Energy Networks Association:

Potential impact of the ERA's DRP methodology

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Executive summary

The Energy Networks Association (ENA) engaged PricewaterhouseCoopers ('PwC' or 'we') to provide advice on the potential implications of the Economic Regulation Authority (ERA) of Western Australia's debt risk premium (DRP) estimation methodology if it were to be adopted by the Australian Energy Regulator (ERA). Specifically, our scope requires us to:

- Estimate the potential impact on the businesses if the AER were to apply a similar DRP estimation methodology to that applied by the ERA in the ATCO case; and

- Incorporate an analysis of the weighted averaging technique that has been adopted by the ERA.

Summary of the ERA's approach

The ERA's approach, as amended by the Australian Competition Tribunal ('the Tribunal') can be described as follows:

- Select a sample of bonds based on the following criteria:

  – Credit rating of BBB/BBB+ by Standard and Poor's;

  – Time to maturity of 2 years or longer;

  – Bonds issued in Australia by Australian entities and denominated in Australian dollars;

  – Inclusion of both fixed bonds and floating bonds; and

  – Inclusion of both Bullet and Callable/Puttable redemptions.

- Exclusive reliance on the Bloomberg service for bond yield; and

- The calculation of a 'combined weighted average debt risk premium' based on a combination of weights depending on:

  – The remaining term to maturity; and

  – The issuance size of the bond.

Applying this approach to an averaging period covering the 20 business days to 20 December, 2010, the ERA estimated a debt risk premium (DRP) of 289.3 basis points for ATCO (amended upon Appeal).

Summary of implications of the ERA's approach

Table 1 below contains a summary of debt risk premiums calculated on the basis of alternative assumptions about the sample composition, estimation methodology and data sources used. We offer the following comments on each of these cases:

Original: A weighted (simple average) DRP of 306bp (303bp) and average term to maturity of 5.2 years. This is the ERA's original Tribunal-amended estimate for the December 2010 averaging period. It is higher than the 289.3bp reported by the ERA because its figure of 289.3bp was not annualised.

Table 1: Summary table of debt risk premiums using alternative sample selection criteria, methodologies and data sources

Case		Averaging period	Data source	No. of bonds	Ave. term	DRP (bps)	Weighted DRP
Original	Strict application of ERA approach	2010	Bloomberg only	13	5.2	303	306
1	Strict application of ERA approach	2013	Bloomberg only	20	4.40	231	233
1a	Strict application of ERA approach	2013	Bloomberg & UBS	36	4.82	254	283
1b	ERA's sample including A- bonds	2013	Bloomberg only	50	4.77	192	183
1c	ERA's sample including A- bonds	2013	Bloomberg & UBS	100	5.28	213	220
1d	Strict application of ERA approach including only A- bonds	2013	Bloomberg only	30	5.02	167	163
2a	EFA/AER sample, excl. financial/ subordinated bonds	2013	Bloomberg & UBS	59	4.67	201	214
3a	Old AER approach, sample 5-15 years	2013	Bloomberg & UBS	20	6.84	219	236
3b	Old AER approach, sample 7-13 years	2013	Bloomberg & UBS	7	8.22	264	294
4a	AER Bloomberg extrapolation	2013	Bloomberg & UBS	n/a	n/a	308	
4b	Econometric approach (linear function)	2013	Bloomberg & UBS	66	n/a	299	

Source: ERA, AER, Bloomberg, UBS and PwC analysis. Note: 'DRP' refers to the simple average DRP Note: n/a indicates that while approaches 4a and 4b target a 10 year DRP, the average term of the bond sample employed is not relevant, as they are not simple of weighted averages.

Case 1: A weighted (simple average) DRP of 233 basis points (231 basis points) and average term to maturity of 4.40 years. This is the original ERA case updated for the averaging period of 20 business days to 22 April, 2013.

Case 1a: A weighted (simple average) DRP of 283 basis points (254 basis points) and average term to maturity of 4.82 years. This case applies the strict ERA approach, but simply extends the data sources to include UBS as well as Bloomberg. This results in a much higher average DRP of 50 basis points due to the inclusion of a number of finance company and floating rate bonds.

Case 1b: A weighted (simple average) DRP of 183 basis points (192 basis points) and average term to maturity of 4.77 years. This case is the same as Case 1, except that A- bonds have been included, as the AER did in the Powerlink and Aurora Energy draft decisions, which results in a much lower average DRP.

Case 1c: A weighted (simple average) DRP of 220 basis points (213 basis points) and average term to maturity of 5.28 years. If the AER were to adopt the ERA's sample selection criteria, include A- bonds, but broaden the data sources to include UBS, the DRP would be significantly higher.

Case 1d: A weighted (simple average) DRP of 163 basis points (167 basis points) and average term to maturity of 5.02 years. This case is the same as Case 1, except that only A- bonds have been used. This assumes that the ERA misclassifies the benchmark credit rating as A- instead of BBB+ (as the ERA did in its Western Power Network decision). This compounds the impact of the ERA's methodology, resulting in a much lower average DRP, and an under-estimate of the 5 year DRP when the appropriate credit rating is BBB+.

Case 2a: A weighted (simple average) DRP of 214 basis points (201 basis points) and average term to maturity of 4.67 years. This case is a blend of ERA and

previous AER sampling approaches, in that a 2 year cut-off is applied (ERA), but financial and subordinated bonds are excluded (previous AER approach). This reduces the sample size and the DRP.

Case 3a: A weighted (simple average) DRP of 236 basis points (219 basis points) and average term to maturity of 6.84 years. The term to maturity in the cases presented above are wrong (ranging from 4.40 to 5.28 years). If the AER were to apply its previous approach using a 5-15 year range, as in the Powerlink/Aurora Energy draft reports, this would significantly reduce the sample and but raise the average years to maturity. However, 6.84 years is still materially different from a benchmark term of 10 years.[1]

Case 3b: A weighted (simple average) DRP of 294 basis points (264 basis points) and average term to maturity of 8.22 years. This is the same approach as in Case 3a, except that the range is narrowed to 7-13 years, which reduces the sample size to 7. The DRP is higher due to a higher average term to maturity.[2] However, the Tribunal would be likely to consider the sample of 7 bonds to be too small.

Cases 4a and 4b: Case 4a is the Bloomberg extrapolation, which was applied by the AER in the Powerlink and Aurora Energy final decisions, and currently derives a DRP of 308 basis points. The 299 basis points derived in Case 4b by using an econometric approach (with a sample of 66 bonds) is relatively close (less than 10 basis points) to the Bloomberg extrapolation, and provides continuing support for its use.

The original ERA 'bond yield approach'

On 28 February, 2011, in its Final Decision on WA Gas Networks Pty Ltd (ATCO), the ERA applied its 'bond yield approach' to estimate a debt risk premium.[3] That approach had been developed in an earlier Discussion Paper, which had been issued on 1 December 2010.[4] At a general level this approach relies on bond yields observed for Australian bond issues with more than 2 years remaining to maturity and calculates a weighted average debt risk premium, where the weights are based on issue size and term to maturity.

The ERA calculated the simple averages of four scenarios for each of its 'weighted average methods', which ranged from 302 basis points to 318 basis points, and chose the highest (318 basis points based on the term to maturity weighted average).[5]

ERA's approach as amended by the Tribunal's ATCO decision

ATCO appealed to the Australian Competition Tribunal (the Tribunal), which published its decision on 8 June, 2012. The Tribunal concluded that it found 'no error in the ERA's decision to depart from the Bloomberg FVC as a basis for estimating the DRP'. The Tribunal considered that the scenarios developed by the

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[1]   We note that dropping the SPI bonds from this sample (on grounds of bias due to Singapore Government ownership) would increase the weighted (simple average) DRP to 245 basis points (222 basis points).

[2]   The DRP would be higher still (335 basis points and 305 basis points respectively) if the SPI bonds were removed.

[3]   Economic Regulation Authority (Western Australia) (28 February, 2011), *Final decision on WA Gas Networks Pty Ltd proposed revised access arrangement for the Mid-West and South-West Gas Distribution Systems*, pp. 75-92.

[4]   Economic Regulation Authority (Western Australia) (1 December, 2010), *Measuring the Debt Risk Premium: A Bond-Yield Approach*.

[5]   Scenario 1 was the ERA's full sample of 17 bonds, scenario 2 dropped the BBB- bonds (13 bonds), scenario 3 dropped bonds that had less than 5 years to maturity (8 bonds), and scenario 4 included only BBB+ and BBB bonds with more than 5 years to maturity (6 bonds).

ERA were 'valid', but that the ERA had fallen into error in the way it had applied its analysis. The Tribunal was critical of the ERA's application of its initial weighted average method, noting that by taking a simple average of four scenarios with different sets of bonds in each, gave a double, triple and quadruple weighting to some of the bonds. The Tribunal also suggested that the ERA should consider applying a combined weighting system, which 'might have been more reflective of all the relevant conditions including risk in the market for debt.'[6]

In response to the Tribunal's decision, the ERA re-estimated a debt risk premium of 289.3 basis points based on a 'combined weighting' methodology that increased the weighting for the bond's term to maturity and size of issuance.

Critique of the ERA's methodology

The trade-off between consistency and market relevance

In its Discussion Paper the ERA stated that there were two reasons why the market relevance of the estimates should carry more weight than the argument for consistency with other WACC parameters.

- First, attempting to maintain consistency would reduce the level of market relevance, which would be likely to be further compromised in future.

- Secondly, moving away from a 10 year term provides a larger sample, and 'any measure that relies on a small sample of data points will be less reliable than one based on a larger sample.'[7]

Reliance on more data will not always improve the accuracy of an estimate, since the *relevance* of the data is an important consideration, as is the methodology that is applied to examine the data. As noted in this report, it is almost universally understood by finance academics and market practitioners that other things being equal, bonds with a longer term to maturity will command a higher debt risk premium.[8] Therefore, the selection of a sample of bonds with an average term that is significantly less than 10 years will under-estimate the debt risk premium of a benchmark 10 year term bond.

We note that the ERA's bond yield methodology initially (in the ATCO decision) targeted a 10 year term DRP, and considered that its approach would provide a reasonable approximation to a 10 year DRP. In its subsequent draft decision on the Dampier to Bunbury Natural Gas Pipeline (DPNGP), the ERA declared that 'the Authority is of the view that there are strong grounds for matching the assumption of term to maturity with the regulatory period, which is generally 5 years.'[9] In a short period of time the same 'bond yield' methodology had gone from being a method of estimating the 10 year DRP, to being a methodology applied to estimate the 5 year DRP.

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[6] Para 176

[7] Economic Regulation Authority (Western Australia) (1 December, 2010), p.9.

[8] PricewaterhouseCoopers (March, 2012), *SPAusNet, Multinet Gas, Envestra and APA Group: Estimating the benchmark debt risk premium*, pp.25-26.

[9] Economic Regulation Authority (Western Australia) (14 March, 2011), *Draft Decision on Proposed Revisions to the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline, Submitted by DBNGP (WA) Transmission Pty Ltd*, pp.187.

ERA's bond yield method under-estimates the 10 year debt risk premium

The ERA's methodology fails to estimate a debt risk premium for a corporate bond with a 10 year term to maturity. For the 20 business days to 20 December, 2010, the ERA's methodology derived a debt risk premium estimate of 289 basis points, which is close to the simple average of 286 basis points for the ERA's bond sample, which had an average term to maturity of only 5.2 years.

The ERA's retrospective test

The ERA presented its combined weighted average debt risk premium number of 289.3 basis points (as at 20 December 2010) as being a close estimate of the likely value of the then current 10 year BBB+ debt risk premium based on a 'retrospective test' that examined a period prior to the global financial crisis (2005 to 2007) when the debt risk premium showed a relatively low rise with term, and the resulting 'error of estimate' of 13 to 34 basis points would have been considered unacceptably large.

The ERA's weighting system

The ERA's weighting system, which on the face of it, constitutes one of the core principles of the bond yield approach, is not appropriate for the following reasons:

- First, the ERA's weighting according to term to maturity does not provide a valid estimate of the 10 year BBB+ debt risk premium. A large proportion of the ERA's bond observations were bunched between 2 and 5 years. As a result, even in a hypothetical case where there is a strong perfectly linear relationship between term and debt risk premium, the ERA's approach would significantly under-estimate the 10 year debt risk premium.

- Secondly, the ERA has produced no evidence to justify its implicit assumption that the size of issuance is linearly related to liquidity in a bond, and hence to the reliability of the yield observations. Whilst it is likely that a bond with relatively small issuance will have less market activity, it is also quite possible that bonds above a certain threshold size will have similar levels of market liquidity, while bonds below a certain threshold size will be likely to have no liquidity whatever.

However, in practice, the weighting seldom has a material effect.

The Tribunal's analysis was not comprehensive

We make the following observations about the Tribunal's analysis in the ATCO appeal:

- The Tribunal noted that a 'sample size of six is too small' (scenario 4),[10] while a 'sample of 13 is still a respectable number, given the relative paucity of bond-issuing firms in Australia'.[11] In previous appeal decisions the Tribunal emphasised the need to increase the sample size by:

  - Having regard to a wider group of bonds that includes credit ratings on either side of the BBB+ credit rating band (i.e. A- as well as BBB rated bonds); and

  Having regard to floating rate notes, which are mainly priced by UBS.

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[10] Para 170

[11] Para 169

In its ATCO decision the Tribunal did not consider any of these approaches as solutions to the problem of small sample sizes (possibly because it was not raised).

- As discussed above, the Tribunal did not note that the estimation error of 13 to 34 basis points that the ERA found when applying its methodology to the pre-global financial crisis period (2005 to 2007) was a very large error in the context of the relatively flat debt risk premium at that time.

