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Cost of debt consistent with the NGR and NGL

Dr. Tom Hird

March 2014

COMPETITION ECONOMISTS GROUP

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Executive summary

1. Rule 87(3) of NGR defines the allowed rate of return objective as:

> *The allowed rate of return objective is that the 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 applies to the service provider in respect of the provision of reference services (the allowed rate of return objective).*

A benchmark debt management strategy must be defined

2. In my view, the requirements of Rule 87(3) and Rule 87 more generally suggest the need for a regulator to undertake two distinct steps when estimating the return on debt (cost of debt) for a 'benchmark efficient entity' (or any other entity):

   - Step 1: define a financing strategy for a "benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services"; then
   - Step2: estimate the "efficient financing costs" of implementing that strategy.

3. Step 1 is a necessary step given that, before we attempt to measure the cost of something, we must define what that 'something' is. In this case, the 'something' in question is the benchmark efficient debt management strategy that the benchmark efficient entity referred to in Rule 87(3) would undertake.

The ERA's methodology does not define a feasible debt management strategy

4. The ERA's methodology for setting the cost of debt does not comply with Rule 87(3) because the ERA never defines the debt management strategy that, if followed, would give rise to a cost of debt consistent with that calculated under its methodology. Indeed, there is no debt management strategy (efficient or otherwise) that would give rise to a cost of debt consistent with the ERA's methodology.

5. This is true even if the ERA's bond yield approach resulted in a perfectly accurate estimate of the prevailing cost of issuing debt for the benchmark efficient entity. The reason is that the ERA methodology of fixing the risk free rate equal to the 5 year CGS yield and then, each year of the regulatory period, annually updating the DRP based on the spread between BBB debt and CGS yields prevailing at that time, results in a value for the return on debt that it is impossible to emulate under any debt management strategy. That is, the cost of debt calculation undertaken by the

ERA is not replicable by a benchmark efficient business – either in practice or in theory.

6. In addition to this problem, I consider that the ERA's bond yield approach will not result in a reliable estimate of the prevailing (or historic) efficient cost of debt for a benchmark efficient entity. This is, in part, because the ERA methodology does not have regard to all of the available data. Equally critically, the cost of debt estimated under this approach is not for any defined maturity level – but varies based on the vagaries of the bonds in the ERA's sample. A defined maturity of debt issuance is a critical element of any benchmark efficient debt management strategy. Having a cost of debt based on an indeterminate term of debt maturity is a further reason why the ERA's methodology does not conform with Rule 87(3) and is not replicable.

7. The ERA accepts that its methodology does not set an allowance that is based on the costs of a specific debt management strategy. This reflects the ERA's interpretation that the NGR and NGL require it to set a cost of debt allowance that promotes economic efficiency and the ERA belief that the promotion of efficiency requires the regulator to deliberately set the cost of debt allowance in a manner that is not replicable (a replicable allowance is based on the costs of a debt management strategy that is actually implementable). Its reasoning is that a replicable methodology would afford regulated businesses an opportunity to lower costs (by aligning their debt costs with the allowance) that unregulated businesses do not have, and that this would be inefficient.

8. In my view, the ERA's economic basis for its interpretation of the NGR and NGL is not sound. The ERA's analysis sets up a tension between:

   - setting a replicable cost of debt allowance; and
   - promoting economic efficiency.

9. On this basis, the ERA explicitly rejects adopting a replicable allowance that reflects the efficient business practices of a benchmark efficient firm in favour of a cost of debt allowance that it believes will promote economic efficiency (widely defined).

10. However, the ERA's analysis of what promotes economic efficiency is flawed. When this is recognised the perceived tension between setting a replicable allowance (consistent with Rule 87) and promoting economic efficiency disappears. In fact, setting the allowance based on the costs of a replicable debt management strategy of a benchmark efficient entity would actually promote economic efficiency – not the reverse.

Features of an efficient debt management strategy

11. In my view, any benchmark efficient debt management strategy consistent with the NGR and NGL needs to be based on a staggered issuance of debt with a term at

issuance of around 10 years. This is the observed practice of both Australian and foreign utilities. It is reasonable to assume that this near uniformly followed practice is efficient – otherwise businesses would not adopt this practice.

12. The AER, operating under the same Rules as the ERA, has adopted a 10 year term as part of the benchmark efficient debt management strategy. A 10 year or greater term has also been adopted by UK and US energy regulators. Similarly, other domestic regulators of non-energy businesses such as IPART and the QCA have also adopted a 10 year term.

13. By contrast, the weighted average maturity underpinning the ERA's weighted average term is only 5.7 years when the ERA methodology is applied to the ATCO nominated period 22 October and 18 November 2013. Given an upward sloping yield curve, estimating the cost of debt at a 5.7year maturity will materially underestimate the cost of a benchmark efficient debt management strategy (which involves the issuance of debt with an average maturity of around 10 years). This is true whether the cost of debt is estimated based on prevailing market conditions or on an historical average basis.

14. The AER, operating under the same Rules as the ERA, has adopted a 10 year trailing average of the cost of debt as the basis for setting the regulatory allowance. Also Ofgem in the UK uses a 10 year trailing average of 10 year debt costs, as do US regulators. In the US the time horizon of the trailing average reflects the actual issuance of a regulated business (often extending out to 20 years). Of domestic non-energy regulators, IPART also has regard to a 10 year trailing average – although IPART has regard to a prevailing estimate of the cost of 10 year debt.

15. Consistent with the practice of regulated businesses, I consider that setting a cost of debt allowance based on a 10 year trailing average of interest rates on 10 year debt will promote the allowed rate of return objective and the NGR and NGL more broadly. This approach would result in a stable cost of debt allowance that was simple and low cost to replicate. The stability of a trailing average allowance would be in customers' and businesses' mutual interests – consistent with submissions to both the AER and the ERA from both sets of stakeholders.

16. However, this involves a material departure from the previous regulatory practice (under the previous Rules) of resetting the cost of debt at the beginning of the regulatory period based on then prevailing conditions in debt markets. Businesses have the (imperfect) ability to use options and derivative products to manage the risk created by past practice of regular resetting of the cost of debt based purely on prevailing conditions. Once in place, these elements of a debt management strategy take time to unwind.

17. To the extent that a business has managed its debt portfolio on the basis that the previous regulatory practice would continue then it may be appropriate for the allowance for that business to transition over time to a 10 year trailing average. This

could be achieved via a transition mechanism as proposed by the AER (which gradually transitions the allowance every year over 10 years) or a mechanism that sets an "on the day" allowance for the entirety of the next regulatory period but introduces a full or partial trailing average at the beginning of the subsequent regulatory period.

18. The best estimate of the credit rating for a regulated energy business with a 60% gearing issuing 10 year debt is BBB or below. A BBB credit rating is consistent with recently observed credit ratings for Australian regulated utilities and the modelling of credit metrics from specific regulatory decisions (regulatory decisions where the cost of equity allowance was set based on an equity beta of 0.8 rather than the ERA's new range of 0.5 to 0.7). The credit rating for a business issuing shorter term debt or with a less generous cost of equity allowance will be below BBB.

Use of RBA estimates is the best method to estimate the cost of debt

19. Whatever benchmark efficient debt management strategy that is adopted, it will be necessary to estimate the cost of issuing BBB debt. In my view, the best methodology for arriving at this estimate is likely to rely on estimates of the yield on BBB corporate debt at a 10 year maturity as published by the RBA.

20. The ERA finalised its Rate of Return Guidelines prior to the RBA commencing publication of these estimates. Therefore, the RBA's estimates reflect new information that was not available to, or considered by, the ERA in its Rate of Return Guidelines.

21. The RBA's core methodology is transparent and well documented, and has been proposed by IPART as the basis for estimating the cost of 10 year BBB debt. It is similar to the ERA's bond yield methodology in many respects, but it makes considerable improvements in broadening the sample of relevant data collected, and in how this is transformed into estimates of yields at different maturities.

22. In particular, the RBA publishes an estimate of the cost of BBB rated debt at 10 years to maturity, while the ERA methodology is not capable of this.

23. The RBA methodology, like the ERA methodology, restricts its sample to bond yields available from Bloomberg. However, the RBA includes in its sample bonds issued by Australian companies in foreign currencies. Given that almost half of the value of bonds issued by Australian energy utilities is denominated in a foreign currency, a benchmark efficient debt management strategy should similarly account forth issuance of foreign currency bonds. Moreover, including these bonds adds significantly to the observations of long maturity bonds – the maturity of interest for infrastructure issuers.

24. It is also relevant to note that the RBA estimates are consistent with the results of Nelson Siegel curve fitting techniques applied to wide samples of bonds, and are also consistent with the yields on long dated domestic currency bonds as estimated by UBS (bonds for which the Bloomberg database does not report yields). Finally, I note that the RBA estimation technique is transparent and well documented.

1 Introduction

25. My name is Tom Hird, and I have a Ph.D. in Economics from Monash University and over 20 years' experience as a professional economist.

26. I have been engaged by ATCO Gas to prepare an expert report which provides:

    a. An assessment of the ERA's approach to estimating the return on debt set out in the Rate of Return Guidelines, including: A critique of the ERA's reasoning for adopting a 5 year term for the risk free rate (cost of debt and cost of equity), and an analysis of the ERA's proposed bond yield approach to the debt risk premium and the proposal to update the DRP annually.

    b. My opinion on whether the ERA's proposed approach to the return on debt would results in the best estimate of the return on debt that contributes to the achievement of the allowed rate of return objective and meets the requirements of Rule 87.

    c. My opinion on whether the return on debt estimate using the ERA approach would produce a result consistent with the achievement of the NGP and the RPP.

    d. If I find that the ERA's approach does not meet the requirements set out in points (ii) and (iii) above, a suggestion of an alternative method for estimating the cost of debt which should be used to produce the best estimate possible in the circumstances which complies with Rule 87, and report on the estimate this method produces.

27. The full terms of reference that I have been provided with by ATCO is provided at Appendix I to this report.

28. The remainder of this report is structured as follows:

    - **Section 2** discusses defining a debt management strategy consistent with the NGR and NGL. That is, it provides my interpretation of the relevant economic content of the legal context.
    - **Section 3** provides an assessment of the ERA methodology against the NGR and NGL. In this chapter I demonstrate that the ERA's methodology for arriving at an estimate of the cost of debt is inconsistent with the requirements of the NGR and the NGL.
    - **Section 4** discusses efficient benchmark debt management strategies. I conclude that any benchmark efficient debt management strategy consistent with the NGR and NGL needs to be based on a staggered issuance of debt with a term of issuance of 10 years.

- **Section 5**describes why I believe that a 10 year term is also appropriate for the risk free rate used in the CAPM.
- **Section 6** outlines the best estimates of current and historical yields on 10 year BBB debt. In this chapter I provide analysis which demonstrates that, over the 20 day averaging period between 22 October and 18 November 2013, the RBA methodology to estimating current and historical yields on 10 year BBB debt represents an improvement on the ERA methodology.
- **Section 7**summarises my response to the questions put to me in my terms of reference.

29. I acknowledge that I have read, understood and complied with the Federal Court of Australia's Practice Note CM 7, "Expert Witnesses in Proceedings in the Federal Court of Australia". I have made all inquiries that I believe are desirable and appropriate to answer the questions put to me. No matters of significance that I regard as relevant have to my knowledge been withheld. I have been provided with a copy of the Federal Court of Australia's Guidelines for Expert Witnesses in Proceeding in the Federal Court of Australia, and confirm that this report has been prepared in accordance with those Guidelines.

30. I have been assisted in the preparation of this report by Daniel Young and Johanna Hansson in CEG's Sydney office. However, the opinions set out in this report are my own.

Thomas Nicholas Hird

14 March 2014

2 Defining a debt management strategy consistent with the NGR and NGL

31. The relevant legal context for setting a cost of debt allowance under the NGR and the NGL is summarised in my terms of reference. This section provides my interpretation of the relevant economic content of that legal context.

32. In particular, I review Rules 87(3) (the allowed rate of return objective), 87(5) and 87(8)-(10), as directed within my term of reference. I also consider the National Gas Objective (NGO) and the revenue and pricing principles (RPP).

33. Based on the legislative context I consider that, in order to be consistent with the NGR and NGL, the cost of debt allowance must be:

- replicable in the sense that it is based on a well-defined debt management strategy;
- based on a debt management strategy which is efficient in the sense that it reflects a prudent strategy that minimises the expected (risk adjusted) costs of financing. In order to achieve this, the benchmark strategy should be based, as far as possible, on observed behaviour of regulated businesses (where it can be assumed that regulated business have an incentive to behave efficiently); and
- estimated based on the best available data.

2.1 Two steps in arriving at an estimate of the cost of debt

34. In my view, there are two distinct steps involved in estimating the return on debt (cost of debt) for any entity – including a 'benchmark efficient entity'. The basis for this conclusion is a common-sense belief that, before one can embark on an estimation process, one must define what it is that is being estimated. To define what is being estimated, it is necessary to:

- define a financing strategy for a *"benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services"*; and
- estimate the *"efficient financing costs"* of implementing that strategy.

35. The second step cannot proceed without the first step.

36. Examples of elements of a benchmark efficient debt management strategy that may need to be defined in the first step include:

- the amount of debt issued;

- the term structure of the debt issued;
- the timing of debt issuance;
- the market into which debt is issued;
- the type of debt issued (e.g., callable vs non-callable debt);
- the extent to which derivative contracts, such as swap contracts, are used to manage the debt portfolio; and
- the perceived riskiness of the debt issued (e.g., proxied by a benchmark efficient credit rating). This needs to be consistent with the rest of the benchmark efficient debt management policy (e.g., higher assumed gearing should be associated with, other things equal, a lower credit rating).

37. Once a benchmark efficient debt management strategy is defined, the next step is to estimate the financing costs associated with that strategy. This step requires collection and analysis of financial market price/yield information relevant to determining the costs incurred in implementing the benchmark efficient financing strategy at the relevant times. This step focuses on data collection, interpretation and manipulation, to arrive at an estimate of the costs of implementing the benchmark efficient strategy defined in the first step. Relevant decisions that must be made are:

- whether and how to use third party estimates of the yields on broad categories of corporate debt. This might include Bloomberg and RBA published estimates of the yields on bonds of particular maturities/credit ratings;
- whether and how to use third party estimates of the yield on specific debt instruments (e.g., a specific bond issued company "X", another bond issued by company "Y", etc.); and
- what sources for these data should be used and what, if any, differential weighting should be applied to the data sources.

2.2 Rule 87(3): the allowed rate of return objective

38. Rule 87(3) states:

> *The allowed rate of return objective is that the 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 applies to the service provider in respect of the provision of reference services (the allowed rate of return objective).*

39. This envisages that:

- it is possible to define a "benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services";
- "efficient financing costs" for that entity can be estimated; and
- the service provider should receive compensation that is "commensurate" with this.

40. In the context of setting the allowed cost of debt, I consider that this requires:

- a benchmark efficient debt financing strategy to be defined;
- the costs of efficiently implementing that strategy to be estimated; and
- compensation commensurate with this to be provided to the service provider.

41. In my view, the definition of a benchmark efficient financing strategy must be such that it would be possible for a benchmark efficient entity to undertake that strategy. This does not necessarily mean that a specific regulated entity must actually or potentially be able to implement that strategy, nor that it must be the most efficient strategy for that entity. However, it must be conceivable that this strategy would be efficient for a benchmark entity facing the same risks.

42. By way of example, if it is not possible to issue 100 year debt, or it is known to be prohibitively expensive to attempt to do so, then issuing 100 year debt should not be included in the definition of a benchmark efficient debt financing strategy. To do so would be to attempt to arrive at a cost estimate that is associated with doing something that is impossible/inefficient. Similarly, if it is impossible to trade certain derivative contracts, or if it is known to be prohibitively costly to do so, then the trading of such derivative contracts should not be included in the definition of benchmark efficient debt financing strategy.

43. The AEMC Final Rule Determination suggests that the AEMC envisaged its Rule change would require that the regulator clearly define a benchmark debt financing strategy and then estimate the costs of implementing that strategy.

> *While the Commission considers that allowing the regulator to estimate the return on debt component of the rate of return using a broad range of methods represents an improvement to the current approach, it is a separate issue from that of benchmark specification and measurement.* ***A historical trailing average approach still requires the regulator to define a benchmark and use appropriate data sources to measure it. Arguably, it is even more important that the benchmark is defined very clearly and can be measured,***

> ***because it needs to be estimated periodically in the future***.[1][Emphasis added.]

Similarly, the AEMC clearly envisaged that the definition of an efficient benchmark entity would include a definition of that benchmark entity's efficient debt financing strategy.

> *The first factor in the rule requires the regulator to have regard to the characteristics of a benchmark service provider and how this influences assumptions about* ***its efficient debt management strategy***.[2]

2.2.1 Definition of "efficient" as used in 87(3)

44. It is also necessary to define what is meant by the term "efficient" in the two places it is used in Rule 87(3). In my view, the correct interpretation is that the benchmark entity must engage in a financing strategy that gives rise to the lowest *expected* finance costs for an "entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services".

