Consistent historic	Special case
Full offsetting	**Not easily applied**	**Does not reflect current market conditions**	**Inconsistent**
Partial offsetting			
No offsetting	**Yes**		**Yes**

Table 5.4 shows that in the presence of offsetting then the only surviving approach is a consistent spot based one but, as noted above, this is associated with estimation concerns. This creates a tension and a need for compromise as there is no approach that is fully acceptable when there is offsetting. We consider that the above filters are useful but that at least one requirement may need to be loosened given that it may no longer be possible to deny the possibility of offsetting behaviour from the MRP.

The candidates for loosening are:

- consistency with the SL CAPM; and

- reflection of current market conditions.

Alternatively, AER could accept the possible imperfections with estimating a short-term MRP and focus on a solution that raises concerns but which at least passes all the filters.

5.7. Regulatory strategy

A final consideration, linked back to the assessment criteria set out in Section 2 of the report, is concerned with the time consistency of decisions. Two key concerns arise here:

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[54] A historic approach with a relatively short trailing average risk free rate could be investigated further as a compromise option that is consistent and is more sensitive to current conditions.

- first, any change in approach needs to be seen in the broader context of previous and future determinations – if approaches are expected to yield the correct answer on average but not for any specific determination, then the timing of a change could lead to a windfall gain for either consumers or providers; and

- second, the change in the guidelines that is forthcoming means that any change in the approach employed for the Victorian Gas distribution businesses will only be for the next five year period and will not set a precedent for the next price determinations (although it may provide some input to the consideration and development of the guidelines expected during 2013).

Consequently, any proposed change in the approach needs to be considered in terms of the way in which it relates to:

- previous decisions; and

- the next five years.

From a windfall gain or loss situation it would appear that the last decade has seen spot risk-free rates that are close to the historic risk-free rate, consequently there are no accumulated "losses" or "gains" to consider. Looking forward, however, a shift away from spot rates to historic rates would entail an increase in the risk-free rate and consequently a gain for the companies relative to what they would have received.

In both cases, the likely evening out of the short-term "gains" with longer-term "losses" may not arise as the change in the guidelines could affect this. So, the companies' request for a change in the approach has to be seen in a possible opportunistic light. This would suggest that an even higher hurdle for change be employed, although the possible impact on investment incentives and returns to investors arising from a mis-estimated short-term MRP means that a change should still be considered.

6.   RECOMMENDATIONS FROM PART A

This chapter summarises the recommendations for AER from Part A of this paper. We first consider the options against our assessment criteria before stating our position.

6.1.   Assessment criteria

Broad criteria	Measures	AER	Proposed consistent historic
Impact on stakeholders	• Effect on WACC • Effect on cost efficiency • Effect on investment levels • Effect on prices	• No change • High incentives for efficiency • Low investment but may increase cost efficiency of investment • No change	• Increase materially now • Reduces incentives • Increase investment, but not necessarily efficient. • Increased prices
Accountability	• Consistent with theory • Supported by robust analysis • Have the pros and cons been identified	• In theory none. • Yes - estimation captures vast majority of accepted approaches • Yes	• Yes • No - estimation period doesn't affect risk free rate or MRP • Good information available for regulatory precedent
Consistency	• With previous decisions • With regulatory requirements • With overall regime	• Consistent but slight rationale for change • Consistent • Consistent	• Inconsistent and rationale for change • Inconsistent (too high) • Consistent
Transparency	• Replicability • Simplicity	• Estimation approaches complex, but approach clear • Complexity may be justified in getting latest estimate	• No complex, although requires judgement. • n/a
Targeted	• Broader impacts	• Well targeted	• Well targeted

6.2.   Recommendations from Part A

There is currently a lack of evidence surrounding the stability of either the MRP or the expected market return in the coming years to the extent that it is not certain at any time if there is no, partial or full offsetting occurring. The best anchor that we have is from evidence on a constant expected cost of equity over the long run. Therefore the approach

adopted by the AER is important in determining whether a consistent approach is being employed. Given the way that the AER characterises it's approach we believe that from a theoretical perspective a consistent estimate is being derived. However, the reliance on a spot calculation causes some concern owing to the problems associated with deriving a reliable estimate of the spot MRP.

It therefore may be prudent to aim to provide the cost of capital over the life of the asset as in the established UK approach discussed above. This provides the ability to lock on to some form of long term stability in the cost of equity and reasonably remunerate the cost of capital over the full life of the assets.

We recognise that AER is currently committed to calculating the return on equity in a manner that reflects current market conditions and this linked with the need to minimise any time inconsistency means that a high hurdle should be applied to making any move away from the existing approach for this determination. Longer term consideration of moving to an alternative approach under the new guidelines would seem to be appropriate, especially as the importance of current market conditions has been lowered (i.e. in the new rules this is a matter to have regard to while in the old rules decisions needed to be commensurate with current market conditions).

It should be noted that this conclusion is derived solely from the analysis of the question as posed in Part A. Any implications from the answer to Part B for this will be considered in the overall concluding section.

PART B:
Market Evidence

7. CRITICAL REVIEW OF ERNST & YOUNG MARKET EVIDENCE

7.1. Introduction

This section contains our understanding of the Ernst & Young (EY) report, which forms the basis of this critical review. A set of key questions underlie this review, namely:

- Are the objectives of those individuals consistent with the AER's?

- Is the methodology used by those individuals robust and consistent with the AER's constraints?

- Is the methodology used by EY to summarise the results appropriate?

- Are the results informative?

  - As overall values

  - As parameter values

The methodology by which EY gather and refine its sample of primary data is the first consideration before looking at how EY interpret and utilise this data in reaching their judgement on the prevailing cost of equity that can be drawn from that evidence. We then assess the approach used by EY, which includes analysing the underling primary data.

7.2. Market evidence

The EY paper is a review of valuation reports. Further information of the methodology adopted is given below. The use of this evidence by EY to arrive at a conclusion on the prevailing cost of equity is included in Section 7.3.

Table 7.1: EY methodology for review paper

Parameter	EY methodology
Nature of reports	Valuation reports of ASX-listed companies by independent experts
Database	CONNECT 4 Expert Reports database
Time period	Reports issued between 1 January 2008 and 10 October 2012
Initial population size	889 reports
Final sample size	132 reports (17 in 2012)
Conditions for inclusion	- Uses discounted cash flow methodology - Uses CAPM - Provide sufficient information on estimation methodology - Uses data from domestic Australian market - Use CGS bonds of a ten-year tenor
Determination of inclusion	The conditions for inclusion are clear, but the process by which it was determined that a condition was met is unclear.
Other	Reports do not make adjustments for imputation credits