- While the Tribunal questioned the weighting system applied by the ERA, there are additional issues with the ERA's combined weighting approach that were not commented upon.

The ERA's five reasons for adopting its approach

In its ATCO decision the ERA gave five primary reasons for why it had decided to depart from reliance on the Bloomberg fair value curve.

ERA's first reason: There is a significant deviation between Bloomberg's estimate of the 7-year BBB fair yield curve and observed yields from Australian corporate bonds traded in the financial market.

PwC response: The ERA presented an inappropriate comparison to illustrate the alleged inaccuracy of Bloomberg during the period from August 2009 to December 2010. During this period, only a few of the 15 bond yields tracked by the ERA had a remaining term to maturity greater than 7 years. Many of the bonds had remaining terms to maturity of 3, 4 and 5 years, and their yields would be expected to lie below the 7 year Bloomberg fair value curve. Furthermore, our recent empirical analysis, which was undertaken for a number of businesses, employed a wide sample of bonds and found that the extrapolated 7 year BBB Bloomberg curve provides an estimate of the 10 year DRP that is close to that obtained using an econometric approach.

ERA's second reason: Since Bloomberg discontinued publishing the 7 and 10 year AAA fair value yield curves in June 2010, the use of that historical increment in the DRP for extrapolation will become increasingly outdated over time.

PwC response: The ERA's position assumes that no other appropriate extrapolation methodology can be derived. In a PwC report for Powerlink we applied an extrapolation methodology that was based on the average annual increment observed for three pairs of A-rated bonds. This approach was accepted by the AER in its final decision for Powerlink and Aurora Energy, and has been applied in the AERs subsequent decisions.

ERA's third reason: The ERA considered that since Bloomberg had already shortened its estimate of the fair value curve to 7 years, 'it is likely that Bloomberg will again shorten its estimates of fair yield curves in the future.' Furthermore, 'using the 7-year BBB fair value yield curve in deriving the debt risk premium is problematic because this approach is subject to uncertain data being available from Bloomberg.' [12]

PwC response: The ERA's forecast that Bloomberg would be likely to shorten its fair value curve estimate below 7 years has not proven to be correct.

ERA's fourth reason: The ERA was concerned that the method used by Bloomberg to derive its fair value curves is not revealed, and therefore cannot be replicated.

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[12] ERA (28 February, 2011), p.77.

PwC response: We agree that it is not ideal that the full details of Bloomberg's methodology are not revealed, and that as a consequence there is a lack of transparency. However, the use of proprietary models to derive fair value curves is standard commercial practice, and was also a problem with respect to CBA Spectrum's fair value curve service while it operated.

ERA's fifth reason: The ERA noted that CBA Spectrum had at the time of writing, recently ceased publishing its estimates of the yield curves for Australian corporate bonds across all credit ratings.

PwC response: The fact that CBA Spectrum has ceased publishing its fair value curve estimates was a reflection of the disruptions in the bond markets caused by the global financial crisis. It is not relevant to an assessment of whether extrapolation of the 7 year Bloomberg BBB fair value curve in the current market will provide an appropriate estimate of the 10 year BBB+ debt risk premium.

Conclusion

Based on the analysis contained in this report, we conclude that the ERA's bond yield approach:

• Is based on a narrowly defined Bloomberg data set that ignores the significant contribution of UBS data relating to floating rate bonds;

• Applies an inappropriate combined weighting system, which effectively calculates a debt risk premium that is very close to the simple average for an average term of 5.2 years, and thereby significantly under-estimates the benchmark debt risk premium for a benchmark 10 year bond; and

• Is an unnecessary and inaccurate approach at the current time (20 business days to 22 April 2013), given that the Bloomberg extrapolation methodology continues to be supported by an econometric cross-check.

Our analysis indicates that if the AER were to adopt the ERA's bond yield approach, it would be vulnerable to significant criticism given the fundamental errors in the ERA's approach. It would significantly under-estimate the old AER's simple average of yields methodology and the newer AER extrapolated Bloomberg methodology, which both seek to estimate a 10 year DRP. While the ERA has more recently reframed its method as an estimate of the 5 year DRP, with the current distribution of bond data, the ERA's 'bond yield' methodology is likely the over-estimate the 5 year DRP if the appropriate credit rating band is applied, and to under-estimate the 5 year DRP if an inappropriately lower credit rating band is assumed (as has been the case in several recent ERA decisions).

The New Rules that have been published by the Australian Energy Market Commission define the 'allowed rate of return objective' as the rate of return for a Distribution (Transmission) Network Service Provider that:[13]

> 'is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the Distribution (Transmission) Network Service Provider in respect of the provision of *standard control services (the allowed rate of return objective).*'

The AER's assumption about the benchmark efficient entity is that the term of debt at issuance is 10 years. Our current investigations have shown that the assumption

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[13] National Electricity Rules, Version 55, Economic Regulation of Distribution Services, Chapter 6, 6.5.2 (c); National Electricity Rules, Version 55, Economic Regulation of Distribution Services, Chapter 6, 6.5.2 (c); National Electricity Rules, Version 55, Economic Regulation of Transmission Services, Chapter 6A, 6.2 (c).

of a 10 year term of debt at issuance continues to be appropriate, as the actual term is just over 10 years.[14] Our analysis in this report has shown that the ERA's debt yield approach is not capable of providing a reasonable estimate of the cost of debt for a benchmark term of 10 years, and is therefore incapable of satisfying the requirement of the New Rules to achieve the rate of return objective for the benchmark service provider.

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[14] PricewaterhouseCoopers (June, 2013), *Energy Networks Association: Benchmark term of debt assumption.*

Contents

1 Background, scope and overview

1.1 Background

The Energy Networks Association '(ENA') engaged PricewaterhouseCoopers ('PwC' or 'we') to provide advice on the potential implications of the Economic Regulation Authority (ERA) of Western Australia's debt risk premium (DRP) estimation methodology if it were to be adopted by the Australian Energy Regulator (ERA).

In a number of its recent decisions (the Powerlink, Aurora Energy, ElectraNet, and Victorian gas distribution businesses) the AER accepted the Bloomberg extrapolation methodology that was proposed by Powerlink (and recommended by PwC). However, the Australian Competition Tribunal (ACT) decided the ATCO Gas Australia Pty Ltd (ATCO) appeal against the ERA's methodology for estimating the DRP, and found in favour of the latter.[15] The ACT's acceptance for the ERA's approach has been referred to in all the latter's more recent decisions.[16] As the AER is undertaking a consultation process to review its methodology to estimate the DRP, the ENA has requested a detailed analysis and assessment of the ERA's methodology.

1.2 Scope

Specifically, our Scope requires us to:

- Estimate the potential impact on the businesses if the AER were to apply a similar DRP estimation methodology to that applied by the ERA in the ATCO case; and

- Analyse and provide an assessment of the DRP estimation methodology that has been adopted by the ERA.

The precise terms of reference can be found in Appendix A.

1.3 Overview

This report is structured as follows:

- In Chapter 2 we describe the ERA's DRP estimation methodology and the outcome of the Tribunal's decision in the ATCO appeal, and summarises subsequent applications of the methodology.

- Chapter 3 reports our critique of the ERA's methodology and the Tribunal's analysis.

- Chapter 4 provides an empirical analysis that estimates the potential impact of the ERA's DRP methodology if it were to be applied in the current market (i.e. for a test averaging period over the 20 business days to 22 April, 2013). This impact is measured relative to the DRP that would be estimated in the current market using alternative approaches such as the Bloomberg extrapolation methodology

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[15] Application by WA Gas Networks Pty Ltd (No 3) [2012] ACompT 12 (8 June 2012).

[16] For example, see Economic Regulation authority (Western Australia), (28 March, 2013), *Inquiry into the Efficient Costs and Tariffs of the Water Corporation, Acquest and Brusselton Water Board, Revised Final Report*, p.174.

recently applied in the AER's decisions, and the econometric cross-check approach that has been applied by PwC in a number of recent reports.

2 The ERA's DRP estimation methodology

2.1 Introduction

In this chapter we first outline the methodology that was applied by the ERA to estimate a debt risk premium for WA Gas Networks Pty Ltd (ATCO), then critique the approach. Next, we consider the ACT's decision in the ATCO appeal, and provide a critique of the ACT's decision based on economic principles and reference to previous decisions made by the Tribunal. Lastly, we discuss the ERA's subsequent applications of its bond yield methodology.

2.2 The ERA's methodology

2.2.1 The ERA's 'bond yield approach'

On 28 February, 2011, in its Final Decision on WA Gas Networks Pty Ltd, the ERA applied its 'bond yield approach' to estimate a debt risk premium.[17] That approach had been developed in an earlier Discussion Paper, which had been issued on 1 December 2010.[18] At a general level this approach relies on bond yields observed for Australian bond issues with more than 2 years remaining to maturity and calculates a weighted average debt risk premium, where the weights are issue size and term to maturity.

The ERA's Discussion Paper raised a concern that the Bloomberg 7 year BBB fair value curve was no longer representative of observed Australian bond yields. The ERA presented two charts, one for a period before (10 November 2005 to 9 October 2007), and a period after (19 August 2009 to 31 October 2010), the worst of the global financial crisis. The ERA considered that the first chart showed that prior to the global financial crisis the Bloomberg 10 year BBB fair value curve was representative of Australian bond yields, while in the second period the Bloomberg 7 year BBB fair value curve was 'substantially different from the observed yields in the Australian bond market.' On grounds that the ERA could not 'understand and verify this difference', it concluded that the use of 'Bloomberg is problematic because it could add significant inaccuracy in and inconsistency across regulatory decisions.'[19]

The ERA was concerned that in the Australian capital market at that time (December 2010), most bonds had a remaining term to maturity well below 10 years. As a result, it identified a trade-off between:[20]

- Consistency between the debt risk premium and other WACC parameters, such as the nominal risk free rate and expected inflation, in terms of a 10-year term; and

- How well the estimates of the debt risk premium are commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services ('market relevance').

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[17] Economic Regulation Authority (Western Australia) (28 February, 2011), *Final decision on WA Gas Networks Pty Ltd proposed revised access arrangement for the Mid-West and South-West Gas Distribution Systems*, pp. 75-92.

[18] Economic Regulation Authority (Western Australia) (1 December, 2010), *Measuring the Debt Risk Premium: A Bond-Yield Approach*.

[19] Economic Regulation Authority (Western Australia) (1 December, 2010), pp. 4 and 7.

[20] Economic Regulation Authority (Western Australia) (1 December, 2010), p. 8.

The ERA considered that greater weight should be placed on market relevance rather than on consistency with other WACC parameters. In other words, the ERA considered it is more important to have a large sample of bonds over a range of maturities than to only take account of a small number of bonds with a maturity close to 10 years.

The ERA established a set of criteria by which it chose bonds for its bond yield approach:

• Credit rating of BBB-/BBB/BBB+ by Standard and Poor's;

• Time to maturity of 2 years or longer;

• Bonds issued in Australia by Australian entities and denominated in Australian dollars;

• Inclusion of both fixed bonds and floating bonds; and

• Inclusion of both Bullet and Callable/Puttable redemptions.

The ERA's approach can be summarised in the following steps:

• Step 1: Using these criteria, the ERA identified a sample of 17 bonds in the Bloomberg service that satisfied its selection criteria.

• Step 2: The ERA then calculated a table of 16 debt risk premiums based on four alternative scenarios, the simple average, median and two weighting approaches (i.e. by term to maturity and amount issued). The first scenario included all bonds (17 bonds), with the other scenarios defined by dropping BBB- bonds (scenario 2, 13 bonds), dropping bonds with terms less 5 years (scenario 3, 8 bonds), and limiting bonds to BBB+ and BBB with more than 5 years to maturity (scenario 4, 6 bonds).

• Step 3: Next, the ERA calculated the simple averages of all four scenarios for each of its 'weighted average methods', which ranged from 302 basis points to 318 basis points, and chose the highest (318 basis points based on the term to maturity weighted average).

The ERA applied a debt risk premium of 318 basis points when determining the WACC for its final decision. The ERA's decision on the debt risk premium was then appealed to the Australian Competition Tribunal.

2.2.2 *ATCO's appeal to the Australian Competition Tribunal*

ATCO claimed that a debt risk premium of 410 basis points was more appropriate to apply, as it was based on 'actual evidence of the cost of debt which would have been charged by a major financier if ATCO were to manage its debt facilities on the basis of the regulatory assumption that its debt/equity ratio was 60/40,' and that 'the ERA was in error because it did not have any regard at all to this "relevant and powerful" evidence'.[21].

In assessing whether the ERA had erred, the Tribunal considered that it 'was presented with three potential techniques to estimate the DRP.

• First, the DRP could be estimated through the Bloomberg FVC, about which there appears to be increasing doubt as to its reliability, especially in using it to estimate the DRP.

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[21] Application of WA Gas Networks Pty Ltd (No 3) [2012] ACompT 12 (8 June 2012), paras 156-157.

- Second, the ERA's new bond yield approach which is market based and transparent as to its composition and estimation.

- The third choice is ATCO's "direct market evidence" approach based on its enquiries of "an experienced capital markets adviser" as to what would be charged to a provider of the relevant reference services for debt finance with no instruction having been given as to term to maturity or credit rating.'[22]

With respect to the third choice the Tribunal noted that ATCO had itself conceded that its 'pragmatic approach' was:

- Not unbiased;

- Not stable;

- Had not estimated the cost of debt based on a large sample of firms; and

- Was not transparent.