45. In this context it is important to make two observations. First, Rule 87(3) is defined at the level of the weighted average rate of return on debt and equity. Thus, a financing strategy that results in the lowest expected cost of debt need not be efficient if undertaking that strategy raises the cost of equity by a more than offsetting amount. That is, if undertaking that strategy results in a higher weighted average rate of return on debt and equity than could otherwise be expected to be achieved.

46. Second, financing strategies are designed without perfect knowledge of the future. This means that different financing strategies will give rise to different costs in different market circumstances. When I define an efficient financing strategy as one that gives rise to the lowest *expected* finance costs, I do not mean that it always gives rise to the lowest actual financing costs. Rather, I mean that it is a finance strategy that prudently takes into account future uncertainties and seeks to minimise the (actuarially weighted) expected financing costs under all possible future states of the world.

47. By way of illustration, a generally upward sloping yield curve for corporate debt suggests that issuing very short term debt (e.g., 3 month debt) might minimise interest costs in most circumstances (i.e., this strategy might be "most likely" to achieve cost minimisation given the range of future possible states of the

[1] AEMC, *National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, p. 90

[2] AEMC, *National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, p. 84.

world).[3]However, this strategy would involve refinancing 100% of debt every 3 months. Any future disruption to financial markets could have potentially disastrous consequences for an entity's debt and equity investors if the firm finds itself unable to refinance its debt.[4] Consequently, even if there is only a small probability of this occurring, the actuarially expected costs of financing solely with 3 month debt might be higher than the actuarially expected costs of funding using long term debt. Thus, even though short term funding might be 'most likely' to achieve cost minimisation, it still has a higher actuarially expected costs than long term debt funding because it magnifies investors' exposure to low probability but high cost events/risks.

2.3 Rule 87(5)

48. Rule 87(5)(a) has clear application to both steps, requiring that regard be had to all relevant evidence both when defining a financing strategy and when estimating the cost of that strategy.

49. Rule 87(5)(b) and Rule 87(5)(c) require regard be had to the desirability of internal consistency between the estimates of the return on debt and return on equity. I consider that, amongst other things, this means that the definition of the benchmark efficient debt financing strategy should have regard to the debt management strategies of the companies used to infer an estimate of the benchmark efficient cost of equity funding.

50. This is because the risks faced by equity holders in an entity depend on the debt financing strategy undertaken by that entity. Therefore, if the cost of equity is estimated based on observed equity risks for a sample of firms then, ideally, the cost of debt estimate should have regard to the debt financing strategies of the same sample of firms.

51. Consider again the illustration used in the previous section. A firm that relies solely on 3 month debt instruments will face very high refinancing risk. This will tend to raise the observed equity beta and cost of equity for that firm – raising the

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3 This is actually a doubtful proposition. The corporate yield curve is generally upward sloping at least in part because short term debt issued by a corporation is less risky than long term debt because it matures first. Consequently, a short term lender is less worried about default because they know the business has locked in funding from other debt providers that it does not need to repay in the short term. If all debt is short term debt then this advantage disappears – and we would expect the cost of short term debt to rise.

4 For example, debt investors are defaulted on and equity investors have their rights usurped by debt investors in bankruptcy proceedings. In the process, part of the intrinsic value of the firm is destroyed due to constraints on its ability operate without funds and in the midst of legal disputes between stakeholders.

sensitivity of its stock price to variation in the perceived liquidity of financial markets.

52. It would be a mistake to use this heightened cost of equity without recognising that it results from a specific debt financing strategy. That is, there is the potential to overestimate the efficient overall average rate of return by adopting this heightened cost of equity in conjunction with a more prudent assumed debt financing strategy (one that would not be associated with the observed heightened cost of equity). The opposite is also true. If the firms used to benchmark the cost of equity engage in prudent debt management practices which lowers their equity risks, then it would be inappropriate to combine a cost of equity estimated from these benchmarks with a cost of debt estimate based on a less prudent strategy (such as very short term borrowing).

2.4 Rule 87(8) to Rule 87(10)

53. Rule 87(8) states that the return on debt should be estimated to contribute to the achievement of 87(3) (the allowed rate of return objective).

54. Rule 87(9) makes clear that the regulator can update the return on debt each year of the access arrangement period.

55. Rule 87(10) is relevant to the first step of the estimation process (i.e., defining a benchmark efficient debt management strategy). Specifically, Rule 87(10) makes clear that, subject to it promoting the allowed rate of return objective and without limitation, the benchmark efficient financing strategy defined in the first step can be based on:

> *(a) the return that would be required by debt investors in a benchmark efficient entity if it raised debt at the time or shortly before the time when the AER's decision on the access arrangement for that access arrangement period is made;*
>
> *(b) the average return that would have been required by debt investors in a benchmark efficient entity if it raised debt over an historical period prior to the commencement of a regulatory year in the access arrangement period; or*
>
> *(c) some combination of the returns referred to in subrules (a) and (b).*

56. I believe that it is relevant that both 87(a) and 87(b) refer to the return that would be required by debt investors if the benchmark efficient entity raised its debt in a particular way. This is consistent with my view that it is necessary to define a benchmark efficient debt financing strategy before proceeding to estimate the costs of that strategy.

2.5 The national gas objective and the revenue and pricing principles

57. The national gas objective (NGO) and the revenue and pricing principles (RPP) in the NGL apply more broadly than to just the cost of debt and equity funding. However, in my view, the requirements set out in the NGL are consistent with my interpretation that the NGR requires an estimate of the allowed return on debt to be based on an estimate of the cost of following a benchmark efficient debt financing strategy.

58. In my view, if the allowance for the return on debt is based on a benchmark financing strategy consistent with what a benchmark efficient entity would undertake, then the regulated entity will:

- have appropriate incentives to invest and maintain its assets in a manner that promotes the national gas objective;
- have *"a reasonable opportunity to recover at least the efficient costs the service provider incurs in providing reference services"* - consistent with (2)(a) of the revenue and pricing principles;
- be provided with effective incentives in order to promote economic efficiency – consistent with (3) of the revenue and pricing principles;
- have tariffs that allow for a return commensurate with the regulatory and commercial risks involved in providing the reference service – consistent with (5) of the revenue and pricing principles; and
- have appropriate incentives to invest in the network - consistent with (6) of the revenue and pricing principles.

59. Similarly, setting tariffs to reflect the cost of debt associated with a benchmark efficient debt financing strategy is consistent with promoting efficient utilisation of gas networks by customers. In fact, in my view, achieving the allowed rate of return objective is an important foundation for achieving the national gas objective and the revenue and pricing principles.

60. Only if the cost of debt allowance is set consistent with a well-defined benchmark efficient debt management strategy can a business attempt to replicate that strategy such that its own efficient costs are commensurate with the allowance. If a business cannot do this because the cost of debt allowance is not based on well-defined debt management strategy, then a gap between the allowed and achievable cost of debt can be created. The effect of this gap can be to:

- weaken incentives to invest and maintain its assets in a manner that fails to promote the national gas objective;

- deny *"a reasonable opportunity to recover at least the efficient costs the service provider incurs in providing reference services"* - inconsistent with (2)(a) of the revenue and pricing principles;
- weaken incentives for efficient investment and thereby fail to promote economic efficiency – inconsistent with (3) of the revenue and pricing principles;
- result in tariffs that do not allow for a return commensurate with the regulatory and commercial risks involved in providing the reference service – inconsistent with (5) of the revenue and pricing principles; and
- fail to provide appropriate incentives to invest in the network - inconsistent with (6) of the revenue and pricing principles.

3 Assessment of the ERA methodology against the NGR and NGL

61. In my view the ERA's methodology for arriving at an estimate of the cost of debt is inconsistent with the requirements of the NGR and the NGL. A key reason for this conclusion is that the ERA has not attempted to adopt an estimation methodology that is derived from, or otherwise consistent with, a well-defined debt management strategy. As a result, the methodology is incapable of giving rise to an allowance that is commensurate with the efficient debt financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services.

62. In addition to this overarching flaw, there are aspects of the ERA's methodology that are, in my view, clearly inconsistent with a benchmark efficient debt management strategy. In particular:

    a. Any benchmark efficient debt management strategy should be based on the issuance of 10 year or longer debt – consistent with actual practice of regulated energy businesses both domestically and internationally. By contrast, the ERA sets an allowance for the cost of debt based on an undefined term of debt issuance (which is part of the reason that that it is not replicable). However, based on recent application of its methodology, the implicit term of debt issuance is a little over 5 years.

    b. The ERA resets the allowed DRP on the entire debt portfolio annually. In order to replicate this cost, a benchmark efficient entity would need to be reissuing 100% of its debt every year. While this is theoretically possible, it would require the entity to issue 1 year debt. This is inconsistent with both efficient practice (10 years) and inconsistent with the ERA's own implicit practice (indeterminate but currently a little over 5 years).

3.1 The ERA's methodology

63. The ERA's rate of return guidelines sets the allowance for the cost of debt in each year of the regulatory period based on:

    - an estimate of the yield on 5 year CGS over a 40 day period just prior to the beginning of the regulatory period; plus
    - an estimate of the debt risk premium (DRP) prevailing at the beginning of each regulatory year arrived at using the ERA's 'bond yield' approach (based on a weighted average of observed DRPs for a particular sample of BBB- to BBB+ rated corporate bonds).

64. This approach to can only be consistent with the allowed rate of return objective if the resulting estimate of the cost of debt is *"commensurate with the efficient financing costs of a benchmark efficient entity with a similar degree of risk as that which applies to the service provider in respect of the provision of reference services"*.

65. Except by accident, this will not be the case unless there exists a benchmark efficient debt financing strategy that would give rise to a cost of debt consistent with these calculations. However, as I discuss in the next sections, there is no feasible debt financing strategy that will give rise to such a cost of debt consistent with the ERA's calculation procedure. Certainly, there is no such efficient debt management strategy.

3.2 Term of debt issuance

66. An important element of any debt financing strategy that must be established is the term of the debt that the entity issues under the benchmark financing strategy.

3.2.1 What do regulated energy businesses do

67. The ERA surveys evidence provided by CEG and PwC to the effect that the average tenor of debt at the time of issuance by infrastructure businesses, including Australian regulated energy businesses, is in excess of 10 years.[5]I have further confirmed this with subsequent analysis of audited non-publicly available information sourced from ENA members. Based on these data I estimated a simple and weighted average term of debt at issuance of 10.9 years and 10.5 years respectively. My letter to the AER detailing this analysis is provided at Appendix A.

68. The AER, relying on the same data presented by me, adopts an estimate of 8.7 year term at issuance – although this is achieved by including the wholly Singapore Government owned business SPIAA and treating callable debt 'as if' it matures at the first call date.[6]For the reasons outlined in my letter, I do not consider that these are appropriate adjustments to make when estimating the benchmark term of debt issuance for a benchmark efficient entity. In any event, the AER adopts a 10 year term as the relevant benchmark.

69. The same pattern of long term debt issuance is observed for US and UK regulated energy businesses.[7]In the context of a report for the ENA, I estimated a weighted average term of debt at issuance of 18.2 years across a sample of 86 regulated US

5 See Appendix 3 to the ERA Explanatory Statement to the Rate of Return Guidelines, p.35.

6 See AER, Explanatory Statement to the Rate of Return Guidelines, p. 142.

7 CEG, *Debt strategies of utility businesses, A report for the ENA*, p.31

energy businesses. The weighted average term to maturity at issuance for the businesses within the sample with the highest proportion of regulated assets is even higher, at 19.4 years. In the same report, I demonstrated that the weighted average term of debt at issuance for UK regulated energy businesses is 19.1 years.[8]

70. Further to this, the ERA performs its own analysis and confirms the finding that regulated businesses issue 10 year debt.[9]

3.2.2 Why do regulated energy businesses issue long term debt?

71. The near universal practice of regulated energy businesses issuing long term debt provides strong evidence that this practice is efficient. That is, this practice tends to lower the overall risk adjusted finance costs of a regulated energy business. If this was not the case then we would not observe such a tendency in the data.

72. Moreover, the fact that we do observe this strong tendency in the data means that issuing short term debt must be expected to raise risk adjusted finance costs. This conclusion is grounded in one of the fundamental principles of modern finance theory, namely, the Modigliani-Miller Theorem.

73. This theorem states that in perfectly liquid and frictionless markets, the way in which a firm finances itself has no impact on the cost of capital – it just shifts risk around to different investors. However, in the real world, capital markets are less than perfect, and the fact that we see some dominant financing strategies must reflect an attempt by firms to minimise transaction costs and risks that arise from market imperfections. This is discussed further in Appendix B and Appendix G to this report, where I also discuss the role of long term debt issuance in minimising refinance risk – the existence of which is a form of "market imperfection". However, the principle is intuitively simple and flows from the proposition that businesses have an incentive to adopt an efficient debt finance strategy. If we observe that businesses overwhelmingly issue long term debt, then it should be assumed that it is efficient to so.

3.2.3 What does this mean for the regulatory benchmark?

74. Given that there is no dispute that the observed term of debt issued by regulated businesses is around 10 years, I consider that this should form the basis of a benchmark efficient debt finance strategy that the ERA should attempt to estimate the cost of.

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8 CEG, *Debt strategies of utility businesses, A report for the ENA*, p.30

9 See ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, Appendix 3, pp. 38-39

3.2.4 What is the ERA's implied term at issuance?

75. The ERA's implicit estimate of the term of debt issued is, by contrast, defined by the average maturity of the bonds in its sample used to implement the 'bond yield' approach. The average term of debt will vary depending on the bonds that are in the sample, and the weights applied to them will tend to be around half of the average maturity that those bonds had at the time of issuance. That is, the remaining life of bonds in the ERA sample will tend to be half of the maturity of those bonds at the time that they were issued.

76. Strict application of the ERA bond yield methodology from the 22 October 2013 to the 18 November 2013 results in a weighted average remaining maturity of bonds of 5.7 years. This is around half of the 10 year plus maturity at issue that we actually observe for regulated utilities.

77. Moreover, because the term of debt will vary from year to year depending on the vagaries of maturities of the bonds in the ERA sample, this makes it impossible for an entity to have a debt management strategy consistent with the ERA benchmark. That is, if the average term of the bonds in the ERA sample is 5 years in one regulatory year and 6 years in the next then it will not be possible for a regulated business to have a portfolio of debt that has a term at issuance that matches the ERA's implicit term in both years – even assuming it could predict what that would be in advance (which it could not). This is discussed further in Appendix C.

3.2.5 What reason does the ERA give for not adopting a 10 year debt issuance

78. The ERA acknowledges the difference between the maturity at issue of regulated utilities (10+ years) and the weighted average maturity of the bonds used to estimate its DRP. However, the ERA argues at length that it is not the maturity of a bond at the time of issuance that is relevant, but rather the maturity of the bond at the current time.[10]

> *The Authority considers that it is the average remaining term to maturity that determines the debt profile of a firm at a given time.* ***That is, the yield required to service a firm's cost of debt is a function of the remaining term to maturity, and not the term to maturity at issuance.*** [emphasis added]

79. This view is expressed in multiple places in the Explanatory Statement (see Appendix C for details). In summary, the ERA states that:

    - regulated utilities issue 10 year debt; but

[10] ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, Appendix 3

- because this debt is issued gradually through time, the average remaining maturity of a bond is only a little over 5 years; and
- the yields that a business has to pay to service its debt are determined by the remaining term to maturity and not the term to maturity at issuance.

80. The ERA and I are in broad agreement on the first two points. However, I strongly disagree with the ERA's view summarised in the third point above. This position is incorrect. Once a bond is issued, its coupon (or its trading margin (equivalent to the DRP) if it is a floating rate bond) is fixed and the issuer is legally obliged to pay that amount for the life of the bond. The price, and therefore the yield, of the bond in secondary markets may vary but this has no impact on the legal obligations of the issuer. It is quite true that, given an upward sloping yield curve and holding other things equal, the yield on secondary bonds will tend to fall as their remaining maturity falls. However, this has no effect on the obligations of the issuer – which are set at the time of issuance. (I provide a worked example in appendix C.1 illustrating the difference between the coupon paid on a bond (which is set at the time of issue) and the yield on the same bond in secondary markets.)

81. This is recognised by the AER in its Rate of Return Guidelines where it correctly states:

> *For the purposes of estimating debt yield compensation we consider that it is appropriate to consider:*
>
> …
>
> - *Term at issuance rather than term to maturity. Term at issuance reflects the premium associated with the original term length. An issuer must pay this premium irrespective of the premium at a subsequent point in time, as reflected by the term to maturity.*[11]

82. In contrast, the ERA's conclusion that "the yield required to service a firm's cost of debt is a function of the remaining term to maturity, and not the term to maturity at issuance" is incorrect. Consequently, the basis for the ERA not adopting a 10 year term falls away.

83. In Appendix C, I also review statements by the ERA to the effect that its approach is consistent with advice from Associate Professor Lally and other possible claims in support of the ERA's term assumption. I find that these claims are also incorrect and rest on the same fundamental error described above.

[11] AER, *Explanatory Statement to the Rate of Return guideline*, December 2013, p. 144.