The graph below show the source of the final sample of 132 independent expert reports for those analysts with more than three analyst reports included (over 90% of total reports).
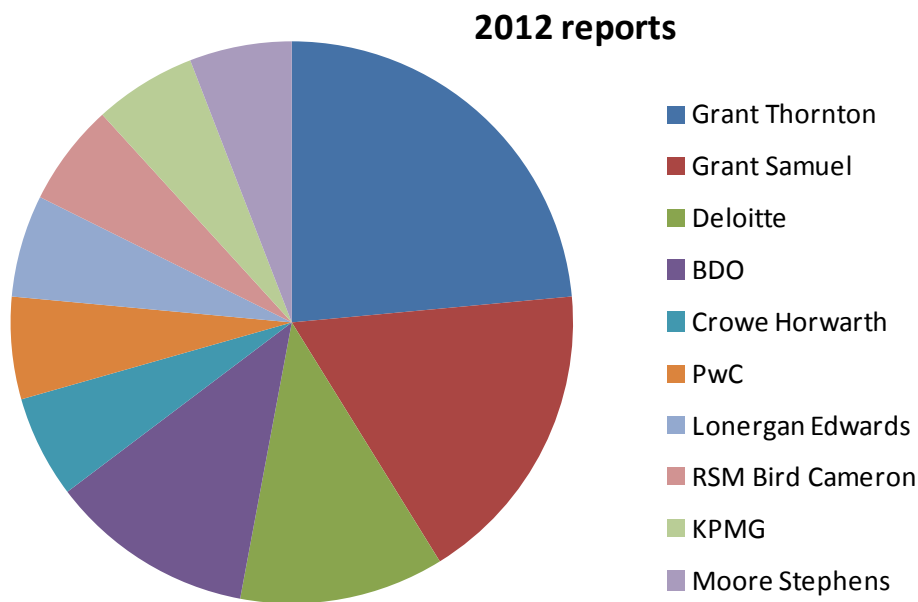
Figure 7.1: Sources for final sample used by EY
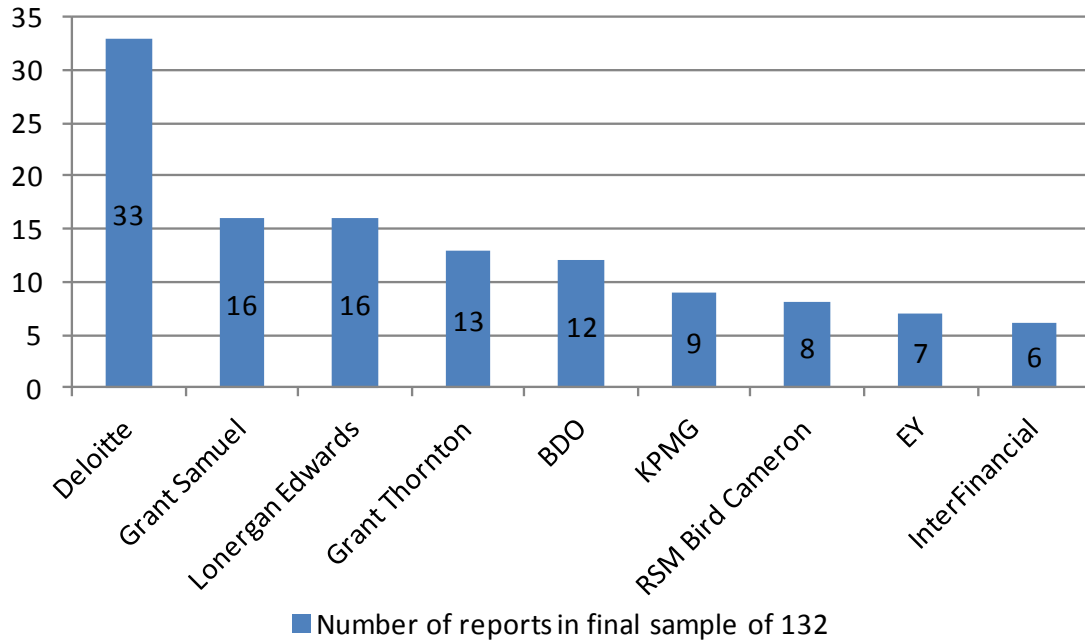
Source: EY

There is a focus on 2012, so the source of the 17 reports in the sample from 2012 only are contained below.

Figure 7.2: Sources for final 2012 sample used by EY

Source: EY

7.3.   Interpretation of market evidence

Ernst & Young

EY use the market evidence noted above to consider what are the appropriate parameter values for the cost of equity components, assuming an equity beta of one for the market cost of equity. Their approach uses a primarily quantitative approach with regards to the final sample, looking at what the calculated values are from independent experts, rather than detailed analysis of the process taken in these calculations[55].

From each report, EY includes the values for the risk free rate and MRP, taken from the independent expert reports. In some cases, the independent experts do not use the calculated value for the cost of equity and make an adjustment before arriving at a final discount rate. The figures presented by EY include any such adjustment.

In terms of how data is presented, EY states in the conclusion that they have focussed upon the 17 independent expert reports issued in 2012 and the implied market cost of equity contained within these reports. For a headline number taken from the independent reports, EY takes the mean of the implied cost of equity and compares this a figure that the AER methodology would imply for the market cost of equity. Further details are provided within Appendix 1.

The overall implied market cost of equity is 10.7% compared to a value of 9.5% said to be the AER methodology implied market cost of equity. This does not consider imputation credits, which EY estimates increases the size of this gap by one percentage point. This gap is therefore 1.2% excluding the imputation credits, but including adjustments made to calculated values.

In terms of the opinions given by EY in this report, the independent expert reports are the best available market evidence and are suggestive that the cost of equity as estimated by the AER in their draft decision is not commensurate with prevailing conditions in the market for funds and thus does not meet the requirements of Rule 87(1) of the National Gas Rules (NGR).

Victorian Gas Networks

The Victorian Gas Networks have used the report in their Access Arrangement submissions to suggest that there is compelling evidence that the AER's cost of equity is too low. There is agreement with EY in that the figure contained within the draft decision does not meet Rule 87(1) of the NGR.

Two further conclusions, as contained within the Revised Access Arrangement Proposals (RAAP) submitted by SP AusNet (SPN)[56], are that the independent experts have changed approach after facing very low CGS yields and that independent experts have increased their MRP estimates due to negative correlation between the risk free rate and MRP.

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[55] How independent experts approach their calculation is discussed in Appendix D of the EY report.

[56] The RAAP by SPN is used as representative of the Victorian Gas Network views, given the alignment of proposed cost of capital parameters by the distribution businesses in both the initial and revised proposals, and the joint commissioning of several reports.

The SPN RAAP contains a table looking at the AER market cost of equity estimates with independent valuations over the period as used in the EY report. For the first three years, the average cost of equity determined by the AER uses the mean of the AER decisions within that year.

Table 7.2: Comparison of independent expert to the average cost of equity from the AER

Year	Average cost of equity - market	Average cost of equity – AER	Difference
2008	12.0%	12.2%	0.2%
2009	11.8%	11.4%	-0.4%
2010	11.7%	12.1%	0.4%
2011	11.1%	11.5%	0.4%
2012	10.7%	9.5%	-1.2%

Source: SPN RAAP, EY

Note: The AER 2012 value is based on using the AER methodology at the date of issue of expert reports.

The conclusions taken from this table by SPN is that the independent expert report values tend to be slightly below the value adopted by the AER. This is taken to mean that network service providers are able to recover at least their efficient costs on equity financing. SPN also conclude that the 'AER's current estimation process…is materially out of step with market practice.' In the following sub-section we consider whether there is any merit to this statement and analyse the approach of both independent experts and EY.

7.4.   CEPA assessment of market evidence

In terms of assessing the EY report, this will cover both the methodology undertaken for the report itself as well as considering the interpretation and presentation of this source of evidence.

7.4.1.   Approach of independent experts

It is important to consider whether differences in parameter values are caused by differences in approach or whether this is a time-based determinant. The risk free rate and MRP are considered separately, but the view from the independent experts suggests there is a relationship between the two parameters and as such an adjustment may have been made to one of these parameters, but not both.

Risk free rate

There appears to be consensus on a broadly correct methodology here. From the sample of reports read and from the description provided independent experts generally use 10yr CGS yields as the starting point. This involves estimating or inferring from the data rather than a direct figure. There is a choice of the appropriate averaging period, with some experts taking the spot rate (e.g. Grant Samuel) and others averaging over, say, five days (e.g. Deloitte).