The Tribunal's emphasis on these absent characteristics of ATCO's approach is instructive. The Tribunal's focus on a 'large sample' of debt cost observations is apparent in a number of places in the decision. At paragraph 166, the Tribunal stated that even if 'a commitment to finance had been obtained, it would have provided a single estimate of one debt-financing transaction.' Clearly, the Tribunal cannot accept evidence with respect to one debt-financing transaction if it seeks to establish a benchmark cost of debt for a benchmark credit rating.

The Tribunal then concluded that it found 'no error in the ERA's decision to depart from the Bloomberg FVC as a basis for estimating the DRP', as the ERA had 'proceeded with an inquiry that sought to establish a more reliable estimate of the DRP than could be derived from the Bloomberg FVC,' it had issued a discussion paper and had taken account of all submitted views.

The Tribunal thought that the scenarios developed by the ERA were 'valid', but that the ERA had fallen into error in the way it had applied its analysis. The Tribunal was critical of the ERA's application of its initial weighted average method, noting that by taking a simple average of four scenarios with different sets of bonds in each, gave a double, triple and quadruple weighting to some of the bonds. The Tribunal also suggested that the ERA should consider applying a joint weighting system, which 'might have been more reflective of all the relevant conditions including risk in the market for debt.'[23]

2.2.3 ATCO – the ERA's revised bond yield approach

In response to the Tribunal's decision, the ERA revised its bond yield approach by focusing on its full sample, i.e. dropping its scenario approach, and deriving a combined weighted debt risk premium based on term to maturity and the size of the bond issue.[24] As displayed in Table 2.1 below, the ERA's revised decision determined an estimated debt risk premium of 289.3 basis points.

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[22] Application of WA Gas Networks Pty Ltd (No 3) [2012] ACompT 12 (8 June 2012), paras 161-162.

[23] Para 176

[24] Economic Regulation Authority (Western Australia) (25 June, 2012), *Revised decision pursuant to rule 64(4) of the National Gas Rules giving effect to the Economic Regulation Authority's proposed access arrangement revisions for the Mid-West and South-West Gas Distribution System, Revised by reason of and pursuant to orders of the Australian Competition Tribunal made on 8 June 2012.*

Table 2.1 Debt Risk Premiums using the ERA's combined weighting system (20 business days to 20 December, 2010)

	Amount $m	Issuance weight	Years to maturity	Maturity weight	Multiplicative Rule	Combined weight	Bond's own DRP	Contributed DRP
APT Pipelines Limited	300	0.126	9.589	0.143	0.018	0.228	285.3	65.1
Bank of Queensland Limited	140	0.059	7.456	0.111	0.007	0.083	277.1	22.9
Dexus Finance Pty Ltd	180	0.076	6.336	0.094	0.007	0.090	299.7	27.1
New Terminal Financing	100	0.042	5.75	0.086	0.004	0.046	364.9	16.6
Mirvac Group Finance Limited	200	0.084	5.739	0.086	0.007	0.091	294.9	26.8
BBI DBCT Finance Pty	150	0.063	5.469	0.081	0.005	0.065	486.7	31.7
Santos Finance Limited	100	0.042	4.758	0.071	0.003	0.038	159.5	6.0
Sydney Airport Finance	175	0.074	4.544	0.068	0.005	0.063	306.4	19.3
Mirvac Group Funding Limited	150	0.063	4.236	0.063	0.004	0.050	283.6	14.3
Wesfarmers Limited	400	0.168	3.725	0.056	0.009	0.118	172.5	20.4
Wesfarmers Limited	100	0.042	3.725	0.056	0.002	0.030	193.6	5.7
Leighton Finance Pty Ltd	280	0.118	3.606	0.054	0.006	0.080	364.7	29.2
Snowy Hydro Limited	104	0.044	2.181	0.032	0.001	0.018	227.1	4.1
Totals	2,379	1.000	67.114	1.000	0.079	1.000		**289.3**

Source: Adapted from ERA (25 June, 2012), p8, with bonds arranged by term to maturity.

The ERA derived a debt risk premium of 289.3 basis points applying the following methodology:

- 'First, the product of term to maturity and the issuance, to be called 'the contribution, is calculated for each bond in the sample.

- Second, the sum of these all [sic] contributions is derived, to be called "the total".

- Third, the weight assigned to each bond is simply the ratio between its own contribution and the sample's total, to be called "the combined weight".

- Fourth, the combined weight for each bond is multiplied by its associated debt risk premium to derive the debt risk premium for each bond, to be called "the bond's debt risk premium", contributed to the sample.'

- Fifth, the sum of the bonds' debt risk premiums is the estimate of the debt risk premium for the sample when two characteristics of bonds are considered: (1) the term to maturity; and (ii) the issuance.

The final column of Table 2.1 shows the relative contributions of each of the sample bonds to the combined total of 289.3 basis points. This indicates that with a contributed DRP of 65.1 basis points, the APT Pipelines Limited bond (APA) had 2 to 16 times the contribution of other bonds to the total debt risk premium. Other bonds that had a relatively high average weighting included the BBI DBCT Finance Pty bond (DBCT) with a 31.7 basis point contribution, and Leighton Finance Pty Ltd with a 29.2 basis point contribution.

2.2.4 Subsequent applications of the ERA's bond yield approach

Since its WA Gas Networks decision the ERA has made a number of decisions about the debt risk premiums of regulated infrastructure assets in Western Australia. The outcomes of these decisions for the benchmark credit rating and debt risk premium are shown in Table 2.2 below, and can be summarised as follows:

- *WA Gas Networks (ATCO)* – As discussed above, this decision was the first to apply the 'bond yield approach' as an estimate of the 10 year debt risk premium for a benchmark BBB+ credit rating. The DRP estimate was 289.3 basis points.

- *Dampier to Bunbury Natural Gas Pipeline* – This decision was made less than a month after the ATCO decision, and departed from it by specifically targeting a 5 year debt risk premium.[25] It did so using the same methodology as was applied in targeting a 10 year debt risk premium in the ATCO case. However, the ERA continued to apply a BBB+ credit rating, which resulted in a slightly higher debt risk premium estimate of 312.4 basis points.

- *Western Power Network* – In this case the ERA made an additional point of departure from the principles it had applied in the ATCO case by adopting a target credit rating of A- for the Western Power Network. This was in marked contrast to the AER's adoption of a BBB+ credit rating for all the electricity distribution businesses that it regulates in the eastern states. The ERA's decision was based on an analysis that inappropriately assessed Western Power's benchmark credit rating on the basis of the observed credit ratings of government owned entities such as Country Energy (AA-), Ergon Energy Corporation (AA) and Integral Energy (AA-), as well as private sector businesses such as SP AusNet Group, whose credit rating is positively impacted by a significant shareholding of the Singapore Government.[26] The sample of A- bonds used in the ERA's analysis included a National Australia Bank bond, which was clearly not an appropriate comparator bond. The resulting estimated debt risk premium of 203 basis points was significantly lower than the ERA's previous decisions.

- *Water Corporation* - The ERA's final revised decision on Water Board was made very recently (March, 2013), and applied the same inappropriate analysis of the benchmark credit rating for the business.[27] In contrast to other state regulators, which have applied credit ratings of BBB+ to similar water businesses, the ERA adopted an A- credit rating. The National Australia Bank bond was included again, as were several bonds issued by the Singapore Government backed SP AusNet Group. At 165.6 basis points, the resulting debt risk premium estimate was significantly lower than the ATCO decision.

Table 2.2 – Summary of the ERA's application of its 'bond yield approach'

Regulated entity	Date of decision	Draft / Final	Target term (years)	Benchmark credit rating	Debt Risk Premium (basis points)
WA Gas Networks (ATCO)	28 Feb 2011	Final	10	BBB+	289.3
Dampier to Bunbury Natural Gas Pipeline	14 March, 2011	Draft	5	BBB+	312.4
Western Power Network	29 March, 2012	Draft	5	A-	203.0
Water Corporation	28 March, 2013	Revised Final	5	A-	165.6

Source: ERA

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[25] In departing from targeting a 10 year term, the ERA was influenced by the case for the "NPV=0 Rule' that had been made by Professor Kevin Davis as adviser to IPART, and by Associate Professor Martin Lally in advice provided to the Queensland Competition Authority and the AER.

[26] Economic Regulation Authority (Western Australia) (29 March, 2012), *Draft Decision on Proposed Revisions to the Access Arrangement for the Western Power network, Submitted by Western Power*, p.174.

[27] Economic Regulation Authority (Western Australia) (28 March, 2013), *Inquiry into the Efficient Costs and Tariffs of the Water Corporation, Aqwest and the Brusselton Water Board, Revised Final Report*, p.168.

3 Analysis of the ERA's bond yield methodology

3.1 Introduction

We begin this chapter with a section that provides a general analysis of the ERA's bond yield methodology based on first principles analysis, empirical evidence, and regulatory precedent. In the following section we analyse the ERA's reasons for rejecting the Bloomberg fair value curve, the advantages it has claimed for its own bond yield approach, and the reasons that the Tribunal gave for its decision.

3.2 General analysis of ERA's approach

3.2.1 The ERA's bond yield method under-estimates the debt risk premium

The ERA's methodology fails to estimate a debt risk premium for a corporate bond with a 10 year term to maturity. In practice, as demonstrated in Table 3.1 below, for the 20 business days to 20 December, 2010, the ERA's methodology derives a debt risk premium estimate of 289 basis points, which is close to the simple average of 286 basis points. A statistic of immediate concern is the finding that for the ERA's entire 13 bond sample the simple average term to maturity was only 5.2 years.

The ERA's sample of 13 bonds falls to 9 if the term to maturity cut-off is raised to 4 years, and the bond yield approach derives a median debt risk premium of 305 basis points, which is again close to the simple average. With a 5 year cut-off the highest debt risk premium (of 316 basis points) is obtained using the ERA's bond yield methodology. While the simple average rises to a maximum of 335 basis points with a 5 year cut-off, the median debt risk premium stays within a narrow range of 281 basis points to 297 basis points.

Table 3.1 Simple average of yields vs. ERA's bond yield methodology (20 business days to 20 December, 2010) for alternative samples

Sample constrained to greater than:	2 years (ERA case)	4 years	5 years	6 years	7 years
Number of observations	13	9	6	3	2
Simple average DRP (bps)	286	306	335	287	281
Median DRP (bps)	285	295	297	285	281
Joint weighted average DRP (bps)	289	305	316	287	283
Average term to maturity (years)	5.2	6.0	6.7	7.8	8.5

Source: Adapted from ERA (25 June, 2012), p.8.

The results shown in Table 3.1 above indicate that for the ERA's sample there was no strong relationship between term and debt risk premium, apart from some suggestion of a humped relationship (with a maximum of 297 to 335 basis points with a 5 year cut-off, which implies an average term to maturity of 6.7 years).

At a theoretical level, Merton's 1974 theory of bond pricing proposed a humped relationship between the debt risk premium and term. However, this theory has been

challenged in the literature due to a perceived inability to explain empirical findings. As noted by Covitz and Downing (2007):[28]

> '...direct tests of Merton-style models find that the models seriously under predict the level of long-term bond spreads.'

In academic circles this tendency for Merton-style models to under-predict yield spreads has been called the 'credit puzzle'. In fixed interest markets, practitioners have observed that corporate bond spreads have almost always been upward sloping, and this has certainly been the case for the vast majority of debt risk premium functions derived from Bloomberg fair value yield curves.

In 1999 Helwege and Turner found that it is generally only the most credit worthy firms in a credit rating band issue long dated bonds, which can give the impression of a 'humped' relationship, but when paired bonds were tested (holding constant their credit worthiness) they found that the relationship is overwhelmingly upward sloping.[29] As Litterman and Iben, members of the Fixed Income Research Department at Goldman Sachs, noted in their 1991 paper:[30]

> '...we find that the term structure of corporate spreads is generally upward-sloping, indicating a market perception of higher probabilities of default in the more distant future.'

Although it is widely accepted that the debt risk premium will rise with term to maturity, there is a question about whether the relationship is linear, or a concave function (i.e. where the premium increases with term but at a decreasing rate). Empirical research has provided evidence of both linear and non-linear relationships.

By estimating essentially the same debt risk premium that would be obtained with a simple average approach, for the sample and averaging period chosen, the ERA's more complex combined weighted average approach is equivalent to estimating the debt risk premium for a 5.2 year term using a simple average approach. Numerous cross-sectional analyses undertaken by commercial fair value curve providers such as Bloomberg and CBA Spectrum (while it operated) have found a rise in the debt risk premium between 5 years and longer terms.

Over the past year and a half, in a number of studies that we have undertaken, we found that based on an analysis of 'paired bonds', the average annual rise in the debt risk premium between approximately 7 and 10 years has been in the order of 7 to 8 basis points. This implies that the 289 basis points estimated by the ERA significantly under-estimated the debt risk premium for a 10 year BBB+ rated bond in December 2010.

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[28] Dan Covitz and Chris Downing (October, 2007), 'Liquidity or Credit Risk? The Determinants of Very Short-Term Corporate Yield Spreads', *Journal of Finance*, Vol. 62, No. 5, pp. 2303-2328.

[29] Helwege, J. and C.M. Turner, (1999), 'The slope of the credit yield curve for speculative grade issuers, *Journal of Finance*, Vol. 54, pp.1869-1884.

[30] Robert Litterman and Thomas Iben (Spring, 1991), 'Corporate bond valuation and the term structure of credit spreads,' *Corporate Journal of Portfolio Management*, p.54.