3.3 Annual update to the DRP

84. The ERA justifies basing the cost of debt allowance on the 5 year CGS rate at the beginning of the regulatory period on the basis that derivative contracts (interest rate swaps) make it possible for a regulated business to issue staggered debt but to hedge its base interest rates to the levels that prevail at the beginning of the regulatory period using interest rate swaps:[12]

> *The on-the-day approach has been criticised on the grounds that it somehow does not allow firms to establish a debt portfolio with maturities that are staggered over time in order to avoid 'refinancing risk' (staggering is also known as debt laddering).Hence, stakeholders have argued that the approach is not replicable. The Authority considers that this view is incorrect.*
>
> *The Authority notes that this lack of replicability is predicated on the idea that the firm is unable to hedge its existing portfolio of staggered debt to reflect exactly the return on debt estimated through the on-the-day approach. The implied view is that the regulated firm must issue all of its debt in the averaging period, just prior to the regulatory period.*
>
> *However, the Authority considers that regulated firms may issue debt at any time, and may hedge the risk free rate by undertaking interest rate swaps, in order to convert to the rate that reflects the prevailing on-the-day rate adopted as the regulatory return on debt.*
>
> *The Authority has not been presented with concrete evidence of impediments to hedging the risk free rate, through the use of interest rate swaps.*

85. This is discussed in more detail in Appendix D where I also describe why I do not consider that such an interest rate swap strategy is efficient. However, even if one did believe that this was efficient, the ERA and its advisers clearly accept that it is not possible to alter the profile of DRP costs in the same way as base interest costs.

> *There are limited instruments for any firm seeking to hedge the debt risk premium.*[13]

86. The ERA's adviser, Chairmont Consulting, states the issue more plainly:

> *DRP cannot be hedged. The regulatory cost of debt calculation must recognise that DRP cannot be effectively hedged because of the lack of liquid derivatives.*[14]

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12 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, pp.67-68.

13 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 69

87. In simple terms this means that the DRP on an entity's portfolio of debt will reflect the historical average DRP that existed at the time each bond in the portfolio was issued. Unlike the base level of interest rates, exposure to which can be altered via entering into interest rate swaps, it is not possible to alter the level of firm specific risk premium that a business pays.

88. The inability to hedge the DRP means that, under any financing strategy, the DRP that is incurred when a bond is issued is fixed until the maturity of that bond. In other words, there is no way for an entity (efficient benchmark entity or the actual service provider) to implement a benchmark efficient debt management strategy that would have the DRP on pre-existing debt reset every year at prevailing DRP rates.

89. The ERA makes the following inexplicable statement in relation to the lack of hedging options for the DRP and its proposed annual updating of the DRP:

> *The debt risk premium will be derived from the yield to maturity of an observed sample of bonds issued by comparator firms with similar credit ratings as the regulated entity (see Chapter 8 – Benchmark credit rating and Chapter 9 – Debt risk premium).* ***The debt risk premium will be updated annually in recognition that it is difficult for firms to manage risk related to changes in this component of debt, given the lack of hedging instruments.***[15][Emphasis added.]

90. I do not understand why the ERA considers that updating the DRP annually helps an entity manage the difference between their actual cost of debt (based on an historical average DRP) and the ERA's allowance. As described above, the DRP paid by a business on its debt issue is fixed for the term of the debt. Updating the allowance to reflect a different prevailing DRP every year does not assist the business align its actual cost of debt with the ERA's allowance in the same year.

91. By way of illustration, let the 10 year historical average DRP on 10 year debt be 3%. However, let the prevailing DRP on 10 year debt be 1%. The actual DRP being paid by a benchmark efficient entity issuing staggered debt would be 3% at the beginning of the year but the ERA DRP allowance would be just 1% - this would be 1.9%[16] lower than efficiently incurred DRP on average over that year.

92. Clearly, the use of a historical average DRP estimate will result in an allowance more commensurate with this assumed debt management strategy. A DRP estimated in this way would be relatively stable through time, better reflecting the

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14 Chairmont Consulting, Cost *of Debt Comparative Analysis*, p. 27

15 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p.53

16 The actual DRP would fall from 3% to 2.8% over the course of the year as 10% of the debt portfolio was rolled over at the lower rate of 1%. The average DRP over the year would be 2.9%.

actual impact of changes in prevailing DRP on an entity's interest costs. By contrast, the ERA's proposed annual updating 'turbo charges' volatility in the cost of debt allowances making it more likely not less that the allowance will significantly differ from actual debt costs.

93. The ERA's Guidelines explicitly include a 2.5bp allowance for the cost of hedging using interest rate swaps:

> *In addition, the Authority recognises that there is a cost involved with hedging. The Authority considers that an annual swap allowance of 2.5 basis points should be provided to firms on the whole of the debt portfolio to compensate for the cost of conducting hedging for the exposure to movements in the risk free rate. The hedging cost allowance would also be added to the return on debt.*[17]

94. However, the DRP is not estimated consistent with the implementation of this strategy (i.e., on a historical average basis). Rather, the antithesis of this, annual updating of the entire DRP allowance, is proposed.

95. The only circumstance in which an entity could align the DRP it pays with the ERA's proposed annual update to the DRP is if the entity relies solely on one year maturity debt (i.e., rolls over 100% of its debt each year). That is, implicitly, the ERA's implied benchmark efficient debt management strategy could be described as follows:

- the benchmark efficient entity finances itself solely with 1 year bonds refinanced at the beginning of each regulatory year; and
- the entity enters into swap contracts to lengthen the base rate exposure for its portfolio from 1 to 5 years (reset at the beginning of each regulatory period).

96. In this case the DRP that the entity faces would be reset every year. However, the credit rating for this entity would need to be consistent with this financing strategy. This credit rating would certainly not be investment grade due to the extreme reliance on short term debt issues. As noted by Kanangra:[18]

> *Rating agencies do not stipulate the debt amount for the capital structure for an issuer. Neither do they counsel issuers on the most appropriate markets for raising debt, nor the term of the debt. However rating agencies are looking for issuers to be conservative in their approach to the debt markets.*
>
> *Factors which the rating agencies seek in highly rated users are:*

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17 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, para.

18 Kanangra, Credit Ratings for Regulated Energy Network Services Businesses, p. 26.

- *A company with a spread of maturities to its debt, such that only a small proportion of its debt matures within each year;*
- *Refinance of maturing debt within 6-9 months of its maturity. Early refinancing obviates the risk of the issuer not being able to refinance a tranche of debt if there is a market disturbance when the debt is maturing; and*
- *Access to liquid funds.*

Neither rating agency has published rules concerning debt maturity or refinance Neither are direct ratings drivers, but both contribute to a well-managed company and go towards stronger ratings.

Liquidity is however a significant consideration for rating agencies. The rating agencies take the approach that a company cannot be investment grade without adequate liquidity. In order to be IG an issuer must not only satisfy the long term metrics but must also have acceptable liquidity. Both agencies measure liquidity by calculating the ratio of the assured cash sources over the next 12-24 months to the cash uses over the same time period. In each opinion each agency has a section on liquidity, in which it describes the sources and uses of cash for the next 12-18 months.

97. In short, having 100% of debt refinanced every year would not provide "a spread of maturities to its debt, such that only a small proportion of its debt matures within each year" and would create a cash requirement (including the cash necessary to repay all debtors for 60% of the value of thereby) that massively exceeded the assured cash sources over the same period. It would also be inconsistent with the formal debt management strategies adhered to by regulated utilities that require no more than 15% to 25% of debt can fall due in a given year.[19]

3.4 How does the ERA justify a non-replicable allowance?

3.4.1 The ERA allowance is not replicable

98. The ERA's cost of debt allowance is not replicable by an efficiently financed benchmark entity because it is not based on the costs of a defined debt management strategy. As discussed in the previous sections, it is based on:

- an indeterminate term of debt issuance (one that is currently 5.7 years based on the bonds in the ERA sample – well below the efficient term of debt issuance based on actual business practice); and

[19] AER, *Explanatory Statement to the Rate of Return guideline*, December 2013, p. 139.

- annual updating of the DRP when the actual DRP for any entity will reflect the historical average DRP.

99. In addition, as discussed in Appendix D the ERA's adoption of a 5 year Commonwealth Government Security (CGS) rates as the base interest rate (and measurement of the DRP relative to CGS rates) is also internally inconsistent with its assumed use of interest rate swaps to reset the base interest rates. That is, if it is assumed that base interest rates are reset using interest rate swaps then the calculation of the cost of debt should reference swap rates not CGS rates – as Chairmont consulting also advised the ERA.

3.4.2 The ERA's rationale for its position

100. The ERA understands that its methodology is not based on a well-defined benchmark efficient debt management strategy. The basis for this is that the ERA interprets the NGR and the NGL as requiring it to set a cost of debt that maximises "economic efficiency" broadly defined. The ERA's analysis leads it to the conclusion that, in order to do this, it should annually reset prices consumers face based on prevailing conditions in debt markets at that time.

101. The ERA does not reach this conclusion because it believes that refinancing 100% of debt every year is an efficient debt management strategy for a benchmark efficient entity. Rather, it is because it believes that setting prices on this basis will give the entity and consumers economically efficient investment and consumption signals.

102. The decision framework that the ERA establishes for itself is described by the following introduction to Appendix 3 – which puts forward 'economic efficiency' as the first of three key evaluation dimensions.

> *i) economic efficiency – does the proposed approach lead to efficient financing costs and economic efficiency; in particular, is it:*
>
> *1. an approach which retains incentives for the regulated firm to adopt efficient financing practices; and*
>
> *2. a good predictor for the actual cost of debt in the regulatory years, thereby providing effective incentives in order to promote economic efficiency;*

103. It is notable that, in setting out these criteria, the ERA does not include providing compensation to a service provider that is commensurate with the efficient financing costs of a benchmark efficient entity as an objective. That is, the ERA does not include the allowed rate of return objective as an objective. Rather, it states its objective as retaining *incentives for the regulated firm to adopt efficient financing practices*. I do not view these as the same thing.

104. Consistent with the ERA's stated evaluation criteria, its ultimate rationale for its methodology is based on its belief that, in order to promote economic efficiency, it is desirable that the cost of debt allowance in each year reflects the prevailing cost of newly issued debt at that time. The ERA accepts that it is not possible for any entity (be that a benchmark efficient entity or the regulated service provider) to arrange its debt financing strategy so that its debt financing costs are equal to the allowance that the ERA provides.

105. The ERA describes the difference between the allowance that it would provide and the cost of debt that an entity (including a benchmark efficient entity) would incur as 'mismatch timing risk':

> *The Authority notes that the practice of staggering debt may increase 'mismatch timing risk'. As noted above, mismatch timing risk, also known as interest rate risk, derives from having revenue based on an assumption of the cost of debt that differs from the cost of debt that the firm actually incurs.*[20]

106. By not setting the cost of debt allowance based on the cost of specific debt management strategy that an entity could follow the ERA creates 'mismatch timing risk'. However, the ERA believes that this is a virtue of its approach because non-regulated firms are exposed to 'mismatch timing risk'. The ERA argues that were it to adopt a methodology that had the potential to allow regulated firms (even in theory) to eliminate 'mismatch timing risk' then this would lower their funding costs relative to unregulated firms; an outcome which the ERA considers would lead to a reduction in economic efficiency.

> *The regulated firm's debt risk premium, under a trailing average approach, would also likely reduce, as lenders would account for the lower risk of future mismatch timing risk and related risks, such as default risk. However, to the extent that this opportunity is not available to other unregulated firms in the economy, such an approach would create a type of financial subsidy to the regulated firm. This creates an economic distortion and an associated reduction in economic efficiency.*[21]

107. The belief that the ERA should aim to align the level of 'mismatch timing risk' faced by service providers with the level of 'mismatch timing risk' faced by an unregulated firm is stated in several places in its explanatory statement. I detail further relevant quotes in Appendix E.

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20 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 69.

21 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 71.

3.4.3 Critique of ERA rationale

108. In my view the ERA's rationale for choosing to create 'mismatch risk' is fundamentally flawed and cannot be justified under the NGR and NGL. I consider that the ERA has misinterpreted the economic content of the NGR and NGL.

109. The ERA interprets its objective when setting the allowance for the cost of debt as being to promote economic efficiency – interpreted broadly so as to include productive, allocative and dynamic efficiency. This includes sending appropriate signals to customers to consume regulated and unregulated services across the economy.

110. By contrast, Rule 87(3) sets out the allowed rate of return objective as follows:

> *The allowed rate of return objective is that the 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 applies to the service provider in respect of the provision of reference services (the allowed rate of return objective).*

111. There are two references to 'efficient' in Rule 87(3). However, in my view these clearly related to the efficient *costs* that would be incurred by a benchmark efficient entity. The word "cost" in this context is critical. Rule 87(3) attempts to align the regulatory *allowance* provided with the *costs* of a benchmark entity. The use of the adjective *efficient* does not fundamentally change this meaning. It simply makes clear that the costs in question are efficiently incurred by an efficiently structured entity. In this context, the term 'efficient' could reasonably be interpreted as connoting 'prudency' or 'cost minimisation'.

112. The ERA's rationale for its cost of debt methodology involves a deliberate and explicit departure from this objective. The ERA does not start from the assumption that it must allow a cost of debt commensurate with an efficient debt financing strategy that an efficient benchmark entity would undertake. Rather, the ERA starts from the assumption that it must set the cost of debt allowance in order to promote economic efficiency. The ERA's interpretation of economic efficiency is very broad as reflected in the below statement.

> *Further, the Authority considers that economic efficiency cannot be considered in terms of a single firm or a single group of consumers. Such a partial approach may be efficient in isolation, but still leave net efficiency gains once the full general equilibrium considerations are considered. The Authority is required to achieve efficient outcomes for the long term interests of consumers of natural gas. Those consumers of natural gas are engaged with the broader economy. Hence their long term interests take into account that engagement with the broader economy. This requires efficient pricing of gas transmission and distribution network services,*

consistent with outcomes that would be observed in effectively competitive markets.[22]

113. Even if this interpretation of economic efficiency is correct it does not alter the interpretation of Rule 87(3). Rule 87(3) does not refer to "economic efficiency". Rule 87(3) refers to "efficient financing costs of a benchmark efficient entity". As described in section 2.2.1 the term "efficient" here has the same meaning as "prudent" or "lowest expected cost" rather than the much broader concept of promoting global economic efficiency across the economy.

114. For the reasons described in section 2.5, I consider that achieving Rule 87(3) also promotes "economic efficiency" when properly defined. As such, there is no tension between achieving Rule 87(3) and promoting "economic efficiency".

115. However, the ERA believes that a tension exists between my interpretation of Rule 87(3) and promoting global economic efficiency across the economy. The ERA decides to attempt to promote its conception of economic efficiency even if this results in an allowance that is not commensurate with the efficient financing costs of a benchmark efficient entity following an efficient debt management strategy.

116. In doing so, the ERA explicitly rejects what I regard as the core requirement of Rule 87(3). That is, it refuses to base its allowance for the cost of debt on the costs that would be incurred in implementing a defined financing strategy. Moreover, the basis for not adopting a defined benchmark financing strategy is, inexplicably, that it would allow service providers to align their cost of debt to the regulatory allowance and thereby offer the potential to largely eliminate 'mismatch risk'. The ERA regards this as resulting in a reduction in economic efficiency on the grounds that:

… to the extent that this opportunity is not available to other unregulated firms in the economy, such an approach would create a type of financial subsidy to the regulated firm. This creates an economic distortion and an associated reduction in economic efficiency.[23]

117. The ERA restates this logic in Appendix 3

… it may be observed that if the regulator set the cost of debt through a portfolio approach, then the regulated firm could have no residual mismatch timing risk, where it issued debt in equal tranches consistent with the periods of the trailing average. As the mismatch timing risk relates largely to the debt risk premium, then this would be the same

22 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 61.

23 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 71.

> *irrespective of whether a pure trailing average or a hybrid portfolio was adopted.*
>
> *Removing this mismatch timing risk from the regulated firm could artificially lower the cost of debt, all other things being equal, given that lenders consider all risks when setting the debt risk premium. This artificial lowering for the regulated firm, as compared to the market firm, would result in a distortion in financing costs between firms in the economy. This provides a further reason, in addition to the efficiency considerations, as to why the trailing average portfolio approach is less efficient than the on-the-day approach.*[24]

118. This logic is simply wrong as a matter of economics. The fact that a 'portfolio approach' (also described as a 'trailing average') would lead to lower costs is precisely why it should be adopted as the relevant efficient benchmark. Inexplicably, the ERA turns a virtue into a vice.

119. To the extent that it is within the ERA's power to lower the risks, and therefore the costs, of service providers then the ERA should adopt that practice and, in doing so, it would promote economic efficiency.

120. This would result in a cost reduction due to regulatory innovation that is just as valuable to society as a technological innovation of another kind. No economist would argue against the introduction of a technological innovation that lowered costs for industry "X" just because this would lower their costs relative to other industries who cannot have this technological innovation applied to them. Such a cost reduction does not involve a 'subsidy' nor does it create a 'distortion'. Such a cost reduction is clearly welfare enhancing 'progress' and is the primary engine of economic growth in the economy.[25]

121. Moreover, a pathway from lower risks to lower prices to end users is directly anticipated in Rule 87(3) which states that compensation must be commensurate with the degree of risk "*…which applies to the service provider in respect of the provision of reference services*". To the extent that the ERA's methodology for setting the cost of debt allowance lowers the risk of a regulated service provider

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24 ERA, Explanatory Statement for the Rate of Return Guidelines, Appendix 3, December 2013, p. 43.