Comparing the current spot rates to previous years suggests that the current figures for this estimation of the risk free rate are very low, as can be seen in international markets such as the US and UK. For Aston Resources, PwC believes that the decline in government bond rates has not fed through into the Cost of Equity, so they use a higher figure for the risk free rate. This figure of 5.1% uses a real risk free rate of 2.5% and inflation of 2.5% and at the time was 1.4% above the spot rate of the ten year CGS yields. PwC refer to this 5.1% as the 'longer term' risk free rate after talking about the ten year bonds, so it may be that this figure is for investment horizons in excess of a decade, rather than the ten years set out by the AER.

The approach taken by Grant Samuel also suggests that they do not believe the ten year CGS yields are representative of the state of the market, referencing trading multiples. In their reports for both Hastings and DUET, Grant Samuel initially state that using the spot rate is appropriate, giving them a risk free rate of 3.0%. Then without specifying extensive justification for the decision they suggest that a 'normalised' risk free rate of 5.0% could be a better estimate.

MRP

The MRP is more dependent on subjectivity than the risk free rate. Most independent experts agree with 6.0% as a starting point for this in light of regulatory precedent and analyst estimates. As with the risk free rate above though, some believe that the fall in the risk free rate has led to an increase in the MRP. Deloitte set out that market evidence points to an MRP of 5.0-8.0%[57], choosing a figure of 7.0%. There is no discussion of how this figure is arrived at other than suggesting that it has increased relative to the previous control period having seen the decline in equity markets and the difficulty firms have had in raising funds.

Grant Samuel sets out that the Sharpe-Lintner CAPM fails to capture repricing of risk after significant market events. This would appear to be a criticism of the model rather than the AER's decision and the choice of a well accepted financial model does place a constraint on its choice of methodology. The reports do utilise a CAPM approach, so it suggests that it is a well accepted financial model.

BDO suggest that the current MRP is as high as 8.0% based on a capital-weighted return of the S&P 200 members, using Bloomberg's Dividend Growth Model (DGM) as a source. Further detail why a range of 6.0-8.0% has been adopted is not given. This approach may be useful, but historical evidence such as Officer (2008), referenced by Grant Samuel, suggests the average annual excess return of the market from 1958-2008 was 5.7%. There is again a degree of subjectivity in choosing the time period to be considered and taking into effects such as survivorship bias.

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[57] Deloitte (2012) Independent Expert Report for Gloucester Coal Ltd says that the 5-8% market cost of equity is taken from recent studies including the Securities Industry Research Centre of Asia-Pacific Limited, Morningstar, Incorporated, ABN AMRO/ London Business School and Aswarth Damodaran (p108).

Combined COE

EY notes in Appendix D that the discount rate and cost of equity are often defined as a range to avoid spurious precision, with greater uncertainty in estimating the cost of equity than cost of debt. The report states that the independent experts 'modify their application of the CAPM' to ensure consistency, so their view will have an effect on the estimate. A regulatory approach should utilise cross-checks, but any adjustment should be justified and based on criteria.

In terms of consistency between reports, the objectives are similar in valuing a company as part of a business transaction, with a methodology that uses discounted future cash flows under a CAPM approach (subject to some discretion). The authors of these reports do obtain evidence from other methods, such as capitalising earnings, trading multiples or Dividend Growth Model (DGM) estimates.

There does not appear to be significant changes in the calculation methodology adopted by independent experts, as suggested by SPN, although adjustments may be suggestive of a reconsideration of approach for the purposes of the valuation papers. Evidence that the MRP estimates have increased is weak and even if this is the case, the corresponding movements downward in the risk-free rate have been of greater magnitude.

The independent experts establish the cost of equity at the time of their report, so there will be differences between reports using the same approach. The use of ten year CGS yields is not criticised as a method, there is just uncertainty over whether it is reflective of the market currently. In terms of the MRP, there appears to be relative consensus around a figure of 6.0% and that there is evidence to support this figure, but the choice here depends on whether there has been a change to the risk free rate. Table 7.3 sets out some further information on the independent expert's approach within the 2012 reports.

Table 7.3: Independent expert approach

Independent expert	Uses 10yr CGS yields?	Averaging period for CGS yields[58]	Market risk premium estimate
Grant Samuel	✓	Short-term	6.0%
BDO	✓	Short-term	6.0-8.0%
Deloitte	✓	Short-term	7.0%
PwC	✓	Long-term	6.0%
KPMG	✓	Short-term	6.0%
Moore Stephens	✓	Short-term	6.0%
RSM Bird Cameron	✓	Short-term	6.0-7.0%
Grant Thornton	✓	Medium term	6.0%
Lonergan Edwards	✓	Short-term*	6.0%
Crowe Horwarth	✓	Medium term	6.0%

Source: CEPA analysis

Note: Short term is <1yr, 1yr < Medium term < 5yrs, Long term 5yrs+

* Lonergan Edwards approach is not apparent.

The difficulty of arriving at a precise point estimate means that consideration of approach is useful, as it also avoids time-based changes. There is a question regarding the time here as the data points for issuance of the report should not be the key feature when data is set out. PwC for example base their risk free rate on data up to 31 December 2011, so it is not clear that this should be a 2012 report as it includes none of that year's data. Presentationally it does distort the pattern of estimates, but the calculation for the AER implied market cost of equity is carried out correctly by EY. Crowe Howarth is similar in that the data cut off is 16 December 2011.

The credibility of some findings of expert reports are hard to understand. In a Grant Samuel report from December 2011 for AUSTAR, they use a spot yield on the ten year CGS for the risk free rate to get 4.5% and a 6.0% MRP, as they 'believe that particularly in view of the general uncertainty, this continues to be a reasonable estimate.' This is as it 'is not statistically significantly different to the premium suggested by long term historical data and is similar to that used by a wide variety of analysts and practitioners (typically in the range 5-7%).' This gave a figure of 10.5% for the market cost of equity and there was no further adjustment made, so it is difficult to understand an implied market cost of equity of 12.4% in August 2012 (nine months later), a time when the risk free rate itself had fallen to just 2.70% in the final week of July 2012. The approach taken by EY itself can be seen by looking at the reports within the larger sample, with the latest report within this being for Intoll Group in October 2010. In this report, EY itself used a similar approach to the AER (i.e. a spot risk free rate and 6% MRP).

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[58] These refer to calculated values rather than adjustments derived after independent expert adjustments. Grant Samuel for example has used adjustments in its independent expert reports after this calculation.

7.4.2. Approach of EY

Before looking at the process and choices taken by EY, a useful starting point is to consider what the objective of the EY report is. The data as presented by EY is secondary data, from broker literature rather than direct empirical evidence. The AER have noted that broker estimates can be used in a reasonable check on their figures rather than the basis for the determination itself. In this sense, the objective appears to be assessing whether the AER's approach and decision is appropriate for the risk free rate and MRP.

It may also be that the report is intending to give a different perspective; looking at how market participants would address setting an appropriate risk free rate and market risk premium and moving away from a regulatory determination. This is useful from a cross-check point of view as market participants are ultimately those investors who make decisions on the cost of equity (and cost of debt). EY do use the Australian domestic market, so there are direct parallels that can be utilised to conduct a reasonableness check.

In setting the cost of capital, there are at least three explanations for why the AER could have set a market cost of equity which in the view of EY does not meet the requirements of Rule 87(1) of the NGR. These are:

- the rules framework and guidelines set out are inappropriate;

- the AER have misapplied the methodology as set out in the rules framework; or

- where a degree of subjectivity is required, the AER's interpretation of market evidence is incorrect.

The EY report is not clear which of the above explanations is responsible for the difference in implied market cost of equity. The 9.5% implies that the methodology is applied correctly, so this suggests that the reason for the difference includes the rules framework and guidelines. The purpose of our report is not to examine the rules framework in detail, but to examine within the constraints of this framework in the context of the EY findings.