3.2.2   The ERA's weighting system

The ERA's weighting system, which constitutes one of the core principles of the bond yield approach, is not appropriate:

- First, we note that the ERA's weighting according to term to maturity does not provide a valid estimate of the 10 year BBB+ debt risk premium. The fact that a large proportion of the ERA's bond observations were bunched between 2 and 5 years will, through weight of numbers, result in an under-estimated 10 year debt risk premium. Table 3.2 below shows that even in a hypothetical case where there is a strong perfectly linear relationship between term and debt risk premium, which indicates a debt risk premium of 400 basis points for a 10 year term to maturity. Faced with this data set the ERA's methodology would predict a debt risk premium of 311 basis points (i.e. an under-estimate of 89 basis points). In this example the average years to maturity of the sample is 4.8, and the simple average debt risk premium for the sample is 269.2 basis points. The simple average and the ERA's bond yield methodology would converge if the issuance size were to be weighted toward the bonds with shorter terms, and the years to maturity were less weighted toward 2 years. This reflects the general characteristics of the ERA's sample, for which the simple average and the combined weighted average debt risk premium are found to be approximately equal. The other point to note is that the actual DRP at 5 years is 275 basis points. Under more recent applications, the ERA's approach is put forward as an estimate of the 5 year debt risk premium. In this context the ERA's predicted value of 311.2 basis points is an over-estimate of the 5 year debt risk premium notwithstanding that in this example the average term of bonds in the sample is 4.8 years.

Table 3.2 Simulation of ERA's bond yield methodology with a hypothetical debt risk premium that is perfectly linearly related to term

Hypothetical bond	Amount $	Issuance weight	Years to maturity	Maturity weight	Multiplicative Rule	Combined weight	Bond's own DRP	Contributed DRP
A	100	0.077	10	0.161	0.012	0.161	400	64.5
B	100	0.077	9	0.145	0.011	0.145	375	54.4
C	100	0.077	8	0.129	0.010	0.129	350	45.2
D	100	0.077	7	0.113	0.009	0.113	325	36.7
E	100	0.077	6	0.097	0.007	0.097	300	29.0
F	100	0.077	5	0.081	0.006	0.081	275	22.2
G	100	0.077	4	0.065	0.005	0.065	250	16.1
H	100	0.077	3	0.048	0.004	0.048	225	10.9
I	100	0.077	2	0.032	0.002	0.032	200	6.5
J	100	0.077	2	0.032	0.002	0.032	200	6.5
K	100	0.077	2	0.032	0.002	0.032	200	6.5
L	100	0.077	2	0.032	0.002	0.032	200	6.5
M	100	0.077	2	0.032	0.002	0.032	200	6.5
Total	1,300	1.000	62	1.000	0.077	1.000		311.3
Average			4.8				269.2	

Source: PwC based on the approach developed by the ERA (25 June, 2012), p8

- Secondly, the ERA has produced no evidence to justify its implicit assumption that the size of issuance is linearly related to liquidity in a bond, and hence to the reliability of the yield observations. Whilst it is likely that a bond with relatively small issuance will have less market activity, it is also quite possible that bonds above a certain threshold size will have similar levels of market liquidity, while bonds below a certain threshold size will be likely to have no liquidity whatever. This analysis is missing from the ERA's methodology.

- Thirdly, it relies on secondary market data, which excludes the primary market issuance premium, anecdotally 5-10 bps, and therefore understates the debt risk premium payable by the DNSP.

3.2.3 The ERA has not maximised bond data availability

In its decision on the ATCO appeal, the Tribunal considered that while a sample size of 13, which the ERA obtained using a 2 year cut-off date, is appropriate, a sample size of 6 (which would have been obtained if the ERA had restricted the sample to 5 years and longer) is too small. In previous appeal decisions the Tribunal has emphasised the need to increase the sample size by:

- Having regard to a wider group of bonds that includes credit ratings on either side of the BBB+ credit rating band (i.e. A- as well as BBB rated bonds); and

- Having regard to floating rate notes, which are mainly priced by UBS.

By including in its sample only BBB rated bonds from the Bloomberg service, the ERA reduced its sample size significantly. As there is a significant number of A- rated bonds, inclusion of bonds contained in the UBS service (which includes many more floating rate notes) would significantly increase the sample size and provide more observations of bonds with terms exceeding 5 years.

3.3 Specific analysis of the ERA's approach

3.3.1 The alleged inaccuracy of the Bloomberg fair value curve

In its final decision on WA Gas Networks Pty Ltd (ATCO), the ERA expressed an opinion that during 2010 the Bloomberg fair value curve was 'substantially different from the observed bond yields in the Australian market,' and that it was 'unable to understand and verify this difference.'[31] Using Bloomberg data, the ERA's approach was to observe the fair value yields of a number of bonds over a period of time and compare how they tracked relative to the Bloomberg 10 year and 7 year fair value curves. The ERA found that for the period from November 2005 until September 2007 the Bloomberg 10 year fair value curve tracked the fair value yields of the group of comparator bonds relatively closely. However, during the period from August 2009 to December 2010 the Bloomberg 7 year BBB fair value curve was found to be consistently positioned at the top of the spread of bond yields, which in the opinion of the ERA illustrated the increasing inaccuracy of Bloomberg.

The ERA did not formally demonstrate the alleged inaccuracy of Bloomberg during the period from August 2009 to December 2010. During this period, only a few of the 15 bond yields tracked by the ERA had a remaining term to maturity greater than 7 years. Many of the bonds had remaining terms to maturity of 3, 4 and 5 years, and would therefore be expected to lie below the 7 year Bloomberg fair value curve. The fact that the yield differentials between short and long term bonds was widening during this period gave an impression that the 7 year Bloomberg fair value curve was becoming more inaccurate. However, the widening differential could have been due to the fact that the rise for term in the bond market was increasing during this period, and was now much greater than the rise for term that had been observed in the period prior to the global financial crisis.

In November 2009 PwC assessed the accuracy of Bloomberg's fair value curves, and devised a three part test methodology. It was found that while Bloomberg's fair value curves were not accurately reflective of the underlying bond yield data in the period of the global financial crisis prior to the end of 2009, by that time Bloomberg had become reliable. The ERA did not perform any similar tests, but rather asserted that Bloomberg

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[31] Economic Regulation Authority (Western Australia) (28 February, 2011), pp. 72-73.

had become inaccurate based on observing bond yields for bonds with terms to maturity that were almost all shorter than the 7 year Bloomberg fair value curve.

3.3.2 The trade-off between consistency and market relevance

In its Discussion Paper the ERA stated that there were two reasons why the market relevance of the estimates should carry more weight than the argument for consistency with other WACC parameters.

- First, attempting to maintain consistency would reduce the level of market relevance, which would be likely to be further compromised in future.

- Secondly, moving away from a 10 year term provides a larger sample, and 'any measure that relies on a small sample of data points will be less reliable than one based on a larger sample.'[32]

The first point is considered separately in the next section below. With respect to the second point, we note that reliance on more data will not always improve the accuracy of an estimate, as the relevance of the data, and the methodology that is applied to examine the data are also important.

As discussed in detail in our recent report, *SPAusNet, Multinet Gas, Envestra and APA Group: Estimating the benchmark debt risk premium,,* it is almost universally understood by finance academics and market practitioners that other things being equal, bonds with a longer term to maturity will command a higher debt risk premium.[33] In other words, the functional form of the debt risk premium with respect to term will be concave to the origin. Hence, the application of a simple average methodology, or a weighted average methodology (where great weight is applied to bonds with greater term) to a sample of bonds with an average term that is significantly less than 10 years will under-estimate the debt risk premium of a benchmark 10 year term bond. We have also noted that due to its weighting system providing greater weight to bonds with longer terms to maturity, the ERA's approach is liable to over-estimate the 5 year debt risk premium.

Having said the above, we agree that more *relevant* data is better than less data, which the ERA could have obtained had it included UBS data. If a more sophisticated econometric analysis were applied, where an appropriate functional form is accommodated, it is appropriate to maximise the data that is relevant. This is what we did in a number of our recent reports estimating the debt risk premium. As has been the practice of the AER, where both UBS and Bloomberg provided a yield we averaged the values. In contrast the ERA's approach was to ignore UBS data that would have provided more long term bond observations, and instead apply a weighted averaging methodology that understates the debt risk premium for a bond with a 10 year term to maturity, and overstates the debt risk premium for a 5 year bond. This means that the debt risk premium estimates obtained under the ERA's methodology are inconsistent with both the other WACC parameters, and the market.

3.3.3 The ERA's five reasons for departing from applying the Bloomberg fair value curve

The ERA gave five reasons for departing from applying the Bloomberg fair value curve. These reasons are all empirical rather than theoretical. However, each of the empirical reasons given by the ERA can be shown to be either wrong or outdated.

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[32] Economic Regulation Authority (Western Australia) (1 December, 2010), p.9.

[33] PricewaterhouseCoopers (March, 2012), pp.25-26.

ERA's first reason: There is a significant deviation between Bloomberg's estimate of the 7-year BBB fair yield curve and observed yields from Australian corporate bonds traded in the financial market.

PwC response: PwC's recent empirical analysis, which was undertaken for Powerlink, ElectraNet and the Victorian gas distribution businesses, we used a wide sample of bonds and found that the extrapolated 7 year BBB Bloomberg curve provided an estimate of the 10 year DRP that was close to that obtained from a separate econometric analysis.[34] In other words, over the past 18 months we have found that the Bloomberg extrapolation has provided estimates that were close to observed yields from Australian corporate bonds traded in the financial market. The AER has also recently applied the Bloomberg extrapolation methodology in its decisions.

ERA's second reason: Since Bloomberg discontinued publishing the 7 and 10 year AAA fair value yield curves in June 2010, the use of that historical increment in the debt risk premium for extrapolation will become increasingly outdated over time.

PwC response: The ERA's position assumes that no other appropriate extrapolation methodology can be derived. In PwC's recent reports on the debt risk premium we applied an extrapolation methodology that is based on the average annual increment observed for matched pairs of bonds. This approach was accepted by the AER in its final decision on Powerlink, and has been used in its subsequent decisions.

ERA's third reason: The ERA considered that since Bloomberg had already shortened its estimate of the fair value curve to 7 years, 'it is likely that Bloomberg will again shorten its estimates of fair yield curves in the future.' Furthermore, 'using the 7-year BBB fair value yield curve in deriving the debt risk premium is problematic because this approach is subject to uncertain data being available from Bloomberg.'[35]

PwC response: The ERA's 2010 forecast that Bloomberg would be likely to shorten its fair value curve estimate below 7 years has not proven to be correct.

ERA's fourth reason: The ERA was concerned that the method used by Bloomberg to derive its fair value curves is not revealed, and therefore cannot be replicated.

PwC response: We agree that it is not ideal that the full details of Bloomberg's methodology are not revealed, and that as a consequence there is a lack of transparency. However, the use of proprietary models to derive fair value curves is standard commercial practice, and was also a problem with respect to CBA Spectrum's fair value curve service while it operated. As noted by the Tribunal, the Bloomberg service is used in the market despite its lack of transparency and has been accepted by a number of regulators. Furthermore, it is possible to subject the Bloomberg FVC to cross-checking by empirically estimating a fair value curve based on all available data. In the past regulators have responded to the lack of transparency by testing the fair value curve estimates against the available data. PwC undertook this exercise as part of its recent report for the businesses. Our analysis showed that the extrapolated 7 year Bloomberg BBB fair value curve currently provides a relatively close estimate of the 10 year debt risk premium that is estimated by applying econometric analysis to the available bond data.

ERA's fifth reason: The ERA noted that CBA Spectrum had, at the time of writing, recently ceased publishing its estimates of the yield curves for Australian corporate bonds across all credit ratings.

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[34] For example, see PricewaterhouseCoopers (March 2012), *SPAusNet, Multinet Gas, Envestra and APA Group: Estimating the benchmark debt risk premium.*

[35] ERA (28 February, 2011), p.77.

PwC response: The fact that CBA Spectrum ceased publishing its fair value curve was a reflection of the disruptions in the bond markets caused by the global financial crisis. It is not relevant to an assessment of whether extrapolation of the 7 year Bloomberg BBB fair value curve in the current market will provide an appropriate estimate of the 10 year BBB+ debt risk premium. As discussed above, that question has recently been addressed in PwC's earlier report to the businesses, and the analysis concluding that the extrapolated Bloomberg fair value curve does provide a reasonable estimate based on the underlying data.

In conclusion, we consider that the ERA's five reasons are not reasons for departing from a 10 year term, but reasons for departing from reliance on the Bloomberg fair value curve. The ERA's five reasons do not provide any compelling evidence for departing from Bloomberg at the time they were first proposed (February, 2011), and still less evidence that Bloomberg cannot be relied upon in the current market.

In making its criticisms of Bloomberg, the ERA has not made reference to the fact that despite its lack of transparency the Bloomberg service is widely used in the market, a point that has been noted by the Tribunal. Bloomberg has at times been less reflective of the market, as we observed in a previous report that examined the 2008-09 period at the height of the global financial crisis. During that period Bloomberg significantly under-estimated bond yield observations in the market, but by November 2009 we found that Bloomberg's fair value curve was providing a fair reflection of the underlying data.

3.3.4 Analysis of advantages claimed for the ERA's approach

In this section we provide an analysis of the advantages of the 'bond yield' approach, which have been claimed by the ERA.

ERA's first claimed advantage: The setting of criteria to select a sample of Australian corporate bonds from an independent financial services provider (Bloomberg) is an unbiased approach.

PwC response: An approach that sources bond yields from only one financial services provider (Bloomberg) will reduce efficiency if more data are available from sources such as UBS. In our study for the Victorian gas distribution businesses we observed that for the full sample of available bonds over the entire study period:[36]

– UBS accounted for 44 per cent of the fixed coupon bond yield day observations and 74 per cent of the trading margin day observations for floating rate bonds;[37]

– Bloomberg accounted for 34 per cent of the fixed coupon bond yield day observations, and did not provide trading margins for floating rate bonds; and

– AFMA had the lowest proportion of the fixed coupon bond yield day observations (22 per cent), and only 26 per cent of the trading margin day observations for floating rate bonds.