25 The argument made by the ERA is that it should not adopt a policy that would reduce risks and costs for regulated businesses because this cost reduction is not available to other businesses. Applying this same logic elsewhere would lead to equally absurd results. For example, it would imply that the innovation in the use of pesticides for apple orchards created an 'economic distortion' because the opportunities created were not available to gas pipeline investors. Gas pipeline owners are made no worse off if apple producers can innovate and reduce costs – in fact they are made better off to the extent that the price of apples fall as a result (as gas pipeline owners are also consumers). Similarly, apple orchardists are made no worse off if gas pipeline owners' risks and costs fall – in fact they are made better off to the extent that the price delivered gas falls (as are all direct and indirect consumers of energy from gas).

then 87(3) would have those lower costs passed onto customers. Even if this pass-through only happened with a delay (say, until credit ratings for regulated businesses adjust to reflect the change in practice), economic efficiency would be promoted in the meantime by virtue of the risk reduction. It is just that the beneficiaries of the cost reduction would initially be the investors in the service provider.[26]

122. Consistently applying this flawed logic the ERA sees its objective as trying to align the mismatch timing risk that a regulated firm faces with that faced by an unregulated firm:

> *To the extent that the mismatch timing risk of the regulated firm would then be aligned with that faced by the unregulated firm in an effectively competitive market, then the outcome would be consistent with efficient financing costs, and with the requirement for efficiency more generally.*[27]

123. Not only is this objective fundamentally flawed as a matter of economics, it is inconsistent with the requirements of Rule 87(3). A further critique of the ERA's analysis of why its approach promotes economic efficiency is provided in Appendix E.

124. Finally, it is worth noting that the benchmark credit rating is influenced by more than just the nature of the cost of debt allowance. It is also influenced by the level of equity buffer provided in regulatory decisions - which in turn depends in part on the assumed equity beta. Similarly, institutional settings and projected volatility in debt markets are important for an assessment of credit ratings. Transitioning to a more easily replicable cost of debt allowance can be expected, other things equal, to raise the benchmark credit rating. However, other things are not equal. For example, the cost of equity allowance under the ERA guidelines will very likely be lower than the cost of equity allowance received by those regulated businesses that the ERA has used to determine the benchmark credit rating (over the historical 5 year period used by the ERA). This is discussed further in Appendix F.

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26 Moreover, the ERA assumes that its assumed credit rating already compensates for the higher cost and higher risk that its new methodology imposes. As discussed above, I consider that the opposite is true. That is, there would need to be a corresponding reduction in the benchmark credit rating (which is based on businesses that aren't subject to this risk) and/or a separate allowance that compensates for the higher risk.

27 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 74.

4 The efficient benchmark debt management strategy

125. In my view, any benchmark efficient debt management strategy consistent with the NGR and NGL needs to be based on a staggered issuance of debt with a term at issuance of 10 years. This is the observed practice of both Australian and foreign utilities. Consistent with the analysis in section 3.2andit is appropriate to assume that the uniformly observed practice of regulated utilities staggering their debt maturity profile (and therefore their issuance requirements) is efficient. This fact means that the cost of debt on an efficient debt management portfolio will be a function not just (or even primarily) of prevailing interest rates but will be a function of historical average interest rates over the period the current debt portfolio was raised.

126. Consistent with this fact, the AER, operating under the same Rules as the ERA, has adopted a 10 year trailing average of the cost of debt as the basis for setting the regulatory allowance. Ofgem in the UK also uses a 10 year trailing average of 10 year debt costs[28] as do US regulators (although for US regulators the time horizon reflects the actual issuance of a regulated business (often extending out to 20 years).[29] Of domestic non-energy regulators, IPART also has regard to a 10 year trailing average – although IPART also has regard to a prevailing estimate of the cost of 10 year debt.

127. Consistent with the practice of regulated businesses and the practice of Australian, UK and US energy regulators, I consider that setting a cost of debt allowance based on a 10 year trailing average of interest rates on 10 year debt would promote the allowed rate of return objective and the NGR and NGL more broadly. This approach would result in a stable cost of debt allowance that was simple and low cost for a business to hedge to. The stability of a trailing average allowance would be in customers' and businesses' mutual interests – consistent with submissions to both the AER and the ERA from both sets of stakeholders.

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28 Ofgem, Strategy decision for the RIIO-ED1 electricity distribution price control, March 2013, p.10

29 There are many different State and Federal based regulators of US energy networks. However, Regulatory Research Associates provides a summary of standard practice by US regulators called "The rate case process: a basic guide" published in June 2011. On page 6 of that document US regulatory practice is summarised as follows:

In a rate case, the cost of debt, 6.5% in the table above, is the "embedded" cost of debt, usually an average of the cost of the debt issues that the company has outstanding. It is not the current yield – it is the embedded cost which reflects the bonds' coupon payments. This issue is usually straightforward. The same methodology applies to the cost of preferred stock.

128. I set out below five criteria that I consider a benchmark efficient debt management strategy should satisfy.

    i. It should be hedgeable/replicable in the sense that it is able to be implemented by the benchmark efficient entity – the strategy must be feasible for a business to implement.

    ii. Implementation of the strategy involves low transaction costs for the business – if there are two equally implementable debt raising strategies, the strategy that involves the lowest transaction costs (direct and indirect) should be preferred.

    iii. It minimises the prospect and consequences of estimation error – a business should be able to be confident that, if it manages to the benchmark strategy, its cost of debt will move with the ERA's estimate of costs.

    iv. It gives rise to relatively low price volatility for customers. Customers are not well placed to hedge against the resulting volatility in network prices and especially do not want to be facing higher prices when they are facing broader budgetary pressures, e.g., due to a financial crisis.

    v. The benchmark debt management strategy should reflect the standard practice of businesses operating in similar environments to network energy businesses.

129. I consider that a 10 year trailing average of 10 year fixed rate debt costs is the benchmark debt management strategy that best satisfies the five criteria I have set out above. (Detailed reasoning, along with a description of why these criteria are consistent with the NGR and NGL is provided in Appendix G)

130. In reality, almost all businesses, including regulated infrastructure businesses, raise debt in a staggered fashion over time. Moreover, for infrastructure businesses with very long lived assets, the average maturity of this debt at the time of issue tends to be long term (around 10 years or more). It is very likely that this is a response to a desire to minimise expected transaction costs, in particular insolvency/bankruptcy costs that are heightened if large amounts of debt must be refinanced in a short period of time. Consequently, a business's cost of debt at any given time will reflect the costs incurred when issuing debt over the last decade and not just over the last 10 to 40 days.

131. In order for a cost of debt benchmark to reflect this practice it is necessary for it to capture the cost of debt issued over a long period into the past as well as more recently. One simple way to do this would be to estimate, and periodically update, a trailing average cost of debt over the last 10 years (consistent with the average term of debt issuance for Australian regulated businesses). This would be updated periodically (either annually within the regulatory period or every five years).

132. This benchmark performs well against the criteria I set out above.

i. It is hedgeable/implementable. In order to implement this benchmark all a business must do is engage in staggered issuance of 10 year debt so that it is refinancing around 10% of its portfolio each year.

ii. It is low transaction cost for the business. The business must simply issue staggered debt at a rate of about one 1oth of their portfolio every year. Similarly, by spreading refinancing over 10 years this will prudently manage refinancing risk and minimise the associated transaction costs.

iii. The potential cost of estimation error is low. A business can be confident that, if it issues staggered 10 year debt its costs will move with the regulator's estimate of costs. This is because a trailing average can be updated regularly –annually and potentially quarterly. Consequently, any one estimate of the cost of debt will have a weight in the trailing average of at most 10% (2.5% if quarterly estimates are used). An error in one period's estimate will not have a significant impact on the overall allowance. Only if the cost of debt was repeatedly mis-estimated, and in the same direction each time, would the benchmark estimate depart materially away from the actual market cost of debt associated with that benchmark.

iv. It gives rise to relatively low cost volatility and does not result in higher prices when customer budgets are under stress. The gradual updating of the benchmark estimate means that it is relatively stable. This stability has the effect of preventing cost of debt allowances materially contributing to network price increases at precisely the time that customers would most value lower prices (and vice-versa with respect to cost of debt reductions contributing to price reductions when these are less important to customers).

v. A 10 year trailing average is also consistent with standard business practice. It is standard practice for infrastructure businesses to engage in staggered issuance of long term debt. Consistent with the reasoning in Appendix B, this suggests that this approach is likely to minimise transaction costs.

4.1 Transition arrangements

133. However, this involves a material departure from the previous regulatory practice (under the previous Rules) of resetting the cost of debt at the beginning of the regulatory period based on then prevailing conditions in debt markets. Businesses have the (imperfect) ability to use options and derivative products to manage the risk created by regular resetting of the cost of debt. However, once in place, these elements of a debt management strategy take time to unwind.

134. To the extent that a business has managed its debt portfolio on the basis that the previous regulatory practice would continue then it may be appropriate for that business to transition over time to a 10 year trailing average. This could be achieved via a transition mechanism as proposed by the AER (which gradually transitions the allowance every year over 10 years) or a mechanism that sets an "on the day"

allowance for the entirety of the next regulatory period but introduces a full or partial trailing average at the beginning of the subsequent regulatory period.

4.1.1 Mechanisms used to manage mismatch risk

135. Businesses may have use callable debt to give it the option to refinance at the beginning of the regulatory period. In so doing, the firm could limit the potential that the regulatory allowance, based on the prevailing market conditions, is materially lower than the cost of debt on its existing bonds. If this scenario does eventuate then the entity might attempt to raise new debt at the lower rates. If it is successful then it could exercise its call option to retire the existing (higher cost) debt and use the proceeds from the new debt for this purpose.

136. The ERA itself identifies the possible use of call options as a separate means of giving the regulated business the option to reset both its DRP and base rate exposure at the beginning of the regulatory period.

> *Firms may choose not to hedge, but to use other instruments to manage their mismatch pricing risk. For example, many firms include options in their debt issuance, to allow them to call back debt when it is more expensive than the prevailing rate, and then reissue new debt at the lower prevailing rate. These call options assist firms to minimise their financing costs, and are available to regulated and unregulated firms alike. The use of such instruments is productively efficient and part of efficient financing practices.*[30]

137. However, the ERA does not make clear that this form of protection comes at a cost in the form of having had to issue higher cost callable debt in the first place. Callable debt is higher cost than non-callable debt because an issuer must promise to pay the lender a 'call premium' in order to compensate the lender for precisely the above eventuality (i.e., that the debt will be called when/if interest rates are lower than the coupon rate set on the bond at the time of issue).

138. Another method that an entity might use to protect itself from this mismatch risk is by using interest rate swaps in an attempt to reset at least the base interest rate at the time of the regulatory decision. Of course, as discussed in section 3.4.1this does not reset the DRP component of the entity's debt costs. Moreover, as the ERA has itself noted, entering into an interest rate swap involves taking on risk that is not compensated.

> *The Authority notes that using observed market transactions of swap rates will result in estimates of the risk free rate that are biased upward. This is a consequence of the possible counter-party credit risk present in*

30 ERA, Explanatory Statement to the Rate of Return Guidelines, p. 70.

IRS and the implicit premium paid by those hedging when entering into a swap. This approach also relies on the assumption that longer maturity swap markets are sufficiently liquid.[31]

139. This statement was deployed by the ERA as a basis for not using the swap rate as the risk free rate in the cost of debt calculation. However, it equally well serves as a basis for concluding that using swap contracts are an imperfect (costly) way in which to manage interest rate risk to the regulatory benchmark. Consequently, it would be inappropriate to assume that such a strategy forms part of the benchmark efficient debt management strategy in the long run (consistent with the criteria that the benchmark strategy should attempt to lower transaction costs).

140. This is consistent with the submission from the Australian Financial Markets Association to the AER that incorporating a swap overlay into the benchmark efficient debt management strategy would raise rather than lower the cost of debt.[32]

AFMA submitted that due to recent international regulatory developments it considers that interest rate swaps are likely to increase the cost of debt rather than reduce the cost of debt.

4.1.2 Transition arrangements

141. Notwithstanding the imperfect nature of the mechanisms available to hedge to an 'on the day' cost of debt allowance, businesses may have put some of these in place. However, once in place, these elements of a debt management strategy take time to unwind. Consistent with this it may be appropriate to apply a transition to a trailing average cost of debt overtime. The AER expressed the same conclusion:

In section 7.3.3 we considered what would constitute the efficient debt financing practices of the benchmark efficient entity under the current 'on the day' approach. We considered it likely that holding a debt portfolio with staggered maturity dates and using swaps to hedge interest rate exposure for the duration of a regulatory control period would constitute such an efficient debt financing practice. Further, we consider that holding a (fixed rate) debt portfolio with staggered maturity dates to align its return on debt with the regulatory return on debt allowance is likely to be an efficient debt financing practice of the benchmark efficient entity under the trailing average portfolio approach. That is, it is likely that the benchmark efficient entity would need to unwind its hedging contracts in moving from the current 'on the day' approach to the trailing average

31 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 83

32 AER, *Explanatory Statement to the Rate of Return Guidelines*, p. 140.

portfolio approach. Therefore, if transition is immediate (that is, if there is no transitional arrangement), the benchmark efficient entity is likely then to face costs or practical difficulties, as:

- *It would have likely entered hedging contracts to manage its interest rate risk in the past*
- *It would be impossible for it 'to go back and lock in rates that applied some time ago'*
- *Without transition there would be, therefore, a mismatch between the expected return on debt of the benchmark efficient entity and the regulatory return on debt allowance set according to the trailing average portfolio approach. This mismatch could potentially be significant.*

A gradual transition, on the other hand, can take into account the efficient financing practices under the current 'on the day' approach. It can also address the need for the benchmark efficient entity to unwind its historical hedging contracts. As SFG suggested:

> *The type of "rolling in" arrangement that has been proposed by QTC would be an effective means of transitioning from the current Rules to the use of an historical average cost of debt approach.*

Further, we consider that a gradual adjustment is also consistent with the need to account for the effect of the change in the return on debt approach on confidence in the predictability of the regulatory regime. This would accommodate any potential discrepancy between the proposed approach to estimating the return on debt and reasonable expectations consumers, service providers, and investors formed before the rule change.

142. On this basis the AER concluded that a transition should be imposed where, in the first instance, the on the day estimate of the cost of debt was retained and given 100% weight initially. However, overtime, new data points from future years were given weight and the weight given to the initial estimate was reduced accordingly – until, after 10 years, all of the preceding ten years (including the initial year) had an equal 10% weight.

143. This is only one possible transition mechanism. Another could be to retain the on the day estimate for the next regulatory period but, in the second regulatory period, introduce a partial or full 10 year trailing average.

144. I consider that these transition mechanisms may be reasonable to the extent that a regulated business can be presumed, under the old Rules and regulatory regime, to have entered into the kind of hedging arrangements described above.

4.2 An 'on the day' estimate without transition

145. For the reasons set out above, I consider that the allowed rate of return objective would be promoted by the use of, or transition to, a trailing average element to the cost of debt allowance. Only then will the cost of debt be based on a replicable debt management strategy. However, I recognise that the ERA has argued that allowances must be based on prevailing conditions at the beginning of the regulatory period (or during the regulatory period in the case of the DRP). For the reasons set out in section 3, I believe that the ERA's reasoning in this regard is flawed.

146. However, to the extent that an estimate based solely on prevailing market conditions was required, my view is that this must be based on a term of debt of 10 years. This is because a 10 year term is consistent with the actual average debt term observed for regulated energy infrastructure businesses. Therefore, compensating businesses based on a 10 year debt term will, on an expected long run average basis, still be expected to deliver an allowance commensurate with a benchmark efficient debt financing strategy.

147. Of course, such an allowance could be very inaccurate in any given regulatory period – or even a series of consecutive regulatory periods. However, it would not be expected to, on average, over or undercompensate relative to a benchmark efficient debt financing strategy that involves issuing 10 year debt.

148. By contrast, setting an allowance based on an assumed debt term of less than 10 years can be expected, given the general upward sloping nature of the yield and DRP curve with respect to maturity, to systematically undercompensate the costs of a benchmark efficient debt management strategy. I note that in the ATCO nominated averaging period, the weighted average maturity of the ERA's bond yield estimate is 5.7 years – well below the 10 years that I consider reflects a benchmark efficient term of debt at issuance.

5 Term of the risk free rate used in the cost of equity estimate

149. The focus of this report is on estimating the cost of debt consistent with the NGR and NGL. However, I have also been asked my opinion on the correct term of the risk free rate to be used in estimating the cost of equity. These are separate issues and it need not follow that the term of the risk free rate used in estimating the cost of equity must be the same as the assumed term, or terms, of debt issuance. However, for the reasons set out below, I consider that the appropriate term of the risk free rate used to estimate the cost of equity should be 10 years – which happens to be the same term that I propose should be assumed for debt issuance by a benchmark efficient entity providing regulated energy transport services.