The topics discussed below are taken from Table 7.1 and present our view on the choice of methodology by EY.

Nature of reports and database

The reports were taken after receiving advice from Thomson Reuters on an appropriate database. The reports were prepared for listed companies in relation to company valuations to discount cash flows. The discount rate is important and a CAPM methodology is used, but this is just an input to the process and whilst these reports are bound by Australian corporate law, the derivation of estimates does not face the extensive rules framework set out for the AER to operate under.

Time period and sample size

The use of a very small sample size can reduce the significance of the findings of a report, so beginning with a large population of independent expert reports is the correct starting

point. Despite this, the sample must balance relevance with sample size. It is not clear that evidence pre-dating the global financial crisis is useful in this respect as current reports are faced with a different market, although using historical evidence to assess what the AER's methodology would give as a market cost of equity can be useful.

As far as we are aware, there is no investigation of outliers. With a small sample size it is difficult to justify exclusion, but using a mean as a summary statistic without excluding outliers can provide a misleading representation of the data. Looking at a modal viewpoint to establish where consensus is by grouping rates in our view would be more representative of the data observations and the median would also provide a useful point of corroboration. There are also several reports included from the same independent expert (for example, Deloitte is the author for a quarter of the larger sample i.e. all reports, not just 2012). For credibility, it is also likely that the authors would follow a similar approach in each report. This introduces a bias in the results, which is only dependent on the number of reports in the sample rather than any market-based evidence. A cross-check of author reports over time would be useful to see whether this bias is significant or not.

Figure 7.3 shows what the market cost of equity (based on the AER's approach) would look like over the time period of the EY report taking a 20 day average of ten year Commonwealth Government Securities (CGS) yields in addition to a constant MRP of 6.0%[59].

Figure 7.3: Market cost of equity using the AER methodology
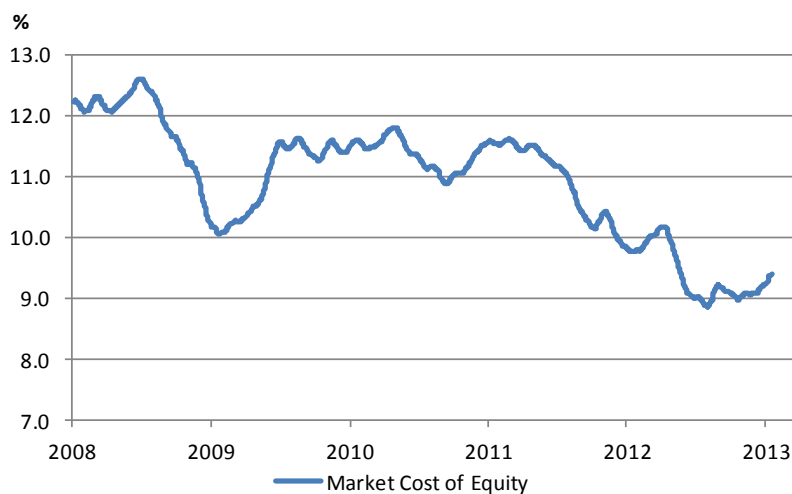
Source: CEPA analysis, RBA
Note: Assumes a 6.0% MRP

This approach has used a constant MRP, but shows the changes in CGS yields are significant (from peak to trough in this period, over 350bps). The methodology adopted above assumes that the cost of equity is not stable and is decreasing over this period.

As 2012 reports are a focus for the EY review, a useful check is to see if these are made on the same basis. The figures below show how the market cost of equity implied by

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[59] The AER did use a figure of 6.5% for eight months in this period, but have since admitted that the change to this rate was not well justified.

independent experts changes over the ten months to October 2012 and the estimates of the risk free rate and MRP that underlies this. Adjustments to calculated values are shown by the dotted line.

Figure 7.4: Independent expert estimates of the market cost of equity in 2012
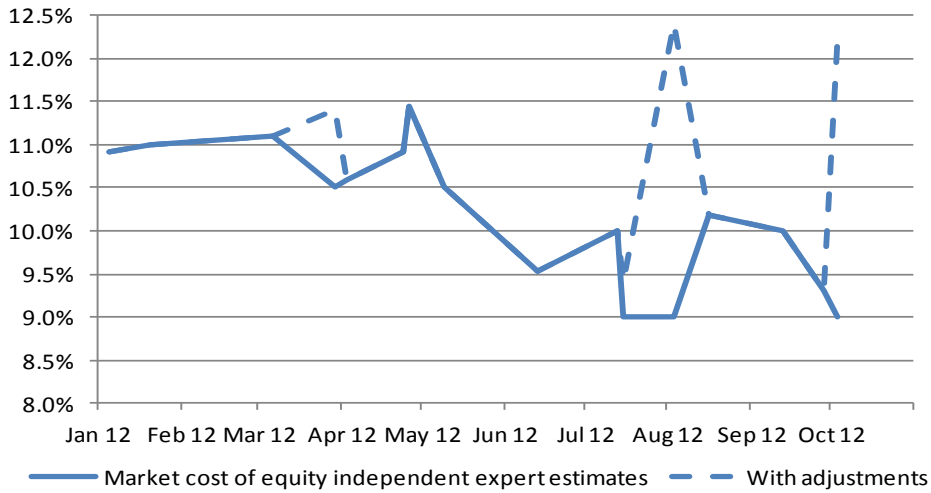
In terms of the AER looking at a forward-looking rate, the latest estimate is most important as any deviations between the independent expert and the AER can be observed. The comparison that EY makes is comparing equivalent figures in that it uses the AER's approach of taking a twenty day average of the ten year CGS yield for the risk-free rate and a 6.0% MRP. The time at which the estimate is made therefore will have an effect on the estimates of the AER and independent experts. EY calculates an AER equivalent measure to capture this and this is where the 9.5% average comes from. EY compares this figure to their 10.7% average rather than the 8.98% decision itself, which is the correct approach in this respect. There are nonetheless concerns over the use of this individual figure.

Figure 7.5: Independent expert estimates of the risk free rate and MRP in 2012
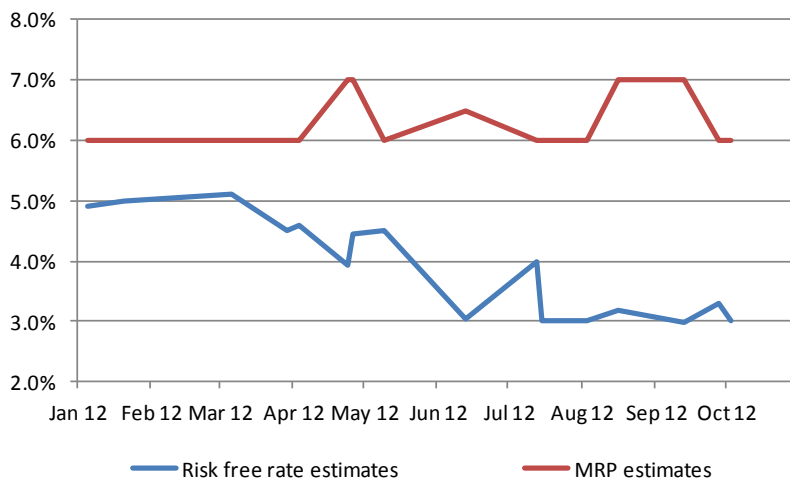
The independent reports were for a range of companies, not only regulated companies. This means that the approach taken by independent experts are not necessarily based upon how a regulator would calculate the MRP. The numbers shoul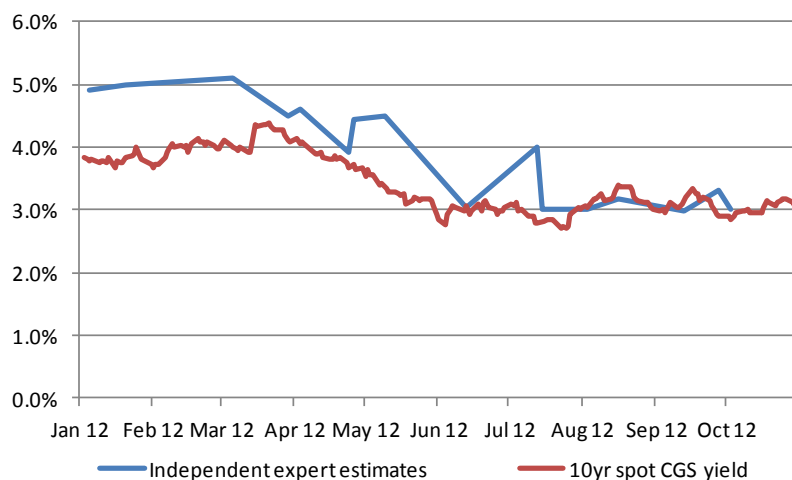d therefore represent spot rates rather than a historic rate. The selection of 6.0% as the MRP goes against the views put forward by the distribution businesses that a 6.0% MRP represents a historic rate.