Hence, by excluding reference to UBS data, the ERA was restricting its sample size, particularly its sample of floating rate bonds, and as a result would provide a less comprehensive view of the yields of Australian bonds.

ERA's second claimed advantage: The ERA claimed that its methodology would be stable, as it would generally have a sufficient number of Australian bonds trading in the Australian market.

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[36] PricewaterhouseCoopers (March, 2012), p.vi.

[37] That is, UBS accounted for 44 per cent of the total of bond yield day observations for all the bond yield days of observations from the three data sources. That is, for some bonds we found bond yield days of observations for all three data providers, for some bonds there were only two providers with observations for particular days, while for some bonds only one provider reported yields for particular days.

PwC response: With respect to this advantage the ERA implicitly defines 'stability' as the existence of a reasonably large sample of bonds. However, no weight appears to have been placed on the countervailing requirement for market relevance. In an extreme case, if a large number of bonds of 2 years' duration were available, but none exceeding 2 years, this would not provide a valid estimate of the market for debt with 10 year term to maturity. That is, the 'stability' of a methodology that produces inappropriate estimates of the cost of 10 year term debt provides no advantage.

ERA's third claimed advantage: According to the ERA, deriving an average debt risk premium based on a sample of bonds with the same credit rating is to be preferred (i.e. more reliable and practical) over an extrapolation to derive a 10 year estimate that is increasingly dependent on bonds with maturities shorter than 10 years.

PwC response: The problem with this claimed advantage is that if the average term of the available sample of bonds shortens, by deriving the average of all the available bonds, it is not possible to claim that the result is a reflection of a 10 year benchmark debt risk premium.

ERA's fourth claimed advantage: The ERA considered that regulatory decisions should be replicable and transparent. Since the Bloomberg bond data used in making decisions would be kept, stakeholders could always replicate the estimates as long as they have access to the Bloomberg data.

PwC response: Whilst regulatory transparency and the open provision of replicable data are laudable characteristics of a regulatory process, they lose force when the methodology that is being applied by the regulator generates material error. If the regulator suspects that the fair value curve being published by Bloomberg is not providing appropriate estimates, it should engage expert advice to examine Bloomberg's estimate.

3.3.5   The ERA's retrospective analysis

As part of its Final Decision the ERA carried out a 'retrospective analysis (or a backdated test)' of the bond yield approach that it was applying to WA Gas Networks Pty Ltd.[38] This test used the period from 29 March 2007 to 13 September 2007, during which time Bloomberg was publishing its 10 year fair value curve. This enabled the ERA to calculate the difference between the debt risk premium derived using its bond yield approach, and the Bloomberg fair value curve yield for 10 year BBB bonds. For all 14 bonds in the sample, the ERA's bond yield approach under-estimated the Bloomberg fair value curve by 34 basis points, and for a sub-sample of 11 bonds (excluding the three floating rate bonds), the difference was only 13 basis points.

The ERA claimed that its backdated test provided 'further evidence on the robustness of the bond yield approach,' and concluded that therefore 'the Authority is of the view that the bond yield approach should be used to estimate the debt risk premium for regulated businesses.'[39] However, on closer examination it becomes apparent that the ERA's backdated test is not appropriate. During the halcyon days that preceded the global financial crisis, a debt risk premium differential of 13 to 34 basis points was considered quite large and unacceptable.

As discussed above, a major failing of the ERA's bond yield methodology is its inability to estimate the 10 year debt risk premium unless the average term of the sample of bonds is 10 years.[40] When the average term of the sample is less than 10 years, the ERA's bond yield

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[38] Economic Regulation Authority (Western Australia) (28 February, 2011), pp.89-91.

[39] Economic Regulation Authority (Western Australia) (28 February, 2011), p.91.

[40] Even if the average term were 10 years, the resulting simple (AER) or complex (ERA) weighted average of the debt risk premiums would not necessarily produce the best estimate of the 10 year debt risk premium.

methodology will under-estimate the 10 year debt risk premium, and the extent of this under-estimate will be dependent on the rise in the debt risk premium with term.

The period during 2005-2007 for which the ERA conducted its backdated test was prior to the global financial crisis, when capital markets were experiencing a time of unusually low volatility, and market confidence was high. As a result, the increment in the debt risk premium for term was relatively small. Since that time the increment in the debt risk premium for term has been much higher, and the degree of understatement could be expected to be significantly higher in the current market.

3.4   Analysis of the Tribunal's decision in the ATCO case

We make three main observations about the Tribunal's decision in the ATCO appeal:

- *The data* - The Tribunal noted that a 'sample size of six is too small' (scenario 4),[41] while a 'sample of 13 is still a respectable number, given the relative paucity of bond-issuing firms in Australia'.[42] However, the Tribunal took a much narrower perspective of data availability compared with previous decisions in which it had suggested that the AER should widen its sample to include UBS data, floating rate bond data, and data for credit rating bands surrounding the credit rating band in question.

- *The out of sample test* - In considering the case the Tribunal commended the ERA's use of an out of sample test, without considering, as we have, how that test could lead to inappropriate conclusions given the significant differences in the Australian bond market pre- and post the global financial crisis. More particularly, the Tribunal did not focus on the fact that the degree of under-estimation of the 10 year debt risk premium using the ERA's bond yield methodology would be much greater in the period after the global financial crisis, since the term spreads have now widened significantly relative to their pre-global financial crisis levels.

- *The weighting system* - While the Tribunal questioned the weighting system applied by the ERA, it did not go far enough. There are additional issues with the ERA's dual weighting approach that were not picked up or commented upon by the Tribunal. In particular, the Tribunal did not consider that the ERA did not substantiate its assumption of a linear relationship between bond issue size and reliability of yield estimate, and that it effectively produces an estimate of the debt risk premium for a bond with a term to maturity that is greater than 5 years but less than 10 years.

3.5   Conclusion

The ERA has produced a methodology that is:

- Based on narrowly defined data set that excluded A- rated bonds in its ATCO decision, and ignored the significant contribution of UBS data (particularly for floating rate bonds that may be converted to yields that are equivalent to fixed rate bonds);

- On the basis of an artificially narrowly defined data base, the ERA has applied an inappropriate and unsubstantiated combined weighting system, which effectively

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[41] Para 170

[42] Para 169

calculates a debt risk premium that is very close to the simple average for an average term of 5.2 years; and

- Presents the resulting debt risk premium number as being likely to be a close estimate of the likely value of the then current 10 year BBB+ debt risk premium on grounds that it had provided a relatively close estimate in the period before the global financial crisis.

These observations relate to the manner in which the AER's approach was originally applied in the ATCO decision, which still targeted a 10 year benchmark term of debt issuance. As discussed in the previous chapter, the ERA's subsequent applications of its 'bond yield' methodology compounded the errors by adopting a 5 year term of debt assumption, and an inappropriate (A-) benchmark credit rating assumption.

4 Empirical DRP estimates using the ERA's approach

4.1 Introduction

In this chapter we undertake an empirical investigation of the ERA's bond yield methodology, and estimate its likely impact if it were to be adopted and applied by the AER. We do this in the following steps:

- First, by recreating the ERA's approach (as amended through the Tribunal's ATCO decision) for the 20 business days to 20 December, 2010 ('the ERA's averaging period');

- Secondly, comparing the results for the ERA's averaging period with an estimate of the debt risk premium for the 20 business days to 22 April, 2013 ('the current averaging period') using the ERA's methodology (including sample selection and database);

- Thirdly, by estimating the debt risk premium for the current averaging period using the extrapolated Bloomberg methodology that was applied by the AER in a number of recent decisions;

- Fourthly, by assessing the impact of applying the ERA's debt risk premium estimation methodology together with the adoption of an inappropriate benchmark credit rating assumption (i.e. A- instead of BBB+); and

- Fifthly, investigating for the current averaging period how closely the debt risk premium estimates obtained using the ERA and recent AER methodologies correspond to other potential alternative methodologies, such as:

    - The econometric estimation approach that we have applied in several of our recent reports; and

    - Other potential scenarios that could be applied by the AER, including the addition of A- bonds (when estimating the BBB+ debt risk premium), using different cut-off periods, a combination of the ERA's combined weighted average approach and the AER's sample and the methodology that was applied in the AER's decisions for Powerlink, Aurora Energy, ElectraNet and the Victorian gas distribution businesses.

4.2 Strict application of the ERA's approach

Original case – Re-creating the ERA's original estimate

Our first task was to re-estimate the 289.3 basis points that the ERA estimated using its own approach for the averaging period including the 20 business days to 20 December, 2010. The results are shown in Table 4.1 below. We experienced some difficulty in re-creating the ERA's approach, since for 10 of the 13 bonds in the sample we found a perfect match to the Bloomberg BGN yields contained in the Bloomberg service, but for three bonds (APA, Dexus and Wesfarmers) we could not find any BGN yields reported by Bloomberg.

After further investigation, we discovered the following in relation to the three remaining bonds:

- APA and Dexus – the yields for these two bonds were Bloomberg BVAL yields rather than Bloomberg BGN yields

- Wesfarmers – we were not able to obtain historical Bloomberg yields for this bond. [43] For the purposes of recreating ERA's approach for the 20 business days to 20 December 2010, we have used the yield reported by the ERA.

We note that the debt risk premiums the ERA calculated were not annualised yields. The bond yields the ERA used were semi-annual, rather than annual yields. The impact of this is an under-statement of the estimated annual debt risk premium. We have corrected this error in our replication.

Based on the 12 bonds that we could find data for, and the Wesfarmers bond yield reported by the ERA, the debt risk premium was 306 basis points.

Table 4.1 Debt risk premium - Re-estimation of the ERA's approach for the ERA's averaging period (20 business days to 20 December, 2010)

Security	Term to maturity	DRP	Weighted DRP
APA Group	9.63	3.03	69
Bank of Queensland Ltd	7.49	294	24
Dexus Finance	6.37	317	29
Leighton Finance	3.64	384	31
Sydney Airport Finance	4.58	324	20
Mirvac Group Funding Ltd	4.27	300	15
Mirvac Group Finance Ltd	5.78	312	28
New Terminal Finance	5.79	385	18
BBI DBCT Finance Pty	5.51	513	33
Snowy Hydro Ltd	2.22	241	4
Santos Finance	4.79	171	6
Wesfarmers Ltd	3.76	184	22
Wesfarmers Ltd	3.76	206	6
Average	**5.20**	**303**	
Total			**306**

Source: Bloomberg Note: * The debt risk premium for this bond is based on the yield reported by the ERA.

Case 1 – The ERA's original approach applied to the current averaging period

Table 4.2 below applies the strict ERA approach to the test averaging period that we have defined as the 20 business days to 22 April, 2013. By constraining the data source to Bloomberg, the ERA's approach would now obtain a sample size of 20 bonds, which have an average term to maturity of 4.40 years and a simple average debt risk premium of 231 basis points. Using the ERA's combined weighting approach we obtain a debt risk premium estimate of 233 basis points, which again is very close to the debt risk premium obtained with a simple average approach. In line with general movements in the market, the debt risk premium has reduced relative to the 289.3 basis points estimated by the ERA in December 2010.

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[43] Bloomberg informed us that the yield to maturity for floating rate bonds, of which the particular Wesfarmers bond is one, are not reported historically by Bloomberg. Bloomberg informed us that the only plausible way historical yields to maturity were obtained if someone was to record daily closing day yields to maturity for floating rate bonds.

Table 4.2   Debt risk premium - ERA's approach applied to the test averaging period (20 business days to 22 April, 2013)

Security	Term to maturity	DRP	Weighted DRP
Adelaide Airport	3.50	256	5
APA Group	7.33	256	33
Bank of Queensland	5.20	314	13
Brisbane Airport	6.30	251	19
Caltex	5.67	214	11
Crown Group	4.32	222	17
DBCT	3.22	324	9
Dexus	4.08	193	10
Dexus	5.47	218	12
Goodman	3.16	217	7
Goodman	4.99	266	16
Holcim	2.01	156	5
Holcim	6.03	182	13
Holcim	4.32	194	12
Mirvac	3.49	245	11
Mirvac	4.74	270	11
Santos	2.51	199	3
Sydney Airport	2.29	184	4
Sydney Airport	5.29	225	7
United Energy Distribution	4.05	242	15
Average	**4.40**	**231**	
Total			**233**

Source: Bloomberg, PwC

Case 1a – The ERA's original approach applied to the test averaging period

Table 4.3 shows the debt risk premium estimate based on the ERA's approach, but broadening the sample to include UBS bonds. This increased the sample of bonds from 20 bonds to 36 bonds.

The average term to maturity for the sample is 4.82 years, the simple average debt risk premium is 254 basis points and a weighted average of 283 basis points. This sample produces a significantly higher debt risk premium than the 233 basis points estimated by excluding UBS bonds.