150. I emphasise that none of the reasoning I rely on in relation to arriving at an estimate of the efficient term of debt issuance depends on the reasoning in this section on the term for the risk free rate.

5.1 There is no theoretically correct term for the risk free rate in the CAPM

151. The ERA proposes the use of the capital asset pricing model (CAPM) to estimate the cost of equity. Given that the CAPM is a 'one period' model, there is no theoretically correct term for the risk free rate used in the CAPM cost of equity estimate. That is, the derivation of the CAPM model does not conceive of there being more than a single (undefined) period. In effect, investors are assumed to exist with wealth at one point in time (the beginning of the period) and then to invest in a fixed portfolio of assets until the end of the period at which point in time they consume their wealth (or otherwise derive utility from that wealth that is independent of any future reinvestment of that wealth).

152. This point has been made in a number of regulatory proceedings by myself and others.[33] It follows that it is not possible to arrive at a theoretically correct or 'pure' term for the risk free rate or the cost of equity used in the CAPM – because the derivation of that model assumes away the existence of multiple periods of different lengths.

33 For example, see Incenta, Term of the risk free rate for the cost of equity, pp.5-6

5.2 Standard practice is to use a 10 year term for the risk free rate

153. It is, however, possible to say something meaningful about standard practice amongst finance practitioners. Incenta has recently demonstrated that this involves the use of a 10 year term for the risk free rate and the market risk premium (MRP) when implementing the CAPM.[34]

5.3 Internal consistency requires the MRP and risk free rate to be estimated consistently

154. Provided that the MRP and the risk free rate are determined consistently the impact on the cost of equity is unlikely to be material. This is because the MRP is defined as the difference between:

- the return investors require from an investment in the equity market; less
- the risk free rate.

155. Changing the assumed term of the latter will not affect the former and, as such, any change in the risk free rate due to this assumption will be perfectly offset by an opposite and equal change in the MRP. This is why the AER concluded:[35]

> *The difference in the overall rate of return between a 10 year and five year return on equity is unlikely to be material.*

156. In this regard, I note that all but one of the ERA's MRP estimates in Table 14[36]and Table 17[37]of the ERA's Explanatory Statement are based on a 10 year risk free rate (the one exception being an ERA estimate). These estimates are used to form a range for the MRP ultimately adopted by the ERA. Data for 10 year risk free rates extend back further in time than does data for 5 year risk free rates – which is presumably why the only 5 year estimate of the MRP in Table 14 is the ERA's estimate and this is for the shortest time period (since 1972 for the ERA estimate but since 1883 for the other estimates). Therefore, historical average MRP estimates can be more robustly estimated relative to a 10 year term than a 5 year term.

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34 Incenta, Term of the risk free rate for the cost of equity, section 3 and p. 43.

35 AER Explanatory statement – rate of return guideline, p. 49.

36 ERA Explanatory Statement for the Rate of Return Guidelines, p. 152

37 ERA Explanatory Statement for the Rate of Return Guidelines, p. 158

157. Moreover, given that currently and, on average in the past, the five year risk free rate has been less than the 10 year risk free rate[38]then the ERA would need to adjust upwards the MRP estimates in Table 14 and Table 17 to make them comparable to a 5 year risk free rate – something that the ERA had not done.

5.4 Conclusion

158. The best estimate of the risk free rate is one that is internally consistent with the MRP estimate. Standard practice is to estimate the MRP relative to a 10 year risk free rate. The ERA relies on estimates of the MRP relative to a 10 year risk free rate when arriving at its MRP range. Moreover, the best estimates of the historical average MRP are available measured relative to a 10 year risk free rate. Therefore, the best estimate of the risk free rate is based on a 10 year term.

[38] Incenta, Term of the risk free rate for the cost of equity, Figure 1 on page 34.

6 Best estimates of current and historical yields on 10 year BBB debt

159. The ERA estimates the yield on BBB debt by way of a bond-yield methodology. This methodology fails to target any particular maturity for which the cost of debt is being estimated – the effect of which is that this methodology results in a downwards biased estimate of the cost of 10 year BBB rated debt. It also takes a narrow and simplified approach to selecting the sample of bonds and the data which will inform its yield estimate, and this results in the exclusion of valuable information. The exclusion of valuable information results in a less reliable estimate than if all the available data was included.

160. Since the ERA published its Guidelines, the Reserve Bank of Australia (RBA) has started publishing yield estimates on 3, 5, 7 and 10 year BBB and A rated debt at the end of each month. Its methodology is well documented and transparent, and the results are publicly available online. The NSW Independent Pricing and Regulatory Tribunal (IPART) has adopted the RBA 10 year BBB estimate as the best estimate of the cost of debt for infrastructure businesses that it regulates (with the same 60% gearing assumed by the ERA).[39]

161. In this chapter I demonstrate that, over the 20 day averaging period from 22October to 18 November 2013 which ATCO has nominated, the RBA methodology provides an accurate estimate of the 10 year cost of BBB rated debt. This is unlike the ERA methodology which does not provide an accurate estimate of the 10 year cost of BBB debt. This is because the RBA methodology takes into account information which the ERA methodology does not. For example, the RBA's methodology has regard to yields on bonds issued by Australian companies overseas, which significantly increases the sample and bond yield information at longer maturities. In addition, the RBA methodology allows one to arrive at an estimate of the cost of debt at different maturities – the ERA methodology does not.

162. While this section focuses on the accuracy of estimates of the cost of debt during ATCO's nominated averaging period, there is reason to believe that the RBA methodology also provides the best estimate of the cost of 10 year BBB debt over the entire period since January 2005 (being the first date for which an estimate is published).

39 IPART, *Fact Sheet, New Approach to Estimating the Cost of Debt: Use of the RBA's Corporate Credit Spreads*, February 2014.

6.1 Methodologies to estimate yields on 10 year BBB debt

6.1.1 Problems with the ERA methodology

163. The ERA uses the following criteria to select the sample of bonds which will inform its yield estimate:

- rated BBB- to BBB+ by Standard & Poor's;
- remaining time to maturity of at least two years;
- issued in Australia by Australian entities and denominated in Australian dollars;
- fixed and floating bonds are included;
- bullet, callable and puttable bonds are included; and
- there are at least 10 yield observations over the 40 day averaging period.

164. In calculating a weighted average debt premium the ERA relies only on Bloomberg data. The weighted average DRP is estimated using a weighting for each bond in the sample equal to its "joint-weight" (weighted by time to maturity and amount issued). The benchmark DRP is calculated as the weighted average DRP using its "joint-weight".[40]

165. The ERA's criteria for selecting sample bonds is restrictive, especially in regards to the exclusion of bonds issued by Australian companies overseas. Issuing bonds overseas is a common practice for regulated Australian utilities – especially when issuing long term debt. I estimate that foreign currency bonds account for almost half (44.3%)[41] of all bonds issued by Australian regulated energy utilities. Given that almost half of all bond issues by regulated Australian energy businesses are foreign bond issues it is appropriate to assume that this is an efficient practice and that the benchmark efficient debt management practice would also involve issuance of foreign currency bonds.

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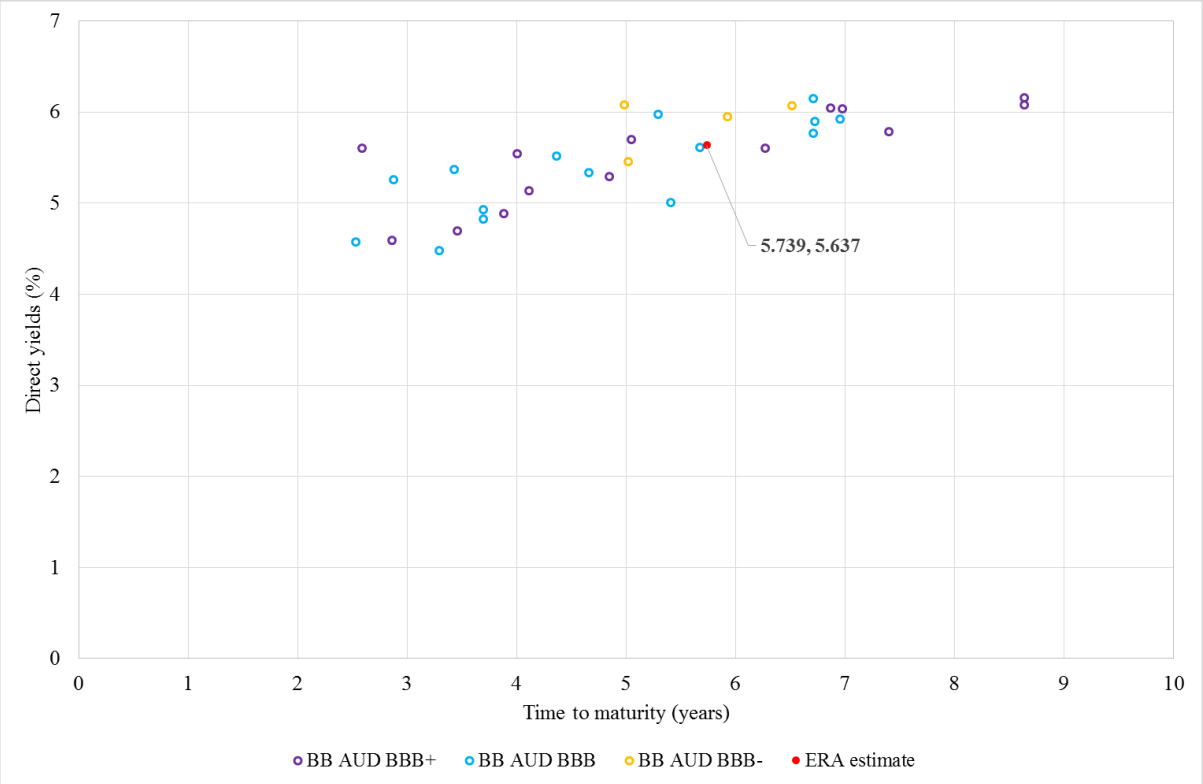
40 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 102

41 I have separately estimated that Australian regulated utilities issue 35% of their total debt in foreign currency (CEG, *Debt strategies of utility businesses* p. 23.). However, this is 35% of total debt (drawn and undrawn). The AER has, based on analysis by using confidential business specific data reported that undrawn debt is 11.3% of total debt (AER, Explanatory statement – rate of return guideline, December 2013, Table 8.2 on p. 143. 11.3% is the difference between drawn debt of $29,879.7m and total debt of $33,668.5m expressed as a percentage of total debt.) Therefore, the 35% calculated by me as a percentage of total debt is 39.5% of drawn debt (35%/(1-0.113)). Moreover, given that the analysis focuses on bond yields the relevant proportion is foreign currency bonds as a proportion of domestic bonds. Given that drawn bank debt is 11% of the total drawn debt portfolio, see Appendix A, then foreign currency bonds are around 44.3% (39.5/(1-0.11)) of all bonds issued by Australian regulated energy utilities.

166. Applying the ERA's bond-yield methodology (excluding foreign currency bonds issued by Australian corporates) over the 20 day averaging period from 22October to 18 November 2013 results in a weighted average yield of 5.637%[42] associated with a weighted average remaining maturity of 5.73 years. Figure 1 shows the bonds which inform the ERA yield estimate during the averaging period.

Figure 1: Outcome of the ERA methodology during the averaging period



Source: Bloomberg, CEG analysis

6.1.2 Why the RBA methodology represents an improvement on the ERA methodology

167. The RBA publishes yield estimates for BBB and A rated debt at maturities of 3, 5, 7 and 10 years at the end of each month. Its methodology is well documented and transparent, and the results are publicly available online.[43]

[42] The ERA does not specify which data source it has used from Bloomberg. We have used BVAL and BGN – in that order of preference when replicating the ERA's methodology.

[43] See New Measures of Australian Corporate Credit Spreads, RBA Bulletin, December 2013, available at http://www.rba.gov.au/publications/bulletin/2013/dec/pdf/bu-1213-3.pdf for a description of the RBA's methodology and http://www.rba.gov.au/statistics/tables/xls/f03hist.xls for its results.

168. The RBA's methodology estimates a yield at a particular maturity based on a weighted average of yields on a sample of bonds. The yield of each bond is weighted by the product of:

- the face value of the bond, such that larger bond issues receive greater weight in the assessment of the benchmark spread or yield; and
- the relative closeness of the bond to the target maturity. This second weighting is achieved by estimating a 'Gaussian kernel', or essentially a normal probability density function, that places greatest weight on issues that are closest to the target maturity.
- greatest weight on issues that are closest to the target maturity.

169. The RBA methodology applies different criteria than the ERA to select the bond sample which will inform its yield estimate at each maturity, especially in regards to bonds issued by Australian companies overseas. To become part of the RBA sample to estimate yields on BBB debt, bonds need to:[44]

- be rated BBB-, BBB or BBB+ (a "broad" BBB credit rating) by Standard & Poor's, or if unrated have an issuer credit rating with Standard & Poor's in that band;
- be a fixed rate bond;
- be issued in Australia by an Australian company in either Australian dollars, United States dollars or in Euros;
- have raised more than $A100 million or its equivalent in foreign currency terms at the time of issue;
- have a residual term to maturity of at least one year; and
- not have any duplicate bond issues in the sample.

170. Figure 2 shows the bonds which meet the RBA selection criteria during the averaging period, together with the RBA curve. Comparing Figure 1 and Figure 2 it is clear that the RBA's selection criteria admits a significantly larger sample of bonds during the averaging period. Figure 2 also shows the implied ERA estimate; that is, the yield estimate that the ERA methodology generates when this expanded data set is used.

171. It is clear from Figure 2 that at the maturity of the implied ERA estimate (6.8 years), the ERA methodology and the RBA methodology generate yields which are not substantially different. However, the ERA methodology only generates a single yield estimate consistent with the weighted average maturity of the sample, and is incapable of estimating yields at different maturities (including closer to 10 years). The reason the RBA methodology generates a slightly lower yield than the ERA

44 RBA, *New Measures of Australian Corporate Credit Spreads*, December 2013.

estimate at the same maturity is because the RBA methodology will give more weight to bonds which are relatively close to the target maturity, whereas the ERA methodology always gives most weight to the longest dated bonds (for any given amount issued).

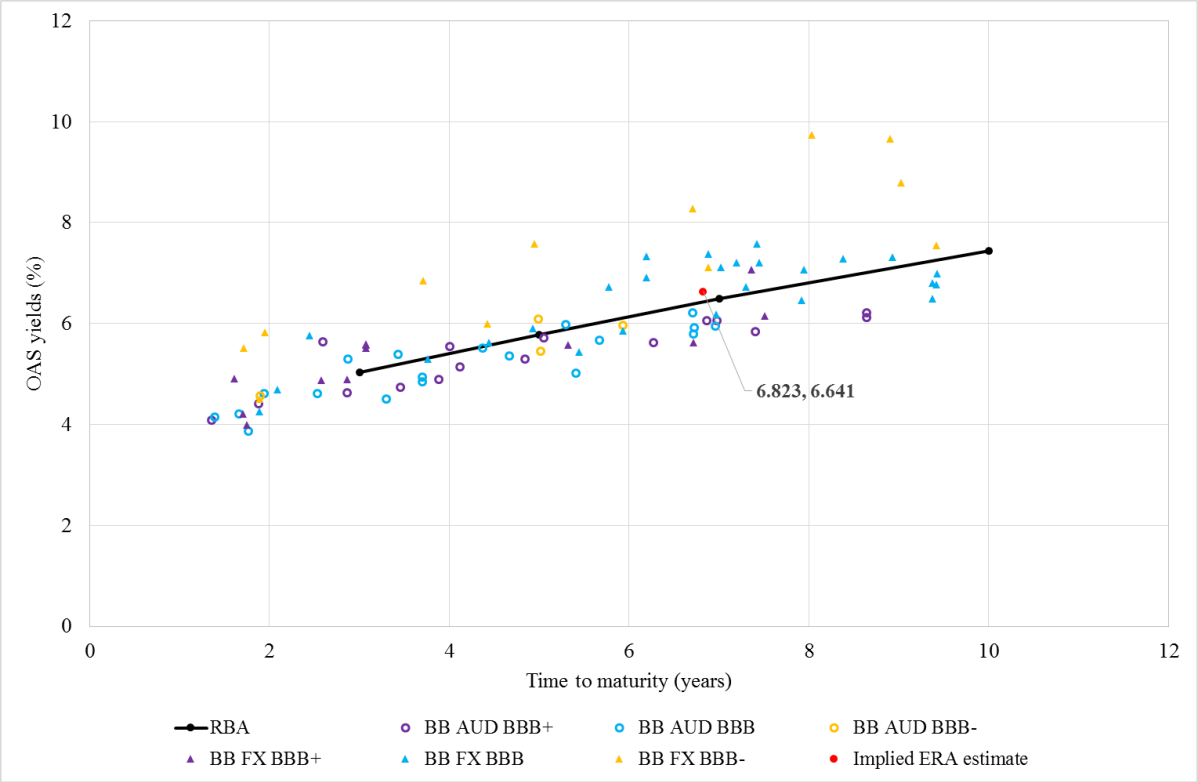
172. Figure 2 suggests that two key problems with the ERA's approach for the purposes of arriving at a reasonable estimate for the yield on 10 year debt rated between BBB- and BBB+ are:

    a. The criteria applied by the ERA for selecting its sample of bonds have the effect of significantly restricting the number of bonds that are considered by its methodology.

    b. The ERA's methodology generates a yield methodology for a single maturity, being the weighted average maturity of the sample. It cannot generate an estimate for a target maturity such as 10 years.