Figure 7.6: Risk free rate estimates in 2012

Source: Independent expert reports, RBA

The figure above would suggest that towards the end of the year, the AER methodology for the risk free rate was much more closely aligned with the views of the independent expert reports, than at the start of the year. This relationship is based on limited data and cannot be determined with confidence, but it shows the limitations to the methodology adopted as a check on the AER draft decision.

Conditions for inclusion

We would agree that having reports on the same basis removes some difficulties in interpreting the available evidence. The objective here of the report is important; whether it is intended to estimate the prevailing market cost of equity or whether it is simply a check of the AER decision.

If the purpose is the latter, the exclusion of reports may have not been necessary as the evidence presented could have proved useful. An example of this is using only reports deriving the cost of equity using the CAPM or not including those looking at CGS yields of different tenor. The report may have benefited from broader context and allaying any concerns regarding subjectivity in their choice of final sample.

A discussion around how subjective decisions were made in eliminating reports would again have provided greater confidence that the reports used represented the best available market evidence. It should also be noted that this is just one type of market evidence and should be used in conjunction with other market evidence which we will discuss in the following section.

Imputation credits

For imputation credits, the decision for the AER is prescribed in Rule 87(3) of the NGR. Due to the relative lack of discussion over the breakdown of the sources of the cost of equity, it is difficult to properly assess what the impact of this will be. This is something that can be re-examined when looking at the rate of return guidelines, but the lack of evidence prevents a discussion within this report.

7.4.3. Data presentation

Our view is that it is very difficult to accurately summarise a report's findings in a single summary figure. Even if the mean of a year's report is acceptable, Table 7.2 shows that there have been years where the average AER decision has been below estimates of the independent experts on the market cost of equity. By the same logic that a positive difference means that the company has received at least their efficient costs, 2009 with a negative difference would equally suggest that decisions have been set and approved at levels below this. The presentation of results is also highly sensitive to timings of decisions and reports given the volatility in market data shown in Figures 7.3 and 7.4, so we do not believe that this is compelling evidence.

Our view is that the calculated figures rather than adjusted figures are preferable as under the framework, there is not much discretion for the regulator to exercise. Table 7.4 below shows summary statistics of the independent expert reports used by EY.

Table 7.4: Calculations of the risk free rate and MRP from independent expert reports

	Jan to Oct 2012			Jun to Oct 2012		
	Risk free rate	MRP	Market cost of equity	Risk free rate	MRP	Market cost of equity
Data observations	17			9		
Mean	3.93%	6.26%	10.19%	3.31%	6.28%	9.59%
Mode	3.00%	6.00%	9.00%	3.00%	6.00%	9.00%
Median	4.00%	6.00%	10.00%	3.04%	6.00%	9.04%

Source: Independent expert reports, EY, CEPA analysis

Looking at the mean from January for both the risk free rate and MRP gives a market cost of equity of 10.19%. The impact of the adjustments within the independent expert reports to the headline figure is therefore approximately half a percentage point.

The table also shows the difference in using alternative summary statistics. The modal values are significantly below the mean values given, which points to a market cost of equity of 9.0%, very similar to what the median value prescribes if taking the reports issued since June 2012.

It is useful to consider the parameters adopted for the AER's approach to cross-check the figures contained in this table. One example is the KPMG Consolidated Media Holdings independent report, where KPMG use a blended risk free rate, using a risk free rate of 3%

for the next ten years and a rate of 5% from Year 11. The figure included within the table is 4.3% (the blended rate), but considering the ten year investment horizon, there is an argument that 3.0% should have been included instead. If this change was made to the figures above, the mean for the risk free rate from June to October 2012 falls to 3.17%.

KPMG in its report for Consolidated Media Holdings Group state that 'a degree of subjectivity is involved in estimating some of the inputs…these limitations mean that any estimate of the WACC must necessarily be regarded as indicative rather than as an absolute measure.' This would further support the view that there is no compelling evidence presented in this report that would show that the market cost of equity should be adjusted.

7.4.4. Conclusion

Overall, our analysis of the information presented by EY suggests that:

- the credibility of some sources is undermined by large unexplained swings in estimates over short time horizons;

- there is clearly a strong time trend, and arguably the more recent studies should have been given greater weight (rather than implicitly equal weight in a straight average);

- looking at the modal estimates of the individual parameters, the discrepancy between the brokers and the AER is less marked; and

- the analysis of the KPMG Consolidated Media Holdings report shows how important each report's idiosyncrasies are.

Given these observations we believe that the arguments put forward by EY for why this market evidence is supportive of a different position to that adopted by the AER is not compelling. If anything, these results are more supportive of a short-term risk-free rate and 6% MRP.

8. FURTHER MARKET EVIDENCE

8.1. Introduction

This section considers the role of valuations taken from well functioning and liquid markets as evidence to better assess parameter values (and expectations of values) for CAPM estimates. The market that is of most interest is the domestic Australian market for parameter estimation in this case, but it is also possible to draw upon information from international markets if deemed appropriate.

This information is drawn directly from market participants rather than estimated (although it may require some interpretation in order to produce figures for the cost of equity or its components). The AER examines evidence on each CAPM parameter individually and uses the information to conduct a check on the overall cost of capital, as well as to see how others have reached views on key parameters. Examples of market evidence used for checks include[60]:

- asset sales, including regulatory assets;

- trading multiples;

- broker WACC estimates; and

- the relationship between the cost of equity and the cost of debt.

This section is intended to draw upon market evidence that has been presented by parties in the regulatory process and where possible to utilise further market evidence. The risk-free rate and MRP are not directly observable, so it is not possible to avoid a degree of subjectivity in interpreting this evidence. Whilst there is this degree of interpretation, theoretical judgements over the appropriateness of guidelines is not the focus of this section.

8.2. Overall Cost of Equity

RAB multiples

The Market Asset Ratio (MAR) is a well-established tool used by equity analysts to compare allowed and actual returns on capital. At its simplest, the concept is that in the absence of other factors a company will earn its allowed return on its Regulatory Asset Base (RAB), and hence any premium in a company's valuation over the RAB will come from:

- expectations of earnings from incentives and efficiencies;

- an actual cost of capital that is below the allowed cost; and

- wider stock market or M&A activity.

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[60] Evidence taken into account by the AER also includes recent decisions by other regulators and the AER itself, as well as recent decisions by overseas regulators.

In our opinion, the first factor is unlikely to account for more than 10% of the premium to RAB. The third factor can come into play as evidenced by short-term share price movements, but sustained cross-company premia are likely to indicate a combination of the first two factors.