Table 4.3   Debt risk premium - ERA's approach applied to the current averaging period (20 business days to 22 April, 2013) and including UBS data

Security	Term to maturity	DRP	Weighted DRP
Adelaide Airport	2.48	182	3
Adelaide Airport	3.50	254	2
Adelaide Airport	3.50	256	4
APA Group	7.33	256	15
Bank of Queensland	5.20	181	3
Bank of Queensland	2.71	189	3
Bank of Queensland	8.13	309	13
Bank of Queensland	5.20	318	1
Bank of America	3.90	234	5
Brisbane Airport	6.30	252	8

Security	Term to maturity	DRP	Weighted DRP
Brisbane Airport	3.28	252	9
Caltex	5.67	208	5
Crown Group	4.32	222	7
DBCT	3.22	301	5
DBCT	3.22	315	4
DBCT	8.22	344	17
DBCT	13.22	377	13
Dexus	4.08	193	4
Dexus	5.47	216	5
Energy Australia	2.65	306	1
Goodman	3.16	216	3
Goodman	4.99	265	7
Holcim	2.01	157	2
Holcim	6.03	192	6
Holcim	4.32	194	5
Investa Office Fund	4.63	240	4
Mirvac	3.49	245	5
Mirvac	4.74	269	5
NATC	3.53	398	15
Santos	2.51	197	1
Sydney Airport	2.29	179	2
Sydney Airport	5.29	226	3
Sydney Airport	2.66	238	5
Sydney Airport	8.67	358	16
Sydney Airport	9.56	372	69
United Energy Distribution	4.05	242	7
Average	**4.82**	**254**	
Total			**283**

Source: Bloomberg, UBS, PwC

Case 1b: ERA's approach including A- bonds

In Table 4.4 we show the estimated debt risk premium if the ERA's approach were applied to the current averaging period using only Bloomberg data, but expanding the sample to include A- bonds (i.e. including BBB, BBB+ and A- bonds). Expanding the credit rating resulted in a sample of 50 bonds.

The average term to maturity for the sample is 4.77 years, and the weighted and simple average debt risk premium being 183 and 192 basis points respectively, which is significantly lower than the 233 and 231 basis points estimated by excluding A- bonds respectively.

Table 4.4 Debt risk premium - ERA's approach applied to the test averaging period (20 business days to 22 April, 2013) adding A- bonds for Bloomberg data only

Security	Term to maturity	DRP	Weighted DRP
Adelaide Airport	3.50	256	2
APA Group	7.33	256	10
Australia Pacific Airports	2.73	170	1
Australia Pacific Airports	3.43	191	3
Bank of Queensland	5.20	314	4

Security	Term to maturity	DRP	Weighted DRP
Brisbane Airport	6.30	251	5
Caltex	5.67	214	3
CBA Property Fund	2.97	154	2
Citipower Powercor	4.10	170	2
Coca Cola Amatil	6.64	132	2
Crown Group	4.32	222	5
DBCT	3.22	324	3
Dexus	4.08	193	3
Dexus	5.47	218	4
ETSA Utilities	3.52	153	2
ETSA Utilities	4.46	169	4
Goodman	3.16	217	2
Goodman	4.99	266	5
GPT	4.65	209	3
GPT	5.84	209	5
Holcim	2.01	156	1
Holcim	6.03	182	4
Holcim	4.32	194	4
Jemena	2.39	127	3
Jemena	4.51	172	4
Jemena	3.92	172	5
SP Ausnet	6.90	188	7
SP Ausnet	8.03	195	7
SP Ausnet	9.27	208	10
Mirvac	3.49	245	3
Mirvac	4.74	270	3
QIC Shopping Centre	4.35	194	3
QIC Shopping Centre	5.34	211	2
Santos	2.51	199	1
Stockland	3.28	185	2
Stockland	7.68	235	5
Sydney Airport	2.29	184	1
Sydney Airport	5.29	225	2
Transurban	3.21	182	2
United Energy Distribution	4.05	242	4
Vero Insurance	12.46	254	7
Volkswagen	2.31	116	1
Volkswagen	4.27	129	2
Volkswagen	3.71	131	2
Wesfarmers	3.62	110	3
Wesfarmers	6.02	151	8
Wesfarmers	6.97	171	7
Westpac	5.13	77	4
Woolworths	3.00	96	2
Woolworths	6.00	134	7
Average	**4.77**	**192**	
Total			**183**

Source: Bloomberg, PwC

Case 1c: ERA's approach including A- bonds and UBS data

Table 4.5 repeats the analysis in Table 4.4, but broadens the sample to include UBS data. This significantly increases the sample size to 100 bonds, and the ERA combined weighted average debt risk premium increases to 220 basis points for an average term to maturity of 5.28 years. The increase in the debt risk premium is the result of including finance industry bonds, some of which have debt risk premiums of over 300 basis points.

Table 4.5   Debt risk premium - ERA's approach applied to the test averaging period (20 business days to 22 April, 2013) adding A- bonds for Bloomberg and UBS data

Security	Term to maturity	DRP	Weighted DRP
Adelaide Airport	2.48	182	1
Adelaide Airport	3.50	254	1
Adelaide Airport	3.50	256	1
AMP	6.03	133	1
AMP	9.75	252	3
ANZ	10.24	215	12
APA Group	7.33	256	4
Australia Pacific Airports	2.73	171	0
Australia Pacific Airports	3.43	190	1
Australia Pacific Airports	2.73	209	1
Bank of Queensland	5.20	181	1
Bank of Queensland	2.71	189	1
Bank of Queensland	8.13	309	4
Bank of Queensland	5.20	318	0
Bank of America	3.23	210	1
Bank of America	3.90	234	1
Bendigo Bank	2.61	148	1
Brisbane Airport	6.30	252	2
Brisbane Airport	3.28	252	2
Caltex	5.67	208	1
CBA Property Fund	2.97	153	1
CBA Property Fund	6.73	234	2
Citigroup	3.00	145	1
Citigroup	3.90	162	2
Citigroup	4.88	167	2
Citigroup	4.88	184	2
Citipower Powercor	2.65	135	0
Citipower Powercor	4.10	169	1
Citipower Powercor	2.65	186	1
Coca Cola Amatil	6.64	131	1
Crown Group	4.32	222	2
DBCT	3.22	301	1
DBCT	3.22	315	1
DBCT	8.22	344	5
DBCT	13.22	377	4
Dexus	4.08	193	1
Dexus	5.47	216	2
Energy Australia	2.65	306	0
ETSA Utilities	3.52	151	1
ETSA Utilities	4.46	169	2

Security	Term to maturity	DRP	Weighted DRP
ETSA Utilities	4.55	183	1
Goodman	3.16	216	1
Goodman	4.99	265	2
Goldman Sachs	3.06	168	1
Goldman Sachs	3.67	177	4
Goldman Sachs	4.69	193	2
Goldman Sachs	3.06	195	1
Goldman Sachs	3.67	212	3
Goldman Sachs	4.69	221	2
GPT	4.65	208	1
GPT	5.84	210	2
Holcim	2.01	157	1
Holcim	6.03	192	2
Holcim	4.32	194	2
Investa Office Fund	4.63	240	1
Jemena	2.39	127	1
Jemena	3.92	171	2
Jemena	4.51	172	2
SP Ausnet	6.90	192	3
SP Ausnet	8.03	195	3
SP Ausnet	9.27	210	4
Jemena	7.01	227	2
Mirvac	3.49	245	1
Mirvac	4.74	269	1
Morgan Stanley	2.18	175	1
Morgan Stanley	2.18	179	1
Morgan Stanley	3.92	239	3
National Australia Bank	9.69	215	15
NATC	3.53	398	4
National Wealth Management	13.24	313	6
National Wealth Management	13.24	345	3
QIC Shopping Centre	4.35	195	1
QIC Shopping Centre	5.34	210	1
Santos	2.51	197	0
Stockland	3.28	185	1
Stockland	7.68	233	2
Sydney Airport	2.29	179	1
Sydney Airport	5.29	226	1
Sydney Airport	2.66	238	1
Sydney Airport	8.67	358	5
Sydney Airport	9.56	372	20
Transurban	3.21	182	1
Transurban	2.64	219	1
Transurban	4.64	262	3
United Energy Distribution	4.05	242	2
Vero Insurance	11.51	275	3
Vero Insurance	12.46	277	3
Vero Insurance	12.46	289	3

Security	Term to maturity	DRP	Weighted DRP
Vero Insurance	11.51	300	2
Vero Insurance	13.54	314	3
Volkswagen	2.31	115	0
Volkswagen	3.71	133	1
Volkswagen	4.27	134	1
Wesfarmers	3.62	110	1
Wesfarmers	6.02	151	3
Wesfarmers	6.97	172	3
Westpac	5.13	71	2
Westpac	5.13	94	0
Woolworths	3.00	96	1
Woolworths	6.00	133	3
Average	**5.28**		
Total			**220**

Source: Bloomberg, UBS, PwC

Case 1d: Strict application of the ERA's approach including only A- bonds

In its more recent decisions the AER has applied an A- benchmark credit rating to electricity water distribution businesses, when other regulators have assessed similar businesses as having a benchmark BBB+ credit rating with 60 per cent gearing. As discussed above, the AER's inclusion of all A- bonds in the Bloomberg database results in the inclusion of inappropriate bonds, such as the National Australia Bank and SP AusNet (due to its Singapore Government shareholding). In Table 4.6 we find the sample size is relatively large, at 30 bonds, the average term is 5.02 years, and the estimated weighted (simple) average debt risk premium is significantly lower at 163 (167) basis points.

Table 4.6   Debt risk premium - ERA's approach applied to the test averaging period (20 business days to 22 April, 2013) for Bloomberg A- bonds only

Security	Term to maturity	DRP	Weighted DRP
Australia Pacific Airports	2.73	170	1
Australia Pacific Airports	3.43	191	4
CBA Property fund	2.97	154	2
Citipower Powercor	4.10	170	3
Coca Cola Amatil	6.64	132	3
ETSA Utilities	3.52	153	3
ETSA Utilities	4.46	169	6
GPT	4.65	209	5
GPT	5.84	209	7
Jemena	2.39	127	4
Jemena	4.51	172	6
Jemena	3.92	172	6
SP Ausnet	6.90	188	9
SP Ausnet	8.03	195	9
SP Ausnet	9.27	208	14
QIC Shopping centre	4.35	194	4
QIC Shopping centre	5.34	211	3
Stockland	3.28	185	2
Stockland	7.68	235	7
Transurban	3.21	182	3

Security	Term to maturity	DRP	Weighted DRP
Vero Insurance	12.46	254	9
Volkswagen	2.31	116	1
Volkswagen	4.27	129	3
Volkswagen	3.71	131	2
Wesfarmers	3.62	110	5
Wesfarmers	6.02	151	11
Wesfarmers	6.97	171	10
Westpac	5.13	77	6
Woolworths	3.00	96	3
Woolworths	6.00	134	10
Average	**5.02**	**167**	
Total			**163**

Source: Bloomberg, PwC

Case 2a: Applying the ERA's weighted average approach to a modified old AER approach sample including Bloomberg and UBS data and excluding financial and subordinated bonds

Using a hybrid ERA and old AER methodology sample, we estimate a simple DRP average of 201 basis points and a weighted average of 214 basis points. In this scenario the sample increases to 59 bonds, comprising bonds with a credit rating of BBB, BBB+ and A-, 2 years or greater to maturity and are not financial, callable or subordinated bonds.

Table 4.7 Debt risk premium - ERA's approach applied to the current averaging period (20 business days to 22 April, 2013) for the modified old AER's sample using Bloomberg and UBS data and excluding financial, callable and subordinated bonds

Security	Term to maturity	DRP	Weighted DRP
Adelaide Airport	3.50	254	1
Adelaide Airport	3.50	256	2
APA Group	7.33	256	8
Australia Pacific Airports	2.73	171	1
Australia Pacific Airports	3.43	190	2
Australia Pacific Airports	2.73	209	2
Brisbane Airport	6.30	252	4
Brisbane Airport	3.28	252	5
Caltex	5.67	208	2
CBA Property Fund	2.97	153	1
CBA Property Fund	6.73	234	4
Citipower Powercor	2.65	135	1
Citipower Powercor	4.10	169	2
Citipower Powercor	2.65	186	1
Coca Cola Amatil	6.64	131	2
Crown Group	4.32	222	4
Dexus	4.08	193	2
Dexus	5.47	216	3
ETSA Utilities	3.52	151	2
ETSA Utilities	4.46	169	4
ETSA Utilities	4.55	183	2
Goodman	3.16	216	2
Goodman	4.99	265	4

Security	Term to maturity	DRP	Weighted DRP
GPT	4.65	208	3
GPT	5.84	210	4
Holcim	2.01	157	1
Holcim	6.03	192	3
Holcim	4.32	194	3
Investa Office Fund	4.63	240	2
Jemena	2.39	127	2
Jemena	3.92	171	4
Jemena	4.51	172	3
SP Ausnet	6.90	192	6
SP Ausnet	8.03	195	5
SP Ausnet	9.27	210	8
Jemena	7.01	227	3
Mirvac	3.49	245	3
Mirvac	4.74	269	3
QIC Shopping Centre	4.35	195	2
QIC Shopping Centre	5.34	210	2
Santos	2.51	197	1
Stockland	3.28	185	1
Stockland	7.68	233	4
Sydney Airport	2.29	179	1
Sydney Airport	5.29	226	2
Sydney Airport	2.66	238	3
Sydney Airport	8.67	358	9
Sydney Airport	9.56	372	37
Transurban	2.64	219	2
Transurban	4.64	262	5
United Energy Distribution	4.05	242	4
Volkswagen	2.31	115	1
Volkswagen	3.71	133	1
Volkswagen	4.27	134	2
Wesfarmers	3.62	110	3
Wesfarmers	6.02	151	6
Wesfarmers	6.97	172	6
Woolworths	3.00	96	2
Woolworths	6.00	133	6
Average	**4.67**	**201**	
Total			**214**

Source: Bloomberg, UBS, PwC

Case 3a: Applying the ERA's weighted average approach to the AER's sample including Bloomberg and UBS data for bonds with terms of 5 to 15 years

In Table 4.8 we find that if we only use bonds that have a term to maturity between 5 and 15 years, then the weighted average debt risk premium increases from 214 basis points to 236 basis points (higher than the 219 basis points obtained as a simple average).[44] While

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[44] We note that dropping the SPI bonds from this sample (on grounds of bias due to Singapore Government ownership) would increase the weighted (simple average) DRP to 245 basis points (222 basis points).

the sample size in this case is 20, the average term to maturity is only 6.8 years, and again the sample includes the inappropriate SPI bonds.