173. These problems are substantially resolved in the RBA methodology, which takes into account foreign currency bonds, and also generates yield estimates at maturities of 3, 5, 7 and 10 years. On this basis, I consider that the RBA methodology represents a significant improvement on the ERA methodology (I do not consider that use of the ERA methodology would not be consistent with the new Rules).

Figure 2: RBA methodology



Source: Bloomberg, RBA, CEG analysis. RBA values are interpolated between over the ATCO averaging period.

6.1.3 Alternative methodologies for estimating the yield on 10 year BBB debt

174. In addition to the RBA methodology for estimating yield for 10 year BBB debt, it is also relevant to consider the Bloomberg fair value methodology and the Nelson-Siegel methodology.

6.1.3.1 The Bloomberg fair value curve

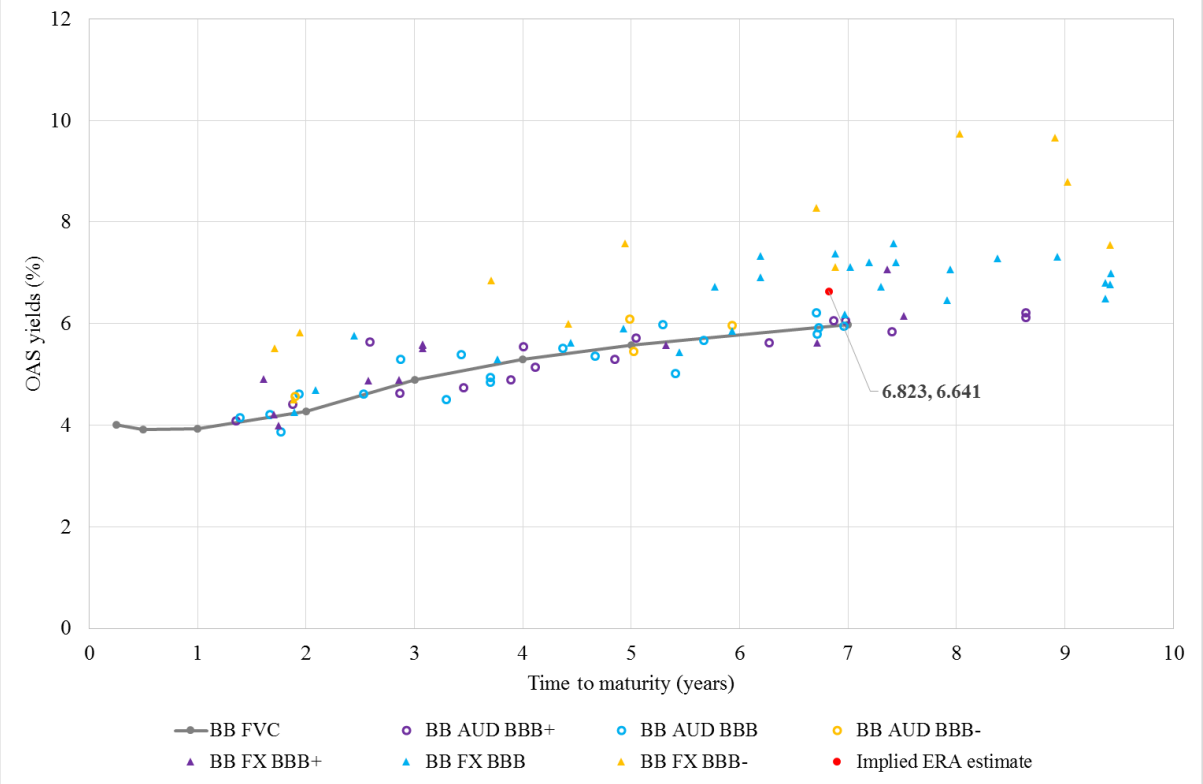
175. The Bloomberg AUD BBB corporate curve relies solely on bonds issued in Australian dollars. Bloomberg's estimates are proprietary and, consequently, its sample selection criteria and methodology is not transparent. Bloomberg states that its fair value curves are constructed using a proprietary optimisation model.[45]

45 I note that Bloomberg is current moving from a 'fair value' methodology to a BVAL methodology. This will result in the current Bloomberg 'fair value' curve being discontinued and replaced with a new, equivalent, curve in the near future (we have had informal indications this could happen as early as May 2014).

176. In constructing its AUD BBB corporate curve, Bloomberg selects the fixed rate bonds rated BBB or near BBB (BBB- and BBB+), which are also domestic AUD bonds, which allows it to optimise a curve that best fits the data. Bonds which are callable can be included in the curve fitting, but this is adjusted for by using OAS rather than yields. Bloomberg publishes its yield estimates at 3 months, 6 months, 1 to 5 years and 7 years on a continuous basis.

177. Figure 3 illustrates how the Bloomberg curve compares to the RBA sample. It is clear from this figure that the Bloomberg fair value curve tends to pass below many of the long dated observations during the relevant 20 day averaging period. This is likely a consequence of the fact that the Bloomberg is not constructed using yield data sourced from foreign currency bonds issued by Australian companies. I consider that this underestimation is a serious shortcoming associated with use of the Bloomberg fair value curve in ATCO's nominated averaging period.

Figure 3: Bloomberg methodology



Source: Bloomberg, RBA, CEG analysis

6.1.3.2 Nelson-Siegel curve fitting

178. The Nelson-Siegel methodology provides a flexible functional form that allows for a variety of shapes that one would expect a yield curve might take but which also limits the amount of computing power required to estimate the relevant parameters.

It provides a useful cross-check against the fair yield estimates published by Bloomberg and the RBA as well as against the methodologies utilised by regulators such as the ERA to estimate DRP.

179. The Nelson-Siegel functional form used is as set out below:

$$Yield(t) = \beta_1 + (\beta_2 + \beta_3)\frac{1 - e^{-\frac{t}{\beta_0}}}{\frac{t}{\beta_0}} - \beta_3 e^{-t/\beta_0}$$

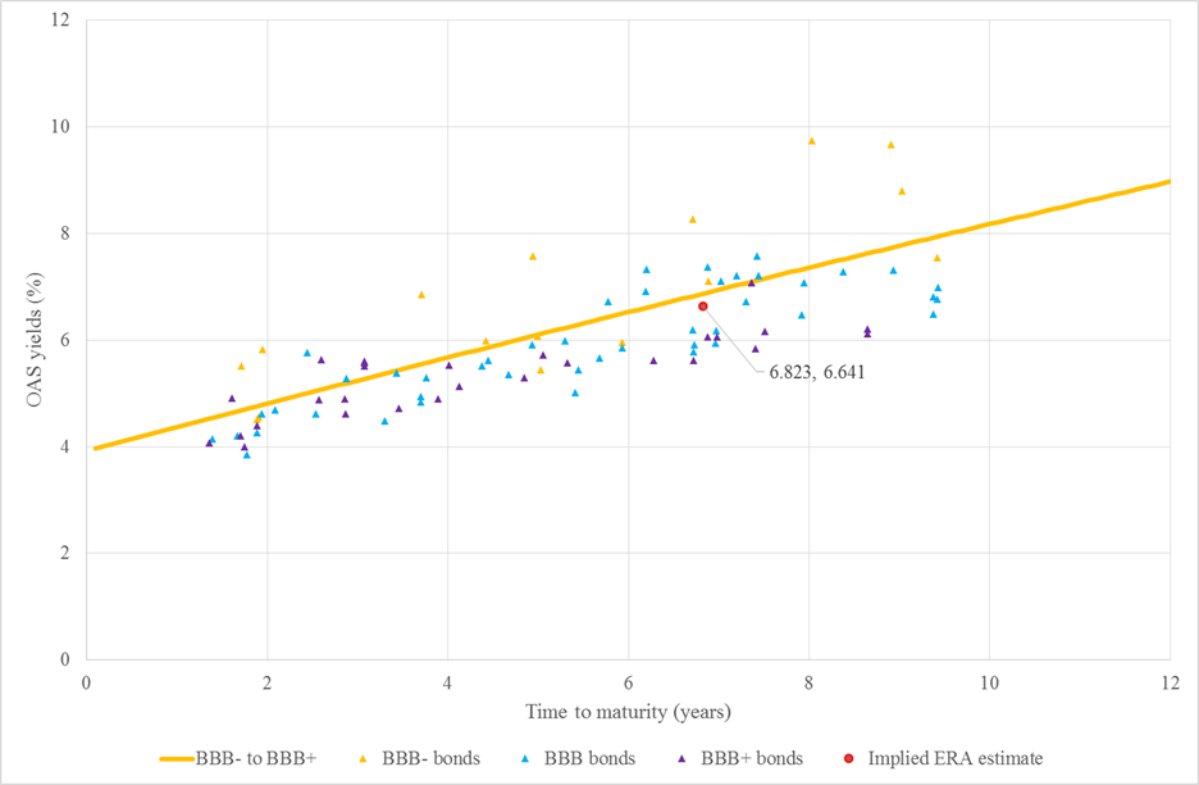
180. Conceptually,$\beta_1$can be interpreted as a long-term component (which never decays), $\beta_2$as a short-term component (its loading starts nearly at 1, and then decays over term to maturity), $\beta_3$as a medium-term component (its loading starts at zero, then peaks at some point and then decays to zero again), and $\beta_0$as a parameter characterising the speed of decay of the short-term and medium-term effects. Therefore, as the term to maturity increases, the estimated yield goes to $\beta_1$rather than to infinity as it would if a linear or quadratic specification were instead adopted. The parameter *t* refers to the bond's term to maturity.

181. This functional form gives the curve the flexibility to take on many different shapes (from monotonically increasing to hump shaped) which allows the curve to be fitted to the data rather than enforcing a shape that may not be consistent with the underlying data. I consider that this is a reasonable assumption - especially for credit ratings that are similar to each other.

182. I estimate β_0, β_1, $\beta_2$and $\beta_3$to define a single Nelson-Siegel yield curve by minimising the sum of squared errors between the fair yield curve and the reported yield data over the averaging period. The regression is non-linear due to the inclusion of the speed-of-decay parameter β_0.

183. Figure 4 shows the result of applying the Nelson-Siegel methodology to the RBA sample, which includes bonds rated BBB- to BBB+.

Figure 4: Nelson-Siegel methodology



Source: Bloomberg, CEG analysis

184. Consistent with the data, the Nelson Siegel methodology estimates a relatively straight line relationship between yield and maturity. The Nelson Siegel 10 year yield is higher than the published RBA yield associated with a target tenor of 10 years (8.17% vs 7.44%). However, this is not a like for like comparison. The weighted average tenor ("effective tenor") of the RBA 10 year estimate is actually 8.60 years.[46] The Nelson Siegel estimate at this tenor is 7.60% - only 0.16% above the RBA estimate. This result supports a conclusion that the RBA estimate is accurate.

185. The RBA (and the ERA) estimates are, to some extent, tied down by the weight given to shorter maturity bonds – albeit, under the RBA methodology, this weight falls as target maturity increases. The Nelson Siegel methodology adjusts for maturity by allowing the slope of the yield curve to vary. Thus, a larger number of low yielding short maturity bonds need not reduce the long maturity estimates and

[46] That is, when the weights from the RBA Gaussian kernel, centred around 10 years, are distributed across the bonds in the RBA sample more weight happens to be given to bonds with maturity less than 10 years than to bonds with maturity more than 10 years (reflecting the preponderance of the former in the RBA sample). Consequently, the effective tenor is less than the target tenor.

may even increase them (if low short maturity yields suggest a more positive relationship between yield and maturity).

186. These are potential advantages of the Nelson Siegel technique. However, they do not produce materially different estimates to the RBA technique in the period in question. Moreover, the RBA estimate produced by a respected independent third party to the regulatory process. In addition, the RBA considered using the Nelson Siegel methodology, found that the results were similar, but chose the Gaussian kernel methodology based on undisclosed statistical results.[47] In this context, I consider that the best estimate in the period in question is based on the published RBA estimate.

6.2 Potential amendments to the RBA yield estimate on 10 year BBB debt

187. The RBA estimate is a good fit to the relevant data as well as being well documented, transparent and publicly available. However, there are some aspects in which I consider that the RBA methodology could potentially be improved further for the purposes of deriving an estimate for ATCO. For example:

- a credit rating range of BBB- to BBB could be used in preference to a credit rating range of BBB- to BBB+; and
- UBS data could be included to supplement Bloomberg data, including data from floating rate notes;
- an estimate of the cost of debt at an effective tenor of 10 years could be developed.

6.2.1 A target credit rating range of BBB- to BBB is preferable

188. In relation to target credit rating, we note the ERA's statement at paragraph 509 of the explanatory statement for the Guidelines provides a basis for believing that gas businesses should be accorded a lower benchmark credit rating than electricity businesses:

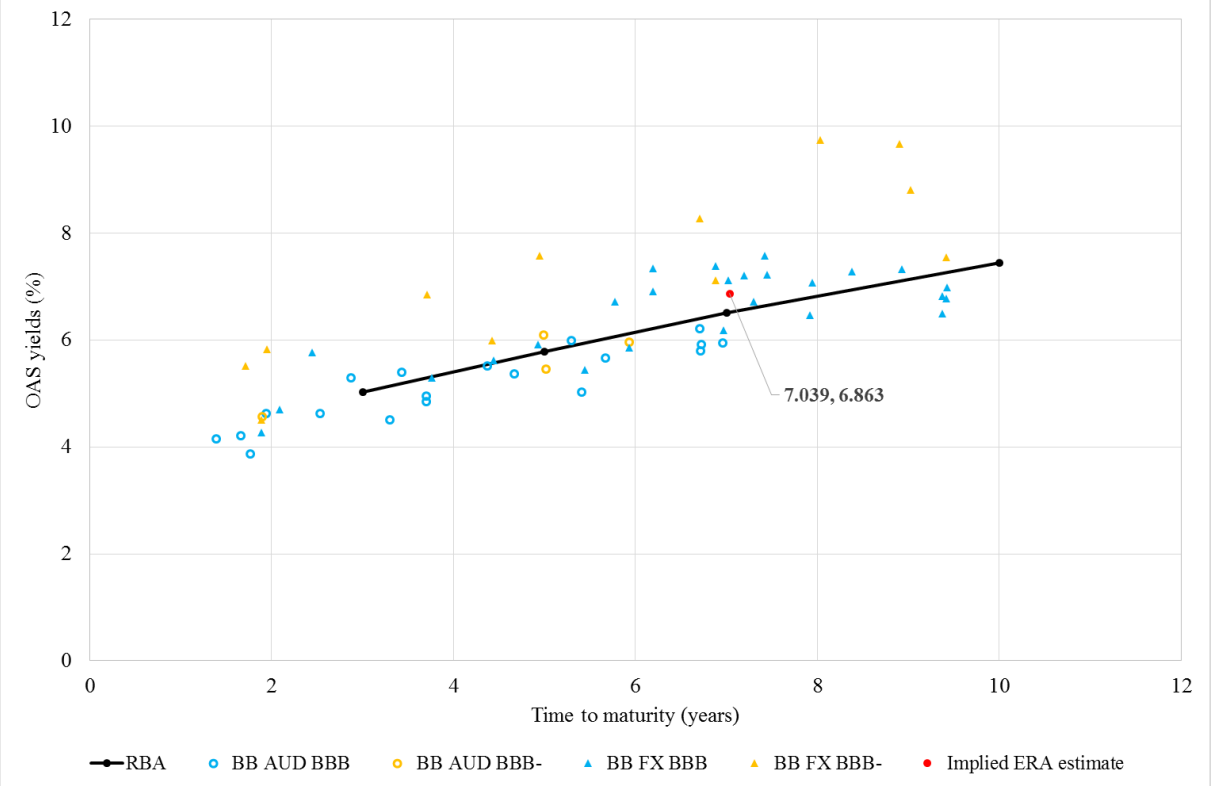
> *The Authority notes that for each of the 3 samples above, the median credit rating for Australian network service providers – including both electricity and gas – is in the range of BBB/BBB+. However, the Authority notes that for gas only networks, the appropriate range is BBB-/BBB. In consequence, for the purposes of these guidelines, the Authority considers that the BBB band, encompassing the BBB-, BBB and BBB+ credit rating notches, is the appropriate credit rating for the benchmark efficient entity.*

47 See New Measures of Australian Corporate Credit Spreads, RBA Bulletin, December 2013, footnote 15..

189. A lower credit rating for gas businesses is consistent with recent work performed by CEG comparing US gas and electricity businesses. On this basis we examine the sensitivity of our analysis to adopting a BBB- to BBB target credit rating range as opposed to the BBB- to BBB+ range.