The most robust MAR analysis comes from values taken from actual transactions, i.e. acquisitions, rather than more volatile share prices, although the latter provide a useful cross-check and, of course, a time series for listed companies. Acquisitions of minority stakes are more problematic as a lack of control premium may be factored-in, but again they are a useful check.

The AER have presented market evidence on RAB multiples for some companies. We have excluded the evidence prior to 2011 for inclusion in Table 8.1 below and evidence since the AER draft determination in Table 8.2.

Table 8.1: AER RAB multiple analysis

Date	Acquirer	Entity/Asset acquired	RAB multiple
Dec 2011	Marubeni Corp/RREEF	Allgas	1.20
Dec 2011	Marubeni Corp/RREEF	Allgas	1.02[61]
Jul 2011	ATCO	West Australian Gas Networks (25.9%)	1.20
Jul 2011	DUET	Multinet Gas (20%)	1.13
Jul 2011	DUET	Dampier to Bunburry Natural Gas Pipeline (20%)	0.95

Source: AER

Table 8.2: AER RAB multiple analysis

Date	Acquirer	Entity/Asset acquired	RAB multiple
Dec 2012	State Grid Corporation of China	ElectraNet SA (41.1%)	1.29

Source: AER, Macquarie [62]

Evidence in this case is restricted by regulated asset sales, so the evidence presented does not provide a comprehensive picture of the current cost of equity. In the majority of cases though, the available evidence would imply that there is a sufficient cost of equity for the companies concerned. The latest data point further confirms and in fact strengthens this conclusion.

Whilst the evidence is relatively limited in the above cases, we would suggest trying to further understand what the MAR premia may be suggesting. Systematic issues will drive the RAB and it is appropriate to look at a range of firms in the sector to be able to draw inferences for parameters common to each company.

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[61] Macquarie, *SP AusNet: ElectraNet underwriting the value*, 29 November 2012, suggests that the RAB multiple for Allgas is 1.23.

[62] http://www.electranet.com.au/media-centre/media-archive/2012/sale-of-electranet-shareholding/

Our view is that you should not place too much weight upon any individual point estimate, but considered together, the RAB multiples analysis provides strong enough evidence to draw conclusions.

Trading multiples

This is similar to MAR analysis above, but is based on listed shares rather than transactions. There are the same issues as noted above about what information you can infer from this evidence. In this case you can only really identify the premium and speculate on its source. A premium may be derived, as above, from:

- expectations of earnings from incentives and efficiencies;

- an actual cost of capital that is below the allowed cost; and

- wider stock market or M&A activity.

This method may require fewer assumptions and you are able to observe the data on a continuous basis, but there is still the restriction that the evidence is for listed entities and listed entities in their entirety.

The four companies contained within the AER's paper are:

- DUET Group (DUET) – an owner of utility group assets;

- Envestra (ENV) – a large gas distribution company;

- Spark Infrastructure (SKI) – a utility infrastructure investment fund; and

- SP AusNet (SPN) – operator of three Victorian energy networks.

Table 8.3 below summarises the evidence presented by the AER from analyst reports in August 2012, taken as a snapshot view rather than continuous view. Table 8.4 contains analyst reports on trading multiples since the AER draft determination.

Table 8.3: Trading multiples presented by the AER

Company	Author	Trading multiple
DUET	JP Morgan	1.18
DUET	Macquarie	1.17
DUET	Credit Suisse	1.14
ENV	JP Morgan	1.25
ENV	Credit Suisse	1.32
ENV	BoA Merrill Lynch	1.10
SKI	JP Morgan	1.22
SKI	Macquarie	1.35
SKI	Credit Suisse	1.36
SKI	BoA Merrill Lynch	1.39
SPN	JP Morgan	1.20

| SPN | Macquarie | 1.17 |
| SPN | Credit Suisse | 1.14 |

Source: JP Morgan, Macquarie, Credit Suisse, BoA Merrill Lynch, AER

Table 8.4: Trading multiples presented by the AER

Company	Date	Author	Trading multiple
DUET	16 Jan 2013	JP Morgan	1.20
DUET	29 Nov 2012	Macquarie	1.23
DUET	7 Nov 2012	Credit Suisse	1.15
DUET	19 Oct 2012	BoA Merrill Lynch	1.20
ENV	16 Jan 2013	JP Morgan	1.29
ENV	7 Nov 2012	Credit Suisse	1.35
SKI	16 Jan 2013	JP Morgan	1.27
SKI	29 Nov 2012	Macquarie	1.34
SKI	7 Nov 2012	Credit Suisse	1.39
SKI	19 Oct 2012	BoA Merrill Lynch	1.25
SPN	16 Jan 2013	JP Morgan	1.24
SPN	6 Dec 2012	Macquarie	1.16
SPN	29 Nov 2012	Macquarie	1.21
SPN	7 Nov 2012	Credit Suisse	1.14
SPN	19 Oct 2012	BoA Merrill Lynch	1.15

Source: JP Morgan, Macquarie, Credit Suisse, BoA Merrill Lynch, AER[63]

Whilst we accept, as per the arguments put forward by SFG Consulting, that there are limitations in what can be inferred from this market evidence, the range of figures from 1.10 to 1.39 suggests that there is outperformance by these companies and there are a significant number of data point for us to be relatively confident in this conclusion. The degree to which there is outperformance on the cost of equity is unclear, but this suggests that the rates allowed are certainly not too low and the figures are suggestive of overly generous rates.

Figures 8.3-8.6 show how illustrative trading multiples have changed since the beginning of 2012 for the companies listed above. The trading multiples would be expected to fall if the AER's methodology led to rates that were too penal, but have risen over this period. This therefore does not illustrate that rates were too low. We present a figure for each of the four companies mentioned, using the latest available figure for the RAB and net debt, with time series data for market capitalisation.

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[63] JP Morgan, *Utilities 2013 Outlook: Regulatory Risks Recede*, 16 January 2013, pp. 54, 58, 61, 64. Macquarie, *Macquarie Marquee Ideas: The forgotten yield play*, 6 December 2012, p.3. Macquarie, *SP AusNet: ElectraNet underwriting the value*, 29 November 2012, p. 2. Credit Suisse, *Regulated Utilities Monthly: Equity IRRs getting tighter*, 7 November 2012, p. 14. Bank of America Merrill Lynch, *SP Ausnet: Re-iterating 7.7% 2013 divi, growing at 2%*, 9 November 2012, p. 5. Bank of America Merrill Lynch, *Australian Utilities: Moving to a lower WACC world*, 19 October 2012, p. 6.

Figure 8.3: Trading multiples for Envestra[64]

Trading multiples

Legend: ENV ——— | × Analyst estimate

Source: Annual reports, Bloomberg, CEPA analysis.

Figure 8.4: Trading multiples for SP AusNet[65]

Trading multiples

Legend: SPN ——— | × Analyst estimates

Source: Annual reports, Bloomberg, CEPA analysis.