Table 4.8   Debt risk premium - ERA's approach applied to the test averaging period (20 business days to 22 April, 2013) for the old AER methodology's sample using Bloomberg and UBS data for bonds with terms of 5 to 15 years

Security	Term to maturity	DRP	Weighted DRP
APA Group	7.33	256	15
Brisbane Airport	6.30	252	8
Caltex	5.67	208	5
CBA Property fund	6.73	234	8
Coca Cola Amatil	6.64	131	3
Dexus	5.47	216	5
GPT	5.84	210	8
Holcim	6.03	192	6
Jemena	7.01	227	6
QIC Shopping Centre	5.34	210	3
SP Ausnet	8.03	195	10
SP Ausnet	6.90	192	11
SP Ausnet	9.27	210	16
Stockland	7.68	233	8
Sydney Airport	9.56	372	71
Sydney Airport	8.67	358	16
Sydney Airport	5.29	226	3
Wesfarmers	6.02	151	12
Wesfarmers	6.97	172	11
Woolworths	6.00	133	11
Average	**6.84**	**219**	
Total			**236**

Source: Bloomberg, UBS, PwC

Case 3b: Applying the ERA's weighted average approach to the old AER's sample including Bloomberg and UBS data for bonds with terms of 7 to 13 years

In this case, the sample decreases to 7 bonds and the years to maturity increases to 8.22 years. The ERA's weighted average and the simple average debt risk premiums are 294 and 264 basis points respectively.[45] Once again, this approach would be likely to be discounted by the Tribunal owing to the small sample size of 7 bonds.

Table 4.9   Debt risk premium - ERA's approach applied to the test averaging period (20 business days to 22 April, 2013) for the old AER method's sample using Bloomberg and UBS data for bonds with terms of 7 to 13 years

Security	Term to maturity	DRP	Weighted DRP
APA Group	7.33	256	31
SP Ausnet	8.03	195	21
SP Ausnet	9.27	210	33
Jemena	7.01	227	13
Stockland	7.68	233	16

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[45] The DRP would be higher still (335 basis points and 305 basis points respectively) if the SPI bonds were removed.

Security	Term to maturity	DRP	Weighted DRP
Sydney Airport	8.67	358	34
Sydney Airport	9.56	372	146
Average	**8.22**	**264**	
Total			**294**

Source: Bloomberg, UBS, PwC

Cases 4a and 4b – The Bloomberg extrapolation and econometric cross-check

Table 4.10 below estimates the extrapolation increment that is obtained by reference to a paired bonds analysis for CBA Property Fund, GPT, Stockland and Sydney Airport bonds. For the current averaging period, this analysis obtains an annual estimated increment of 15 basis points per annum. For the current averaging period the debt risk premium from the 7 year Bloomberg BBB fair value curve is 264 basis points. Adding the average increment obtained from our paired bonds analysis results in a 10 year extrapolated Bloomberg BBB estimate of 308 basis points.

Table 4.10 Debt risk premium implied by paired bonds for the test averaging period (20 business days to 22 April, 2013)

Bond issuer	Maturity	Term to maturity	DRP	DRP increment per annum
CBA Property Fund	13/12/2019	6.73	233	6
CBA Property Fund	13/12/2022	9.73	251	
GPT	24/01/2019	5.84	210	9
GPT	16/08/2022	9.40	241	
Stockland	1/07/2016	3.28	185	11
Stockland	25/11/2020	7.68	233	
Sydney Airport	6/07/2018	5.29	226	34
Sydney Airport	11/10/2022	9.56	372	
Average				**15**

Source: Bloomberg, UBS, PwC

In our previous reports for Powerlink, ElectraNet and the Victorian gas distribution businesses, we cross-referenced the extrapolated Bloomberg debt risk premium estimate against the results of an econometric analysis that used a sample of Australian non-finance bonds with a term to maturity greater than a year and with credit ratings of BBB, BBB+ or A-. In these reports, by applying econometric tests we found that a straight line regression gave superior results. Applying a straight line regression to the current data obtains a debt risk premium estimate of 299 basis points.[46]

The fact that the econometric estimate of 299 basis points is relatively close to the 308 basis points estimated with the Bloomberg extrapolation provides support for the latter. These approaches provide debt risk premium estimates that are approximately 75 basis points higher than the ERA's approach. Given that the ERA's approach is an estimate for a term of 4.40 years, the 75 basis difference between the ERA's estimate (233 basis points) and the extrapolated Bloomberg estimate (308 basis points) for 10 years, implies an annual increment of 13 basis points – this is very close to our estimate of the annual basis point increment.

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[46] The linear regression result implied an intercept of 118 basis points and an annual increment of 18 basis points per annum.

Appendix A   Terms of reference

Background

The Australian Energy Regulator (AER) is developing Rate of Return Guidelines that will form the basis of the regulated rate of return applied in energy network decisions. The AER published an issues paper in late December 2012 and a formal consultation paper in early May 2013 under the recently revised National Electricity Rules (NER) and National Gas Rules (NGR).

The AER undertook its last review of the weighted average cost of capital (WACC) in 2009 under a previous version of the NER.

As further detailed below, the Energy Network Association (ENA) would like to engage you to assess the ERA's DRP methodology in the context of the allowed rate of return objective :

> *"[t]he rate of return for a [Service Provider] is to be commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applied to the [Service Provider] in respect of the provision of [services]"*

Scope of work

The ENA requests you to:

- Analyse and provide an assessment of the DRP estimation methodology that has been adopted by the ERA; and

- Estimate the potential impact on the businesses if the AER were to apply a similar DRP estimation methodology to that applied by the ERA in the ATCO case.

The ENA requests the consultant to provide a report which must:

- Attach these terms of reference;

- Attach the qualifications (in the form of a curriculum vitae) of the person(s) preparing the report;

- Identify any current or future potential conflicts;

- Comprehensively set out the bases for any conclusions made; and

- Only rely on information or data that is fully referenced and could be made reasonably available to the AER or others.

The ENA intends to submit the consultant report to the AER in response to the consultation paper. Accordingly the report will become a public report.

Contact

Any questions regarding this terms of reference should be directed to:

Nick Taylor (Jones Day)

Email: njtaylor@jonesday.com

Phone: 02 8272 0500

Appendix B CVs

Jeff Balchin
(Incenta Economic Consulting)

Managing Director

Mob: 0412 388 372

jeff.balchin@incenta.com.au

Jeff is an economist at Incenta Economic Consulting. Jeff has almost 20 years of experience in relation to economic regulation issues across the electricity, gas and airports sectors in Australia and New Zealand and experience in relation to water, post and telecommunications. He has advised governments, regulators and major corporations on issues including the development of regulatory frameworks, regulatory price reviews, licensing and franchise bidding and market design. Jeff has also undertaken a number of expert witness assignments. His particular specialities have been on the application of finance principles to economic regulation, the design of tariff structures, the design of incentive compatible regulation and the drafting and economic interpretation of regulatory instruments.

In addition, Jeff has led a number of analytical assignments for firms to understand the responsiveness of consumers to changes to prices or other factors (like promotional activities) and to use this information to inform pricing strategy.

Relevant experience – Energy and Resources

- Strategic regulatory advisor – he has been a strategic adviser to regulators during a number of major price reviews, including the precedent setting early Victorian gas and electricity distribution price reviews (1998, 2001, 2003 and 2006). He has also been retained by regulated businesses to provide strategic advice during major regulatory reviews, including Australian electricity transmission businesses during several major reviews of their regulatory regime, for gas and electricity businesses during price reviews and for two major New Zealand firms (Powerco and Christchurch International Airports) during New Zealand regulatory reviews. Has also assisted a number of firms in relation to unregulated infrastructure, to justify their prices (providers) or to respond pricing proposals (customers) for infrastructure assets, including Dunedin Airport, Virgin Australia and SunWater.

- Review of regulatory regimes – has assisted major utilities during the review of regulatory regimes, including major assignments for the Australian electricity network businesses during the drafting and subsequent review of the regulatory regime for electricity networks.

- Regulatory finance issues – he has provided advice on a range of finance issues to regulators and regulate businesses, including major reviews of equity betas and deriving a benchmark cost of debt and complex valuation issues (including the proper specification of target revenue formulae). He has also provided extensive advice in relation to regulatory accounting issues, including the treatment of related party arrangements, provisions and revaluation gains, and on methodologies for allocating costs between activities. Similarly, he has provided extensive advice in relation to deriving an allowance for taxation for regulatory purposes. He has also provided substantial advice in relation to regulatory asset valuation and depreciation issues.

- Cost benefit studies – he has advised in relation to methodological issues in quantifying the economic costs and benefits of electricity distribution and transmission investment, including specific advices on the treatment of green obligations and on the economic benefits of IT projects to make expanded use of advanced metering infrastructure.

- Incentive regimes – he has advised on the design of incentives for regulated businesses to minimise cost, undertake efficient service improvement and on the design of price controls (an objective of which is to create an incentive for firms to structure prices efficiently).

- Market structure – he was involved in the early debate around market structure in

the Australian energy sector and assisted in the design of the ring fencing arrangements in place for the gas sector. More recently, he undertook a major review for the Victorian government on the need for continuing with special cross ownership rules for the energy sector.

- Analytical pricing activities – has undertaken assignments for a major Australian supermarket and department store to use analytical techniques to estimate the sensitivity of sales to prices and other factors (including promotional activities) from transactions data bases to assist in pricing strategy and to review the effect of pricing activities.

Qualifications and memberships

- Bachelor Economics (First Class Honours) University of Adelaide
- CEDA National Prize for Economic Development]

Michael Lawriwsky
(Incenta Economic Consulting)

Executive Director

Mob: 0400 002 355

michael.lawriwsky@incenta.com.au

Michael is an Executive Director at Incenta. Previously he was a director at PricewaterhouseCoopers (Australia), a director and partner in the Allen Consulting Group, and a director – corporate finance in ANZ Investment Bank. He has had a career spanning academia, investment banking and economic policy advice. He has had involvement in regulation and market reform in wide a range of businesses spanning energy, transport, water, gaming and wagering. He has advised on over $15 billion of bids in the Australian energy and transport sectors.

Regulatory and Policy roles:

- International Air Services Commission **-** Between 1997 and 2007 Michael was a part-time Commissioner of the International Air Services Commission. The IASC was established in 1992 as an independent body regulating new entrant airlines and allocating capacity to Australian international airlines with an objective of strengthening competition.

- Review of Business Programs (Mortimer Report) - In November 1996 Dr. Lawriwsky was appointed to the Review of Business Programs under the leadership of Mr. David Mortimer (Mortimer Report). This was a major review of Government support programs for business with a 15 person secretarial staff. The process included public forums, stakeholder interviews with key government and business groups and analysis of numerous submissions. The report led to the formation of Invest Australia.

Relevant experience by sector

Regulated gas networks:

- Jemena Gas Networks – advice on the appropriate methodology to estimate the cost of debt in relation for gas transmission assets. This is part of the WACC proposal for a gas network revenue determination.

- Essential Services Commission (Victoria) – adviser to the ESC on cost of capital issues associated with the 2007-2008 Gas Price Review.

- QCA – adviser on cost of capital issues (including beta) in relation to Queensland gas distribution assets.

- QCA – adviser on the prepayment of network charges by Envestra.

- Allgas – Adviser on regulatory modelling and regulatory outlook for ANZ Infrastructure Services in its bid for Allgas.

- Envestra – adviser to ESCOSA and Queensland Competition Authority on cost of capital and working capital (prepayment) issues relating to Envestra's 2006 access arrangements in South
Australia and Queensland respectively.
- ACCC – advised the ACCC on differentials between BBB and BBB+ for a gas utility in connection with an appeal lodged by the East Australia Pipeline Limited. ACCC – prepared a report on review of studies comparing international regulatory determinations, which was included as Appendix G of ACCC's submission to Productivity Commission Review of the National Gas Code.
- BHP Billiton – advised BHP Billiton on its submission in response to the Draft

Report of the Productivity Commission Review of the National Gas Code.

- Gas and Fuel (Gascor) – adviser to the company in relation to the potential purchase of the Wagga Wagga Gas Company from the City of Wagga Wagga.

- Gas and Fuel (Gascor) – mandated to critique Gascor's weighted average cost of capital calculation used in regulatory tariff setting.

- The USA Gas Utility market – authored this ANZ Securities monograph examining the regulatory structure and market reforms introduced into the US gas industry and implications for Australia. ⬜ Gas and Fuel Corporation – co-authored this ANZ Securities monograph

Regulated electricity networks:

- Powerlink – adviser to Powerlink on regulatory cost of capital including beta, debt risk premium and on equity and debt raising transaction costs.

- Aurora Energy – advice to Aurora Energy by writing their debt risk premium submission to the Australian Energy Regulator

- CitiPower and Powercor - advice on the appropriate methodology to estimate the cost of debt in relation for electricity distribution assets, as part of the WACC proposal for an electricity network revenue determination.

- Independent Market Operator WA – advised the Western Australia's wholesale electricity market operator, the Independent Market operator, by advising on the methodology to be used to calculate to estimate Allowance For Funds Used During Construction, and the WACC to be applied in the determination of the maximum reserve price for generation capacity.

- Energy Networks Association, APIA and Grid Australia – adviser on the AER review of WACC parameters for electricity transmission and distribution network service providers.

- Retail credit support arrangements – advised the Essential Services Commission of Victoria on new arrangements for credit support by electricity retailers.