190. Figure 5 illustrates the RBA's preferred bond sample less BBB+ bonds, as well as the RBA curve and the implied ERA yield estimate. As a point of comparison, the implied ERA yield increases from 6.641% to 6.863% as a consequence of excluding BBB+ bonds. The weighted average maturity also increases from 6.823 years to 7.039 years. The RBA curve underestimates the yield on almost all of the BBB- bonds and most of the BBB rated bonds (especially at long maturities). It follows that the RBA BBB curve is a conservative estimate of the yield on BBB- to BBB rated long maturity bonds.

Figure 5: RBA less BBB+ bonds



Source: Bloomberg, RBA, CEG analysis

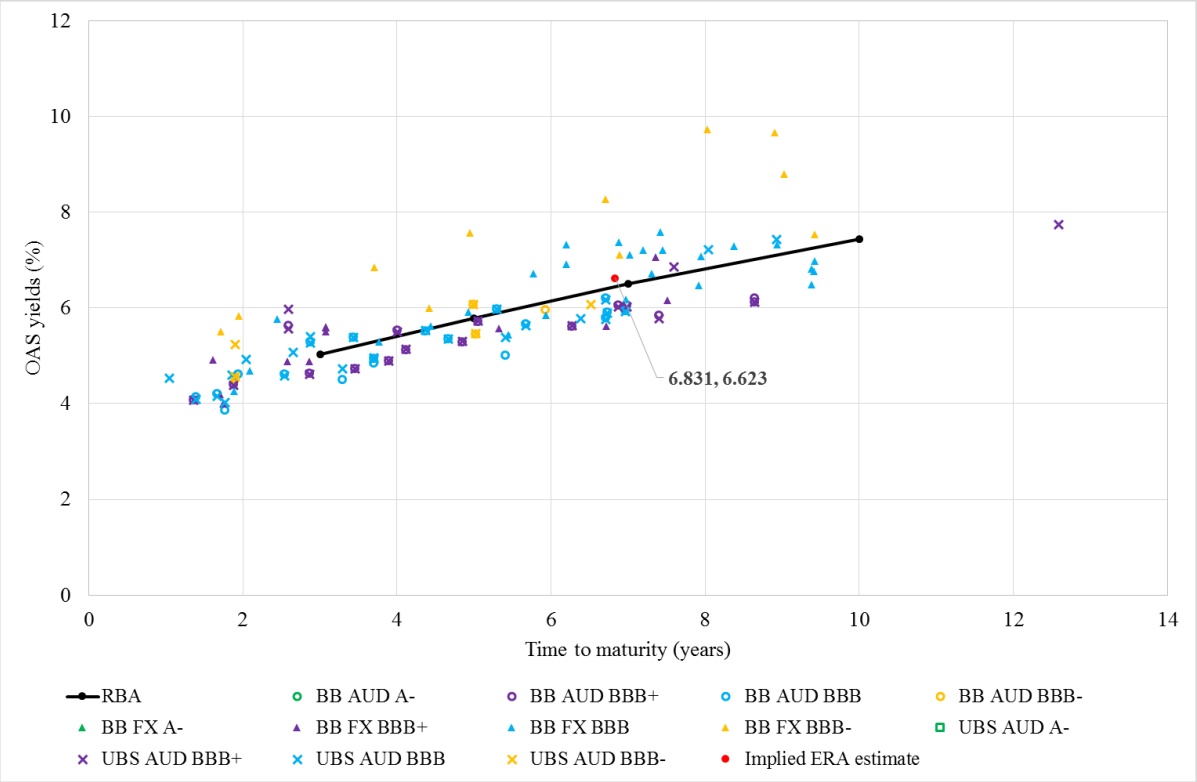
6.2.2 Having regards to data sources other than Bloomberg

191. Figure 6 below clearly demonstrates that there are a number of Australian dollar bonds with longer maturities which do not have yield information from Bloomberg, but which do have yield information from UBS. Taking into account information

from longer dated bonds when such information is available is preferable to disregarding it.

192. The RBA has relied only on data from Bloomberg for its most recent yield estimates, although it uses UBS data to generate historical estimates prior to 2009. I believe that it would be preferable for the RBA (and the ERA) to have regard to UBS data also in the period after 2009.

Figure 6: RBA sample including UBS data



Source: Bloomberg, RBA, UBS, CEG analysis

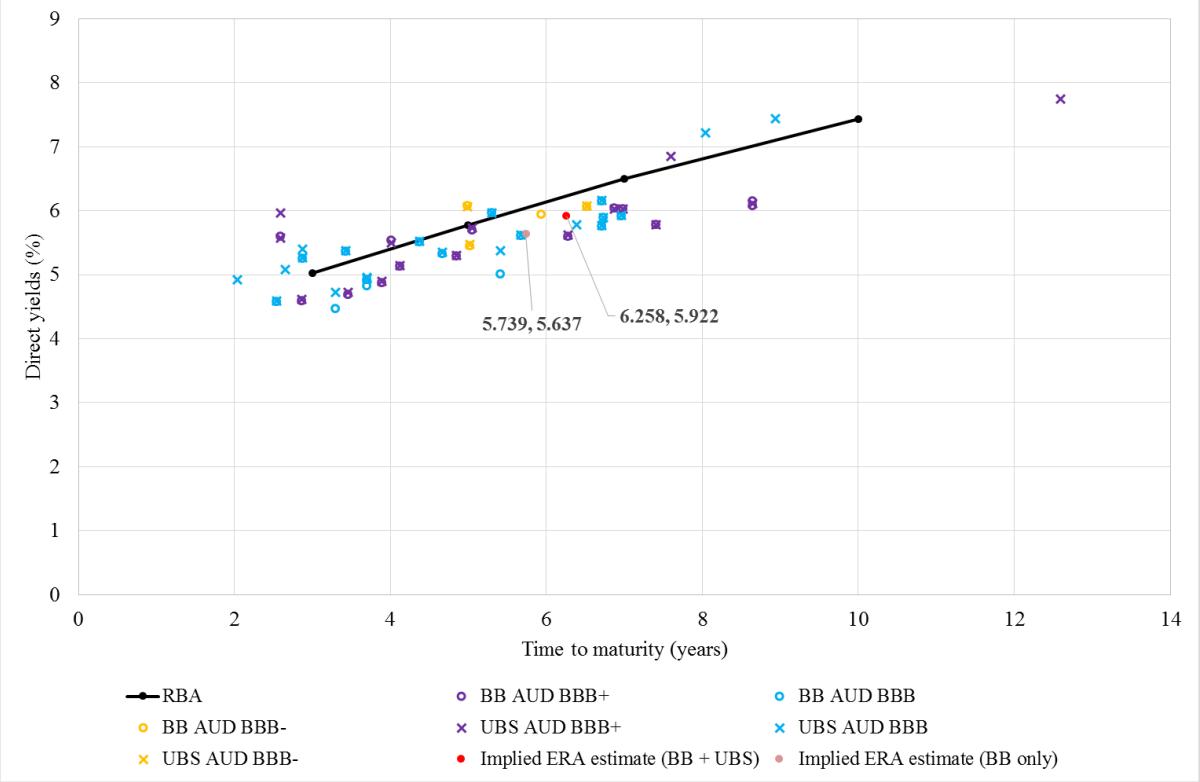
193. In practice, including yield estimates from UBS as well as Bloomberg does not significantly impact the fit the RBA curve to the data. That is, adding the UBS data to the RBA sample does not materially alter the distribution of the observations but rather simply tends to add more observations that are consistent with those already there. As a point of comparison, the implied ERA yield estimate reduces only marginally from 6.641% to 6.623% when UBS data is taken into consideration, and the weighted average maturity remains broadly the same (see Figure 2 and Figure 6 above).

194. However, when considering a sample of AUD bonds only (e.g. ERA and Bloomberg), having regard to UBS yields is important. That is, the RBA curve is a good fit to the RBA sample of AUD and foreign currency bonds issued by Australian companies

with all data sourced from Bloomberg. The RBA curve is also a good fit to AUD only bonds where data is sourced from *both* Bloomberg and UBS – especially at longer maturities. This is illustrated in Figure 7 below, which plots the RBA curve with both the ERA sample (based exclusively on Bloomberg data) plus UBS yields for AUD bond that also meet the ERA sample criteria.

195. It can be seen that the RBA curve is a reasonable fit to the long maturity UBS bonds missing from the ERA sample – bonds that show the same pattern as the foreign currency bonds with similar maturities as shown in the preceding Figure 6.

Figure 7: ERA sample plus UBS data



Source: Bloomberg, RBA, UBS, CEG analysis

196. In conclusion, although it may be preferable for the RBA's method to rely upon UBS data, using Bloomberg data only for the RBA's sample does not appear to significant affect the construction of the RBA's estimates due to its inclusion of long maturity foreign currency bonds issued by Australian companies. If the RBA's methodology did not capture this additional source of long dated bonds, the importance of including the UBS data would increase significantly since there would otherwise be very few bonds available at long maturities.

6.2.3 Extrapolating the RBA estimate to 10 years

197. Whilst the RBA presents its estimates as representing 3, 5, 7 and 10 year estimates, the effective maturity of the estimates as in fact slightly different depending on the bonds available at the time the estimation takes place. During the 20 day averaging period, the effective maturity is 8.6 years. This is because the RBA Gaussian kernel methodology, when applied at a target tenor of 10 years, gives most weight to bonds close to 10 years and progressively less the further away from 10 years a bond is. However, because there are more bonds with less than 10 years remaining tenor than more than 10 years remaining tenor, the weighted average 'effective tenor' is less than 10 years. Given the upward slope of the yield curve, adjusting the RBA estimate to 10 years would likely increase the estimated yield.

6.3 Arriving at a 10 year historical average estimate

198. In my view, the historical behaviour of the RBA 10 year BBB cost of debt estimate is consistent with what would be expected and with other sources of information. This is consistent with the analysis in the RBA Bulletin[48]which shows that the RBA series shows the expected increase in spread to swap over the period 2005 to 2013 – including a large increase during the financial crisis beginning in late 2008 and then again is subsequent periods of financial distress.[49]It is also shown that the series is consistent with the behaviour of the US Bloomberg BBB and A rated corporate fair value curves. However, the RBA curves increase materially more than the Australian Bloomberg fair value curves during the crisis of 2008/09 – which is consistent with my own views stated elsewhere that the Bloomberg curve underestimated the cost of debt in that period.

199. On this basis, I consider that the RBA methodology also provides an appropriate basis to estimate an historical average cost of 10 year BBB rated corporate debt.

48 See New Measures of Australian Corporate Credit Spreads, RBA Bulletin, December 2013,pp. 22-24..

49 See New Measures of Australian Corporate Credit Spreads, RBA Bulletin, December 2013Graph 9 and Graph 10 on page 23.

7 Summary of conclusions

200. The answers to each of the questions put to me in my terms of reference is summarised below.

7.1 Question 1

1. *An assessment of the ERA's approach to estimating the return on debt set out in the Rate of Return Guidelines, including:*

   1.1 *a critique of the ERA's reasoning for adopting a 5 year term for the risk free rate (cost of debt and cost of equity); and*

   1.2 *an analysis of the ERA's proposed bond yield approach to the debt risk premium and the proposal to update the DRP annually.*

7.1.1 Answer

201. The ERA's calculation for the cost of debt does not result in an allowance that is commensurate with the efficient debt financing costs of a benchmark efficient entity. There are three high level reasons for this. First, it is not derived from any well-defined debt management strategy. Second, it has elements that are clearly inefficient – including being based on an average maturity of debt that is less than the average maturity of debt associated with an efficient debt management strategy. Third, the sample of bonds used by the ERA to implement its bond yield estimate is incomplete in that it excludes both foreign currency bonds issued by Australian corporates and bond yield estimates from UBS.

202. For the reasons set out in section 5, I consider that the correct term for the risk free rate in the CAPM is ten years.

7.2 Question 2

2. *Your opinion on whether the ERA's proposed approach to the return on debt would result in the best estimate of the return on debt that contributes to the achievement of the allowed rate of return objective and meets the requirements of Rule 87.*

7.2.1 Answer

203. I do not consider that the ERA's proposed approach to the return on debt will result in the best estimate of the return on debt that contributes to the achievement of the allowed rate of return objective and meets the requirements of Rule 87 calculation. This is consistent with my conclusion that the ERA's calculation will not result in an

allowance that is commensurate with the efficient debt financing costs of a benchmark efficient entity.

7.3 Question 3

3. *Your opinion on whether the return on debt estimate using the ERA approach would produce a result consistent with the achievement of the NGO and the RPP.*

7.3.1 Answer

204. In my view, the NGO and the RPP are best served by an estimate of the cost of debt consistent with Rule 87(3). Consistent with my answer to question 2, I do not believe that the ERA approach to the cost of debt will produce a result consistent with the achievement of the NGO and the RPP.

7.4 Question 4

2. *If in your opinion the ERA's approach does not meet the requirements set out in paragraph 2 and 3 above, what method (or methods) for estimating the cost of debt should be used in order to produce the best estimate (or range of estimates) possible in the circumstances that complies with Rule 87 (including the matters in sub rules 87(8) to 87(12)) and the achievement of the NGO and RPP?*

205. I consider that, in the period 22 October to 18 November 2013, the best estimate of the cost of debt is one based on the RBA's published cost of debt estimates for BBB rated 10 year Australian corporate debt.[50]

[50] RBA, F3 Aggregate Measures of Australian Corporate Bond Spreads and Yields: Non-financial Corporate (NFC) Bonds, published on www.rba.gov.au

Appendix A Letter to the AER on debt term

206. Provided separately.

Appendix B Modigliani Miller and efficient financing strategy

B.1 Finance theory

207. The cornerstone of modern finance theory on the optimal capital structure for a firm is the work of Modigliani and Miller (1958). The following three subsections summarise their results. The first describes the optimal capital structure in the hypothetical context of perfect (zero transaction costs) capital markets. The second describes optimal capital structure in the more realistic context of imperfect capital markets, where "frictions" exist. The third describes the special role of bankruptcy/insolvency costs in determining an optimal capital structure.

B.2 Modigliani-Miller with perfect financial markets

208. The principal insight of Modigliani and Miller (1958) is that the level of risk in a firm is rather like the amount of air in a balloon. Squeezing one end of a balloon does not reduce the amount of air that is inside – it just shifts it to "the other end". In much the same way, issuing debt does not reduce the overall level of risk – it simply shifts it somewhere else – in this case, to equity. Miller (1991) made a similar observation some 30 years later:

> *Think of the firm as a gigantic tub of whole milk. The farmer can sell the whole milk as it is. Or he can separate out the cream, and sell it at a considerably higher price than the whole milk would bring. (Selling cream is the analog of a firm selling debt securities, which pay a contractual return.) But, of course, what the farmer would have left would be skim milk, with low butter-fat content, and that would sell for much less than whole milk. (Skim milk corresponds to the levered equity.) The Modigliani-Miller proposition says that if there were no cost of separation (and, of course, no government dairy support program), the cream plus the skim milk would bring the same price as the whole milk.*

209. In this quote Miller notes that issuing low risk debt securities is analogous to a farmer separating out cream from whole milk; namely:

- the firm gets a good price (low interest rate) for its debt; but
- the corollary is that the remaining equity is less desirable, and so requires a higher return to attract investors.

210. What Modigliani and Miller demonstrated is that if financial markets are efficient and there are no transaction costs, any reduction in the cost of debt will be perfectly

offset by a higher cost of equity. A firm's capital structure therefore has no effect on its weighted average cost of capital (WACC). This "law of the conservation of risk" is comparable to the "law of conservation of energy" from the physical sciences. Like energy, risk cannot be destroyed – it can only be converted from one form to another.

211. It should be noted that Modigliani and Miller do not define "transaction costs" as encompassing simply the direct and observable costs of an activity (such as payments to printers for a prospectus). Rather, transaction costs are defined much more broadly to include costs associated with dealing/trading in imperfect markets. These include, for example, costs associated with imperfect management incentives (agency problems and incentive problems with asymmetric information), and costs associated with trading in illiquid markets and/or with financial constraints that force a business to make suboptimal decisions.

212. A further conclusion that flows from Modigliani and Miller is that, if financial markets are perfectly efficient with zero transaction costs, then no particular debt raising strategy will dominate any other. Irrespective of whether a business issues large or small amounts of debt, short-term debt or very long term debt, callable or puttable debt, etc., its WACC will be the same.

B.3 Modigliani-Miller financial markets with frictions

213. Given the finding that, in frictionless financial markets, a business's capital structure simply does not matter then, if capital markets were frictionless, one would expect that firms with very similar attributes (products, competitors, cost structures and so on) would exhibit a great variety of capital structures. For example, some may have short term debt, others long term debt; some may have high gearing and others low gearing, and so on. There would be no 'common' strategy because, in the absence of frictions, there is no advantage from adopting any particular practice.

214. In actuality, businesses with similar attributes will often consistently adopt the same (or similar) debt raising strategies. The insight of Modigliani Miller is that consistently observed debt management strategies must be explained by a desire to minimise transaction costs (broadly defined) associated with less than perfect markets. That is, once one relaxes the assumption that capital markets are efficient, theory suggests that businesses (or subsets of businesses) will often adopt debt raising strategies that are designed to minimise exposure to those imperfections with a view to reducing transaction costs. Common strategies may therefore start to emerge.