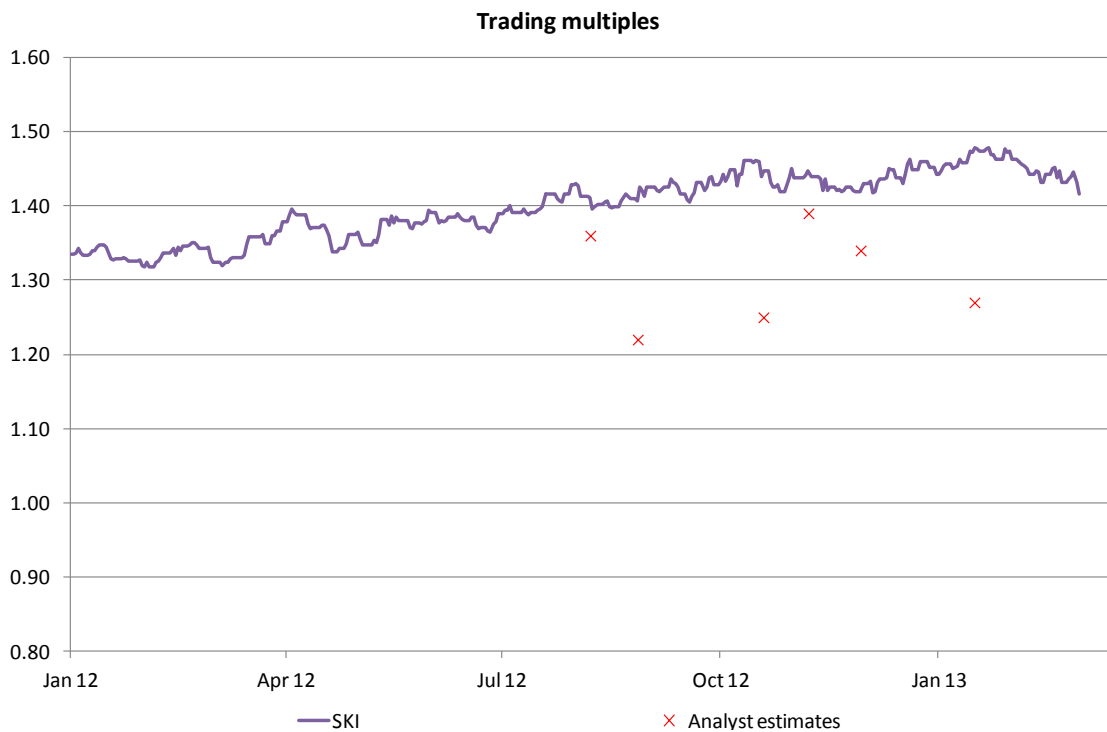[64] Based upon a RAB of A$2,678, net debt and market capitalisation from Bloomberg.

[65] Based upon a RAB of A$6,640, net debt and market capitalisation from Bloomberg.

Figure 8.5: Trading multiples for DUET[66]

Trading multiples

Source: Annual reports, Bloomberg, CEPA analysis.

Figure 8.6: Trading multiples for Spark Infrastructure[67]

Trading multiples

Source: Annual reports, Bloomberg, CEPA analysis.

[66] Based upon a RAB of A$5,185, net debt of A$3,973 and market capitalisation from Bloomberg.

[67] Based upon a RAB of A$3,611, net debt of A$2,995 and market capitalisation from Bloomberg.

For three of the four companies, the analyst estimates correlate with our illustrative RAB multiples analysis. For Spark Infrastructure, our analysis points to a higher figure, but the analyst estimates are in excess of 1.20, pointing to at least no under recovery for the company.

This position is supported by Figure 8.7, which looks at the share price of the companies prior to and after the AER's draft decision.

Figure 8.7: Share prices around the AER's draft decision
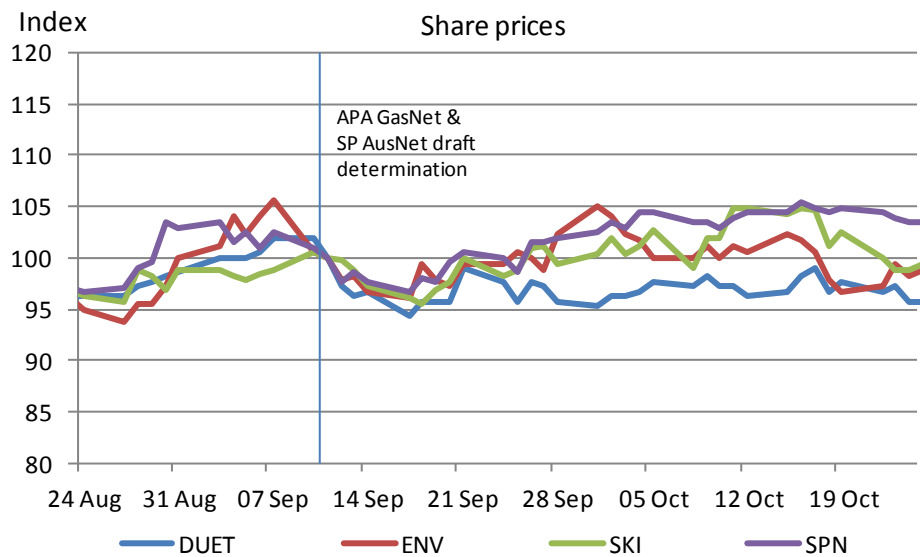
Source: Bloomberg, CEPA analysis

Note: Decision date corresponds to determination on 11 September 2012 for APA GasNet and SP AusNet. Decisions for Envestra and MultiNet on 24 September 2012

We would expect the market to have priced in the decision for Envestra and MultiNet based on the earlier decision on 11 September. The share price since the decision will include a range of figures and will be based on expectations of what the AER would determine, so it is difficult to tell precisely the impact of the decision. The data does appear to show that the decision was likely aligned with market expectations, which would be expected given the clear rules framework in place.Dividend Growth Model (DGM)

The AER have presented evidence on DGM estimates produced by consultants. These are contained within Table 8.5 below.

Table 8.5: Consultant estimates of the MRP

Consultant	Dividend Yield	Dividend per share growth	RFR	MRP estimate
CEG (Mar 12)	5.68%	6.60%	3.77%	8.52%
Capital Research (Feb 12)	4.70%	7.00%	5.08%	6.62%
Capital Research (Feb 12)	5.23%	7.00%	5.08%	7.15%
Capital Research (Feb 12)	5.71%	7.00%	5.08%	7.63%
Capital Research (Mar 12)	6.29%	7.00%	3.73%	9.56%
NERA (Feb 12)	BB/IBES	5.65%	3.96%	7.72–7.75%
NERA (Feb 12)	BB/IBES	5.65%	5.50%	6.18–6.21%
NERA (Mar 12)	BB/IBES	5.65%	3.99%	7.69–7.72%

Source: AER

The estimates for the MRP are consistently above the 6.0% value adopted by the AER in their draft decisions. The CEG March 2012 paper estimates an MRP of 8.52% and the Capital Research paper from the same month estimates 9.56%.

The data contained within the above estimates also shows that there are significant changes in the estimates of the same consultants over a short period of time. The AER note the Capital Research March 2012 estimate of 9.56% being approximately 200bps over their estimate in the previous month. Within February, there is also a 100bp change in estimate from Capital Research and a 150bp change in estimates from NERA in February 2012.

McKenzie & Partington note the high degree of sensitivity with regards to the assumptions adopted and in their view the Gordon model overstates the MRP. Lally agrees that there is an upward bias contained within DGM estimates. The AER state that the AMP approach used by CEG gave a negative or zero MRP in 1994, which should not be possible.

Our standard position is that the concerns surrounding the use of the DGM estimates significantly limit its utility. There is more comfort with applying this to the whole economy rather than just a company, but we would agree with Officer & Bishop, CEG and the ENA in suggesting that the DGM should only be used as a cross-check.

The dividend yield for the ASX as of 31 January 2013 was 3.59% according to Bloomberg. The ten year CGS nominal yield on that day was 3.45% according to the RBA, which is our proxy for the risk-free rate. In terms of a dividend growth estimate, in the long-term this should tend towards the growth rate of the economy i.e. GDP growth. The nominal GDP growth estimate for 2014 is 5.6%, with an average between 1988-2012 of 6.25%[68]. These figures would suggest an MRP of 5.75-6.40%, consistent with the AER's draft decision. As a cross-check, in our view there is no compelling evidence that the AER decision is inappropriate.