- ETSA Utilities – adviser to the Essential services Commission of South Australia on cost of capital issues.

- Energex and Energon – advised the Queensland Competition Authority on cost of capital issues relating to the 2005 access arrangements of these companies.

- Electricity Commission of Papua New Guinea (PNG Power) – lead financial/strategic adviser to the PNG Government on the corporatisation/privatisation of PNG Power, managing a team of investment bankers, lawyers, accountants and regulatory consultants.

- Electricity Trust of South Australia (ETSA) – lead financial adviser to Edison Mission Energy in their bid for this $3.5 billion electricity distribution and retailing company, particularly in relation to regulation, valuation, financial modelling and capital structure.

- Pacific Gas and Electric Company – lead financial adviser in bids for four electricity distribution/retailing companies totalling $5.5 billion (United Energy, Powercor, Citipower, Eastern Energy).
  Electro Power Limited (NZ) – adviser to the company's board in its merger negotiations with the contiguous Central Power Limited, including valuation and capital structure issues.

Energy:

- Snowy Hydro – Michael led a team undertaking a comprehensive valuation analysis of Snowy Hydro, including a cost of capital update.

- Snowy Hydro – Adviser to the Snowy Hydro on cost of capital (on-going annual review). ⬜ Southern Electric International (US) – advised on cost of capital with respect to Australian electricity generation assets.

- Energy Developments Limited – float valuation and pricing for this independent power project underwritten by ANZ Securities.

- Loy Yang A – coordinated a sell-down of $30 million of equity in Horizon Energy Investments to institutional investors.

- Southern Hydro Limited – established a consortium of bidders for this privatisation (Pacific Hydro, Hyder Investments and Hastings Funds Management) and directed financial due diligence/valuation. Including capital structure determination.

- Electro Power Limited (NZ) – analysis of the rate of return on investment which would be required by investors in the Gateway Electronic Monitoring System ("GEMS") – a "smart meter" technology.

Road and Rail:

- Federal Government Department – Strategic and governance review

- QCA – Adviser on the cost of capital issues relating to the Northern Missing Link railway. ⬜ QCA – Adviser on cost of capital issues in relation to the Queensland Rail below rail network – coal price review. ⬜ Victorian Department of Transport – adviser on new techniques for attracting private sector capital to the roads sector

- Victorian Auditor General's Office – Adviser analysing the terms of the cost of capital for the financing of the Tulla-Calder freeway extension.

- Stagecoach plc – adviser to Stagecoach on cost of capital issues relating to bidding for rail infrastructure assets in Victoria.

- Adelaide-Darwin railway – adviser on regulatory issues to the ANZ Investment Bank project finance team in relation to this financing.

Ports:

- Abbot Point Coal Terminal – regulatory adviser to the consortium comprising CKI and Deutsche Bank (RREEF), which bid for this asset (lead adviser, Macquarie Bank).

- Port of Brisbane – regulatory adviser to the Q Ports Holdings consortium partners, Industry Funds Management, Global Infrastructure Partners, QIC Global Infrastructure and Tawreed Investments, which won this bid and was awarded 'Best Privatisation Deal' and 'Asian Infrastructure of the Year' awards (lead advisor, Macquarie Bank). PwC received an award from Infrastructure Partnerships Australia for the role it played in this transaction.
- BHP Billiton – advise on Pilbara ports from a real options perspective Port of Melbourne Corporation – review of regulatory cost of capital for price monitoring by the Essential Services Commission.
- Wiggins Island Coal Terminal - adviser to the ANZ Bank and the User Group proposing a selffunded expansion of coal loading capacity at the Port of Gladstone.

- Port of Waratah – adviser to Newcastle Coal Infrastructure Group (NCIG) in relation to the Prime Minister's Taskforce on Infrastructure.

- Dalrymple Bay Coal Terminal – Adviser to the Queensland Competition Authority on the WACC parameters (including beta) for DBCT.

- Port of Brisbane Corporation – strategic adviser to the port, including a review of strategic options and a valuation of the port's operations.

- Ports of Portland and Geelong – advice on cost of capital to the ANZ Investment Bank team bidding for the assets on behalf of the Strang/Hastings consortium.

- Port of Napier (NZ) – reviewer of the valuation of the port by the ANZ Investment Bank Auckland office.

Airports:

- New Zealand Airports Association – analysis of airport betas for negotiations with airlines and the Commerce Commission.

- Virgin airlines – advice on cost of capital issues for negotiations with airports on landing charges.

- Federal Airports Corporation – directed a seven-month regulatory modelling, valuation and capital structure analysis of all 22 airports as part of the Capital Structure Review commissioned by the Department of Transport/Department of Treasury.

- Brisbane International Airport – lead financial adviser to the Port of Brisbane Corporation in the course of the successful Schiphol/CBA/POBC bid in 1997.

- Christchurch International Airport – adviser to the airport with respect to its negotiations with the NZ Commerce Commission on the cost of capital and implications for landing charges.

Water:

- Gladstone Area Water Board – adviser to the Queensland Competition Authority on the assessment of costs of capital parameters for the 2005 GAWB price review.

- Melbourne Water – adviser to Melbourne Water on its financial strategy, including capital structure, dividend policy and financial benchmarks.

- SA Water – adviser on its capital structure review and review of dividend policy.

- SA Water – adviser on commercialisation, and dividend policy in negotiations with the SA Treasury.

- Auckland City Council (NZ) – advice on the corporatisation of water and waste water assets.

- Gippsland Water – adviser on pricing policy with respect to future capital funding requirements. ⬚ South Gippsland Water – prepared a benchmarking analysis of corporate performance relative to peers.

- United Water – advised the company on the potential for listing on the stock exchange pursuant to requirements under the United Water Management Contract.

General regulatory assignments:

- QCA – adviser on the level of regulated WACCs.

- Debt and equity transaction costs – Advised the ACCC on debt and equity transaction costs that could be applied in regulatory determinations.

- International evidence on regulatory rates of return – Adviser to the ACCC on rates of return provided internationally by regulators.

- Exceptional circumstances – advised the Queensland Competition Authority on appropriate regulatory responses to exceptional circumstances.

- Monte Carlo analysis – adviser to a regulatory agency assessing the efficacy of Monte Carlo analysis as a methodology to be employed in cost of capital studies for regulatory purposes.

Expert Opinions:

- Ferrier Hodgson – Expert opinion on the conduct of an investment bank advising on a multi-billion dollar merger transaction, which destroyed substantial shareholder value and resulted in a default of banking covenants.

- Essential Services Commission of Victoria – Relative bias in the yields of indexed Commonwealth Government Securities when used as a proxy for the CAPM risk free rate.
- Australian Taxation Office, Commerciality of AAPT's financial arrangements

Australian Taxation Office, Statement on the financial arrangements of Futuris Corporation Limited

Qualifications and memberships
- Ph.D. B.Ec. (Hons) (University of Adelaide)
- Trustee and Chair of the Finance Committee, Shrine of Remembrance

Matthew Santoro (PwC)

Managing Director, Joint National Head - Debt & Capital Advisory

Tel: (03) 8603 4707
E: matthew.santoro@au.pwc.com

Professional qualifications and memberships

- Bachelor of Economics (Honours), University of Adelaide
- Affiliate, Institute of Chartered Accountants

Career summary

Matthew has over 28 years of debt and capital markets experience, comprising over 20 years of corporate and institutional banking experience with Deutsche Bank and Citibank and the last eight years in an advisory capacity. Matthew is experienced in a wide range of financing and fundraising transactions, in particular in the area of project financing, acquisition financing, leverage financing, re-financings, property financing and procurement of debt capital markets instruments across the Australian, European and USA markets. His experience includes dealings with credit rating agencies such as Standard and Poor's and Moody's. Prior to joining PwC, Matthew established and was Joint National Head of KPMG's debt advisory practice for a period of five years.

Matthew has extensive experience in the utilities and energy sector, having been responsible for structuring, underwriting and syndicating multi-billion dollar financings for successful bidders during the privatisations of the Victorian and South Australian electricity industries. Debt transactions successfully completed during these privatisations cover the full spectrum of the industry; electricity generation, gas and electric distribution and gas and electric transmission and.

Relevant experience

- Debt structuring, arranging and procurement, onshore and offshore
- US Private Placement, Australian and European Bond markets
- Capital management
- Credit rating agencies

Steven Hong (PwC)

Manager

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Steven is a Manager in PricewaterhouseCoopers' Australian Economics practice with specific experience in regulatory economics and the application of economic and financial principles in regulation.

Prior to joining PricewaterhouseCoopers, Steven was a Senior Analyst at the Australian Competition Consumer Commission, where he was mainly responsible for providing financial and economic advice in regulatory projects.

Relevant experience

- **Regional development authority** – Steven is currently helping a development authority build an investment case for a piece of energy network infrastructure. Part of the project involves identifying the major drivers of investment and the exploring whether future developments in the drivers will support a case for a regulatory investment.

- **Energy Networks Association** – Steven is currently helping the Energy Networks Association (ENA) with a strategy for the future cost of equity. Recent changes to regulatory cost of capital determination procedures allowed the Australian Energy Regulator more freedom to determine the cost of equity. As a result, the ENA want to develop a strategy for future cost of equity proposals.

- **Queensland Competition Authority** – Steven is currently developing a first principles study into the cost of debt. The major issues behind this study is what yield should long-term debt be paying that is supported by financial and economic theory and empirical evidence.

- **Indonesian gas pipeline operator** – Steven helped prepare a submission on the likely return on equity expected by investors on an Indonesian gas pipeline in the past, considering issues such as how the capital asset pricing model would have been applied and whether international cost of equity values can be used as comparators.

- **Goulburn-Murray Water** – Steven helped Goulburn-Murray water develop its operating and capital expenditure forecasts for its third water plan It involved collaborating with the operating, finance and capital expenditure teams within Goulburn-Murray water so that information can be collated and structured to explain to a regulator the cost forecasts for operating and capital expenditure.

- **Electricity and gas utilities** – Development of a methodology to estimate a regulatory debt margin in light of the current uncertainty of a fair value of long term bonds.

- **Energy Networks Association** – Assisted in producing a report that advised on the risks and implications of two possible incentive mechanisms for capex during the AEMC's review of transmission frameworks. The two incentive frameworks are ex-post capex reviews and an efficiency carryover mechanism.

- **Investment consortium** – Steven helped advise an investment consortium on a bid for a regulated asset. Steven's major roles were to: review and identify risks in

the asset's the pricing structure, and review the regulatory model that were used to project the asset's revenue in the future

- **Airline** – Steven assisted an airline in providing financial modelling and regulatory advice to help them negotiate aeronautical charges. The issues covered range from depreciation, allowance for funds used during construction and analysis of pricing models

- **Resources Company** – Steven assisted a resources company in negotiating gas tariffs for a pipeline that is about to be constructed.

- **Resources Company** – Steven helped a resources company re-negotiate gas capacity tariffs by modelling the impact on gas tariffs if they were to be regulated.

- **Resources Company** – Steven assisted a resources company in a gas tariff appeal whereby he modelled the impact of varying degrees of cost allocation. The outcome of this work secured a significant cost decrease by way of lower gas tariffs.

- **Powerco New Zealand** – Steven has assisted Powerco in New Zealand in a number of regulatory engagements in relation to the New Zealand Commerce Commission's review of input methodologies

- **Dunedin International Airport Limited -** Steven has helped Dunedin airport in preparing their pricing proposal to key stakeholders. In this, Steven played a key role in creating a regulatory modelling as well as drafting of the pricing proposal, covering topics such as cost allocation, cost of capital and financial modelling.

- **Kimberly Clark Australia** – Steven was involved in assisting in providing advice as to how an initial regulatory asset base would be set for a gas pipeline if it is to be declared.

- **Powerlink Queensland** – Steven helped Powerlink estimate how much it would cost to raise debt and equity. Steven is also helping to propose a methodology to estimate a debt risk premium in a situation where there is a lack of reliable information.

- **Aurora Energy** – Steven assisted Aurora Energy by writing their debt risk premium submission to the Australian Energy Regulator

- **Independent Market Operator WA** – Steven assisted Western Australia's wholesale electricity market operator, the Independent Market operator, by advising on the methodology to be used to calculate to estimate Allowance For Funds Used During Construction, and the WACC to be applied in the determination of the maximum reserve price for generation capacity.

- **Jemena Gas Networks -** Steven assessed the appropriate methodology to estimate the cost of debt in relation for gas transmission assets. This is part of the WACC proposal for a gas network revenue determination.

- **Assorted energy companies and regulators** – Steven has prepared advice on the appropriate method to estimate a benchmark cost of debt.

- **Christchurch International Airport Limited -** Steven is regularly engaged to provide advice to Christchurch International Airport Limited in relation to input methodologies as part of a regulatory review undertaken by the New Zealand Commerce Commission.

- **Air Services Australia -** Steven assisted the review of WACC parameters applicable for Air Services Australia

- **Snowy Hydro Limited -** Steven reviewed and updated the regulatory WACC parameters for Snowy Hydro Limited.

- **Queensland Competition Authority** – Steven was involved in assessing the financial model used to support a proposed infrastructure charges schedule

- **Queensland Competition Authority** – Steven has prepared advice on the

appropriate method to estimate a benchmark cost of debt.

- **Airline -** Steven was involved in a high level review of the WACC assumptions and methodologies applied by three airports with respect to aeronautical pricing.

- **Essential Services Commission of South Australia -** Steven was involved in a review on the advantages and disadvantages of two methodologies to set an initial regulatory asset base.

Qualifications and memberships

- Bachelor of Commerce (Economics) with Honours, University of Melbourne

- Chartered Financial Analyst

- Institute of Public Administration, corporate member