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[68] OECD Economic Outlook No 92

Alternative approaches

There are a range of further approaches that reports within the regulatory process have stated may be useful in a cross-check. These approaches though are not noted within the AER's rate of return guidelines, so for this report, we are not going to consider evidence derived from these approaches, although they could include:

- regime switching;

- financial market indicators;

- implied volatility approach; and

- black CAPM.

9. CONCLUSIONS FROM PART B

Market evidence on the total cost of equity as well as individual elements of the estimate are available from:

- valuation reports;

- trading multiples; and

- dividend growth model.

While this evidence will only ever be corroborating evidence to a more formal estimation of the SL CAPM derived cost of equity, it can play an important role in determining the degree of confidence given to the CAPM derived value. This is a role played extensively in the UK by market evidence and one that has been considered in Australia.

Overall, the available evidence, while not able to give a conclusive result, is strongly supportive of the idea that the cost of equity has not been set too low.

Quite strong support for this proposition is provided by the trading multiples. Trading multiple values of between 1.0 and 1.2, including the period around and immediately after the announcement of the draft determination, are likely to be predicated on a true cost of equity close to the allowed cost of equity.

Further support is provided in one of the quotes in the SP AusNet document:

> *what attracts us and our clients to the sector is the long standing consistent application of a developed regulatory framework, the stable and appropriate level of returns provided by regulated utilities[69].*

Valuation reports also provide evidence that is supportive of the AER estimates, especially when the more recent evidence is given an appropriate weight. In our opinion the way in which EY has presented this data is inappropriate and misleading. While the precise numbers are not the same as those used by the AER they do support:

- a short-term risk-free rate below the historic average; and

- an MRP that is equal to about 6% (whether this is a short-term or historic value is less clear).

As such, we believe there is strong market evidence that the value for the allowed cost of equity proposed by the AER is in line with the market determined true cost of equity.

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[69] SPAusNet (2012) RAAP Chapter 5 p31

Summary And Conclusions

10. SUMMARY AND CONCLUSIONS

Having considered the specific questions in Part A and Part B we are presented with the following situation:

> **Part A** suggests that while evidence on the precise relationship between the risk-free rate and MRP is limited, there is some evidence of a relationship and hence either a spot or historic approach, rather than a mixed approach, should be adopted. Concerns about the ability to estimate a short-term MRP mean that the historic approach may be preferred if other criteria are not important. And

> **Part B** analysis of market evidence suggests that evidence of the allowed cost of equity being too low is limited with the majority of evidence, especially that linked to on-going trading multiples suggesting that the current estimate is in line with market expectations of the true cost of equity.

Overall when considering the various criteria set out earlier in the report and the recommendations we believe that:

- consumers would be worse off if a move to historic parameter estimates were to occur and while theoretically companies would face more appropriate incentives for investment, the market evidence suggests that these would be linked to an overstatement of the cost of equity which could inhibit investment (or mean that the higher prices paid by consumers were inappropriate); and

- the existing AER approach is more likely to reflect existing market conditions than would occur if a move to historic based parameter estimates were employed.

Overall, on balance, the theoretical consistency in the AER approach, while questioned in relation to estimation concerns, when linked to the two criteria set out above means that our final recommendation is that AER should not change the estimation approach.

APPENDIX 1: PRESENTATION OF ERNST & YOUNG RESULTS

Ernst & Young (EY) consider 17 valuation reports for 2012 from nine different sources. This appendix gives a more detailed explanation of how EY calculates the average implied cost of equity and the AER implied market cost of equity (using a twenty business day average).

In terms of this table, Columns A-D reflect estimates for specific parameters, directly taken from the reports themselves. Column E notes the difference between the final estimate given for the cost of equity or cost of capital against what the calculations would suggest. For example, in the Lonergan Edwards report of 29th March 2012, adding the risk free rate to the MRP would give 10.5%, but the cost of equity figure used is 11.4% (i.e. an additional 0.9% is applied). In the case of the Grant Samuel reports of 15th July and 3rd August 2012, the final estimate given for the WACC is 0.3% and 1.7% above the figure arrived at through calculation of the individual values. The EY report assumes that the WACC change is due to the cost of equity and applies the gearing rate. In the latter example, with 50% gearing, a WACC 1.7% higher than calculated value with a constant cost of debt, means that they have applied an addition of 3.4% to the cost of equity.[70] Column G reflects the calculated market cost of equity as shown in Column E, with the adjustment as noted in Column F.

Column H represents the prevailing risk-free rate, using a twenty day average of the ten-year Commonwealth Government bond yield at the time of the report, in addition to an MRP of 6.0%. This is to be able to compare the independent expert reports to the AER's methodology. The results for this report uses a simple average, which as shown in Column G is 10.7% for the independent experts, which compares to a simple average of 9.5% for Column H, the AER 'equivalent.'.

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[70] Cost of equity adjustment = WACC adjustment/ (1-gearing)

Table A1.1: Ernst & Young report summary

A	B	C	D	E	F	G		H
Independent Expert (IE)	Report date	Risk-free rate applied by IE	Mid-point MRP applied by IE	Calculated market cost of equity (C+D)	Adjustment made by IE	Final market cost of equity (E+F)		AER 'equivalent' market cost of equity (20days)[71]
Crowe Howarth	05/01/2012	4.91%	6.00%	10.91%		10.9%		9.9%
Grant Thornton	20/01/2012	5.00%	6.00%	11.00%		11.0%		10.0%
PwC	06/03/2012	5.10%	6.00%	11.10%		11.1%		9.8%
Lonergan Edwards	29/03/2012	4.50%	6.00%	10.50%	0.90%[72]	11.4%		10.2%
Grant Thornton	03/04/2012	4.60%	6.00%	10.60%		10.6%		10.0%
Deloitte	24/04/2012	3.92%	7.00%	10.92%		10.9%		10.0%
Deloitte	26/04/2012	4.44%	7.00%	11.44%		11.4%		10.1%
Grant Thornton	09/05/2012	4.50%	6.00%	10.50%		10.5%		10.2%
RSM Bird Cameron	13/06/2012	3.04%	6.50%	9.54%		9.5%		9.1%
Grant Thornton	13/07/2012	4.00%	6.00%	10.00%		10.0%		9.0%
Grant Samuel	15/07/2012	3.00%	6.00%	9.00%	0.40%[73]	9.4%		9.0%
Grant Samuel	03/08/2012	3.00%	6.00%	9.00%	3.40%[74]	12.4%		8.9%
BDO	16/08/2012	3.18%	7.00%	10.18%		10.2%		9.0%
BDO	13/09/2012	2.99%	7.00%	9.99%		10.0%		9.2%
KPMG	24/09/2012	4.30%	6.00%	10.30%		10.3%		9.2%
Moore Stephens	28/09/2012	3.30%	6.00%	9.30%		9.3%		9.1%
Grant Samuel	03/10/2012	3.00%	6.00%	9.00%	3.20%[75]	12.2%		9.1%
Average						**10.7%**		**9.5%**

Source: Ernst & Young, CEPA analysis

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[71] Calculations are based on an MRP of 6.0% and a risk-free rate taken as the preceding twenty day average yield of the ten year Commonwealth Government Bond

[72] Adjustment is a direct adjustment to the cost of equity

[73] Adjustment is a 0.30% rise in the cost of capital, translated into a cost of equity adjustment using mid-point gearing of 25%.

[74] Adjustment is a 1.70% rise in the cost of capital, translated into a cost of equity adjustment using mid-point gearing of 50%.

[75] Adjustment is a direct adjustment to the cost of equity