215. A straightforward example is that businesses rarely, if ever, issue public debt at levels below a certain threshold, typically measured in the millions of dollars. This is because there are transaction costs associated with selling debt on both the seller

(prospectus/legal fees etc.) and buyer side (becoming informed about the quality of the debt etc.). For this reason, businesses will typically seek to avoid repeatedly incurring the same transaction costs by undertaking a smaller number of large debt issues (as opposed to a large number of small issues).

B.4 Special role of insolvency/bankruptcy costs

216. Once the Modigliani-Miller result was understood finance academics immediately attempted to explain, within the paradigm of transaction costs, why high levels of gearing were not common? This question was especially pertinent given that the existence of tax as a transaction cost and the tax deductibility of interest costs would tend to suggest that 99.99% gearing would minimise tax costs (and therefore transaction costs).

217. The generally accepted answer was that there were very high levels of transaction costs associated with insolvency/bankruptcy and this was why firms tended not to adopt high levels of gearing. Baxter (1967)[51] was one of the first to make this point but many authors have built on his insight since.[52]

218. The purpose of the present paper is to explain, in the context of the Modigliani and Miller discussion, how excessive leverage can be expected to raise the cost of capital to the firm. It is argues that when account is taken of the "risk of ruin" a rising average cost of capital is perfectly consistent with rational arbitrage operations. Allowing for the possibility of bankruptcy is tantamount to relaxing the assumption that the anticipated stream of operating earnings is independent of the capital structure

219. Insolvency or near insolvency imposes costs on a range of parties, including:

    - Debt investors: insolvency means that debt holders do not get paid when debts fall due (a technical default). Debt investors will typically incur significant costs to manage that disruption (such as curtailing consumption/investment in other activities or borrowing from third parties – often at penalty rates due to the financial distress of the original technical default). If they cannot manage the technical default then they will themselves be rendered insolvent (unable to pay their debts as they fall due);

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51 Baxter, N., "Leverage, Risk of Ruin and the Cost of Capital," Journal of Finance 22, September 1967, pp. 3956-403.

52 For example: Stiglitz, J.E., "A Re-Examination of the Modigliani-Miller Theorem," American Economic Review 59, December 1972, pp. 784-793; Kraus, A. and R.H. Litzenberger, "A State Preference Model of Optimal Financial Leverage," Journal of Finance, September 1973, pp. 911-922; and Kim, E.H., "A Mean-Variance Theory of Optimal Capital Structure and Corporate Debt Capacity," Journal of Finance 33, March 1978, pp. 45-63.

- Equity investors: insolvency (or near insolvency) means that equity investors must stop receiving a dividend on their investment, which they have to manage in the same manner as debt investors and with analogous consequences. Equity investors will also suffer because the businesses reputation as a reliable borrower will be damaged. Moreover, existing equity investors may be forced to participate in a rights issue and/or a public equity raising to address the insolvency. Both of these options are likely to involve substantial transaction costs for equity investors.

220. Depending on the nature of the contracts with debt holders, insolvency may also give rise to debt holders taking full or partial control of the company and, potentially, to bankruptcy proceedings. Protracted legal battles may ensue between debt and equity holders (and between different groups of debt/equity holders) over the future of the firm. This may paralyse management, with the principal focus being on the division of the existing value of the firm (and debt holders attempting to ensure the maximum repayment of their debts) rather than on maximising the total value of the firm (including the equity stake).

221. These costs can destroy the value of a firm that would, had it adopted a less aggressive capital management strategy, never have become insolvent in the first place. Moreover, the disastrous nature of the potential transaction costs associated with insolvency (and bankruptcy), can see a firm in moderate financial distress quickly spiral into insolvency. This is because debt investors may be unwilling to fund the firm (or only at penalty interest rates) for fear of subsequent exposure to these costs. In other words, if there is perceived to be the potential for insolvency, this can become a self-fulfilling prophecy.

222. It is for these reasons that transaction costs associated with insolvency/bankruptcy play a key role in the 'real world' analysis of optimal capital management plans. Any change to capital management strategy can materially influence the likelihood (or perceived likelihood) of insolvency/bankruptcy, and so the probability of these substantial costs being incurred. It is important to recognise that there does not need to be an imminent threat of insolvency or bankruptcy for these factors to have a material bearing upon a firm's optimal capital management strategy. What matters is the potential effect of a particular strategy on expectations.

223. If a more aggressive capital management strategy raises the probability of future insolvency/bankruptcy – by any amount – this will reduce the expected (actuarially estimated) value of future cash-flows. This reduction will be equal to the change in probability of insolvency/bankruptcy multiplied by the expected additional transaction costs associated with those outcomes. Given the substantial magnitude of those costs, even small increases in the probability of those outcomes transpiring (e.g., from 0% to 5%) can have a significant effect on expected future cash-flows and, in turn, on the optimal capital structure.

224. Equally, if one aspect of a debt management strategy raises insolvency/bankruptcy risks another aspect of the debt management strategy might need to be made more conservative so that the net impact is reduced. For example, consider a firm exposed to high levels of refinancing risk due to heavy reliance on short term or lumpy debt maturity profile. Such a firm will have a large amount of its debt portfolio come due in a short period of time. As discussed in section 3.3, this is a situation that businesses treasuries (and credit rating agencies) seek to avoid due to the refinancing risks[53] associated with this. Such a firm may need to adopt a lower gearing and/or higher level of prefunding than would otherwise be the case. This may manage down the expected transaction costs of insolvency/bankruptcy but at the expense of higher other transaction costs (e.g., higher tax costs associated with lower gearing and line of credit fees/carrying costs associated with prefunding debt maturity).

53 The ability to refinance debt on reasonable terms is critical if a firm is to limit its exposure to insolvency risk.

Appendix C Addressing other claims made by the ERA regarding debt term

225. As discussed in the body of this report, the ERA's practice is to estimate the DRP paid on debt based on the average time to maturity of bonds in its 'bond yield' sample – which happen to be around 5.7 years at the moment (and was previously estimated by PwC at 5.2 years)[54]. The ERA acknowledges that this is inconsistent with the actually observed maturity of debt at issuance for regulated utilities (which is over 10 years) but argues that this is not the relevant comparison. The ERA argues that the relevant comparison is the remaining maturity of debt currently on issue (not the maturity at the time it was issued). This appendix provides additional discussion to that provided in the body of the report on why this is an error.

C.1 The cost of debt is determined by the maturity at issuance – not the remaining maturity

226. The ERA makes multiple statements to the effect that it is the remaining maturity of debt not the maturity at issuance that determines the cost of debt.

> *The Authority notes that the prior history of a bond does not determine the current market value for a bond, and therefore does not determine the current market value of a firm's debt.* ***Therefore, the term to maturity at issuance is irrelevant for the pricing of a firm's debt, and consequently irrelevant for determining the refinancing risk present in regulated entities.*** [Emphasis added]

And

> *The Authority considers that it is the average remaining term to maturity that determines the debt profile of a firm at a given time.* ***That is, the yield required to service a firm's cost of debt is a function of the remaining term to maturity, and not the term to maturity at issuance.*** *Investors will price bonds based on the coupons they are eligible to receive, the face value of the bond and the credit risk of the bond issuer. As a consequence, the Authority does not accept arguments for a longer term of the cost of debt is required.* [Emphasis added]

And

> *The above results for remaining term to maturity however, are not inconsistent with the theoretical situation where a 5.5 year term to*

54 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 115

> *maturity is averaged by issuing 10 per cent of debt every year with a maturity of 10 years. The Authority considers that businesses can issue bonds at any time that is optimal for them. This will include consideration of refinancing risk, and should be independent of the regulatory regime.* ***As such, the remaining time to maturity for bonds is relevant to determine the debt profile of a business and then the average cost of debt is determined accordingly, based on the current debt profile.*** [Emphasis added]
>
> *Taking account of the above analysis with regard to current debt profiles of Australian electricity and gas NSPs,* ***the Authority does not believe that the presence of refinancing risk justifies extending the term assumption of the benchmark term of debt to that of the average issuance, as firms on average have a debt portfolio with terms that are significantly shorter.***[55] [Emphasis added]

227. Consider the standard scenario of an upward sloping yield curve for corporate debt. That is, if an entity issues 10 year debt then it pays a higher interest rate/DRP than if it issues 5 years debt.[56]

228. Now, let 10 and 5 year corporate debt rates be 6% and 5% respectively and let, for ease of exposition, this be a constant difference over time. A firm that only ever issued 10 year fixed rate debt will need to pay coupons to its lenders that equal 6% of the amount borrowed. For each $100 of face value of a bond this equates to $6 per annum. As time passes, the remaining life of the bond will fall from 10 to zero years. However, the firm will be legally obliged to keep paying the owner of the bond a $6 coupon over the entire life of the bond. The coupon that is paid by the issuer does not fall.

229. The yield on the bond traded in the secondary market does fall when the bond is half way through its life – in this example to 5%. However, this is just another way of saying that the bond will trade above its face value of $100 if sold in the secondary market. That is, if the original lender were minded to sell the bond it bought five years ago from the issuer, it would be able to sell it at a price (a little under $105) such that the yield the new owner earned would be 5% (a $6 coupon paid for five years on a bond that cost $104.7 results in a yield of 5%).

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[56] The entity pays a higher interest rate for long term debt because long term debt transfers more debt from the entity to the debt providers (e.g., it locks in financing for a longer period forcing the debt funder to be exposed to interest rate and company specific risk premia variations over the longer life of the debt) [ref appendix].

230. But note that this 5% yield is achieved not by a reduction in the coupon payments made by the borrower, it is achieved by a rise in the market value of the bond above its face value. Contrary to the ERA's claims, this change in yield in the secondary market is irrelevant to the cost of debt actually incurred by the issuer – which is entirely determined by the yield determined at the time of issuance.

C.2 Incorrect interpretation of Lally advice

231. The ERA considered expert evidence from Associate Professor Lally on this issue and has incorrectly claimed to be implementing his advice. The error in implementing his advice ties directly back to the above logical flaw in the ERA's position expressed above. On page 25 of Appendix 2 the ERA correctly characterises Associate Professor Lally's advise as follows:

> *39. More recently, Lally (2010) considered the situation where the average debt term used by regulated businesses materially exceeds five years (that is, the term of the regulatory cycle), and where these firms use neither interest rate swaps nor credit default swaps to equate the longer term (say 10-year) debt with the regulated five year term of debt. In this scenario, the present value principle would be violated. This is because the regulator's allowed cost of debt would diverge from those actually incurred by the firms.*
>
> *…*
>
> *42. Lally proposes a further scenario 3 to deal with a situation where credit default swaps are not available. In this situation, it is assumed that the regulated firm will borrow for a tenor of 10 years and use interest rate swaps to convert the ten-year risk-free rate to a five-year risk free rate. Given the difficulties with using credit default swaps to convert a 10-year debt risk premium to a 5-year one, Lally suggests the regulator should use: (i) the five-year risk-free rate, (ii) 10-year debt risk premium, (iii) annualised 10-year debt issuance costs; and (iv) the transaction costs involved with swap contracts. Whilst this would violate the NPV=0 principle, Lally suggests that this would be a slight deviation of approximately only 0.04% of the WACC per year.*
>
> *…*
>
> *46. In the situation where the average term to maturity is significantly longer than 5 years, Lally advocates scenario 2 if credit default swaps are readily available and transaction costs are not significant. If transaction costs are significant, or credit default swaps are not readily available then Lally advocates the third option.*

232. That is, Lally's advice is that where *"the average debt term used by regulated businesses materially exceeds five years"* then, if it is not possible to hedge the DRP [which Lally acknowledges is the case], the term used to estimate the DRP needs to reflect the DRP of the long term debt (10 years in this example).

233. The critical point here is what is meant by *"the average debt term used by regulated businesses"*. If one reads Lally then it is clear that this is the debt term at issuance:

> *The second option would arise only if the average debt term (**from issuance to maturity**) used by relevant comparator firms materially exceeded five years. For example, suppose that the average debt term of such firms is ten years. [Emphasis added.]*
>
> *…*
>
> *For example, a firm might seek an average debt term of 10 years so that, in conjunction with staggering of the maturity dates, approximately 10% of its debt requires roll-over in any one year.*[57]

234. These quotes make perfectly clear that Lally's analysis and conclusions is based on the average term at issuance of debt being longer than the regulatory period – not the average remaining term of a debt portfolio being longer than the regulatory period. (Of course, one should not have to look for quotes to demonstrate this. Lally's analysis would make no sense if the former interpretation was adopted).

235. The ERA argues that it is following Lally's advice:

> *76. The Authority will update the debt risk premium annually. This annual reset could imply a one year term, in order to meet the present value principle. However, as hedging instruments – such as credit default swaps – are not readily available in Australia, firms cannot easily hedge this debt risk premium. Lally observes that where hedging is not available, it is reasonable to adopt the average term to maturity of the debt held by the benchmark efficient firm for estimating the debt risk premium (see paragraph 46 above). This recompenses the firm for the debt risk premium component, recognising efficient financing practices, and in particular, the need to stagger the term of debt to address refinancing risk.*
>
> *77. The Authority's analysis of the debt profile of the benchmark efficient entity indicates that the term to maturity exceeds five years.*
>
> *78. As a result, in line with Lally's advice set out above at paragraph 46, the Authority considers that the appropriate term for the debt risk premium should be the term to maturity observed for the benchmark*

57 Lally M., *The Appropriate Term for the Risk Free Rate and the Debt Margin*, April 2010, pp. 10-11

> *efficient entity through the bond yield approach. That term will fluctuate according to the average term to maturity of the sample in any year.* [58]

236. However, when it comes to determining the *"debt profile of the benchmark efficient entity"* the ERA does not base the term assumption on the *term at issuance* (as logic and Associate Professor Lally require). Rather, the ERA bases its term estimate on the *remaining term* of the bonds in the 'bond yield' sample. There is no reason for this to be consistent with a 10 year estimate and there is every reason to expect it to be shorter[59], which, indeed, is the case (in ATCO's averaging period this is 5.7 years and PwC previously estimated it to be 5.2 years)[60].

C.3 Can a debt management strategy be reconciled to the ERA approach?

237. Putting aside the fact that the ERA has arrived at its approach on an unsound basis, it is useful to ask the question "what would the benchmark efficient debt management strategy have to be in order that a firm would have the DRP estimated by the bond yield approach?". The answer is that the benchmark entity would have to be assumed to issue debt with a *term at issuance* that is equal to the average *remaining term* of bonds in the ERA's bond yield sample.

238. As already discussed, this would involve issuing debt with a shorter maturity than utilities actually issue (and a shorter maturity than the bonds in the ERA's 'bond yield' sample – which are, on average, half way through their own lives). One could believe that the average practice of corporates is inefficient and it would be more efficient to issue shorter maturity debt. The ERA has not made such an argument (relying instead on the incorrect assumption that average remaining term of debt determines the cost of that debt to the issuer). However, it is at least conceivable (by which I mean not logically impossible).

239. However, it is logically impossible for a benchmark efficient entity to alter the term of its debt portfolio every time that the sample of bonds in the ERA's 'bond yield' sample changes. For example, in one year the average term of debt of the bonds in the ERA sample might be 5.5 years. In this case, the DRP estimated would be associated with an implied benchmark efficient term of debt issuance of 5.5 years.

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58 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, Appendix 2, p. 30.

59 The average remaining maturity of the bonds in the sample are, by definition, shorter than the average maturity of the bonds at the time of issuance. Moreover, the sample is not purely comprised of infrastructure issuers such as utilities. Given that infrastructure issuers tend to have the longest maturity bonds (consistent with their asset lives) then the inclusion of bonds from other industries will tend to reduce the average remaining term in the sample even further.

60 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p.115.

240. The following year a large amount of data may not be available for some long dated bonds (and so they would not be included in the sample) and/or new data may become available for short dated bonds. The average term to maturity might drop to, say, 3.5 years (noting that if the sample is the same then the average remaining life falls by one year in any event). This gives rise to a sudden change in the assumed efficient term of debt issuance. The allowed DRP would also drop accordingly assuming a standard upward sloping relationship between DRP and maturity.

241. There is no logical reason to argue that the efficient term of debt issuance changes from year to year based on the vagaries of the average remaining term of the bonds that meet the ERA's criteria for selection in its sample. Moreover, there is no way that an actual service provider (or a benchmark efficient entity for that matter) could predict these variations. Consequently, there is no way to construct a debt management strategy that aligns with the allowance that the ERA's approach would give. In fact, even with perfect foresight it would not be possible to do so. [61,62]

242. It is by no means unrealistic to consider such variability in the average term in the bond yield sample. During ATCO's averaging period there are 75 bonds on issue that meet the ERA's criteria but only 33 of these have yield data. If only two of these 33 bonds are removed from the sample, the weighted average remaining term of the bonds in the sample falls from 5.7 years to 4.6 years.

C.4 What other justifications for the ERA's approach to DRP term might exist?

243. I consider that there are two further related possible justifications for the ERA approach to allowing the 'bond yield' sample to determine the term of the benchmark efficient debt strategy:

    i. it is too difficult to devise a methodology that takes account of how the DRP varies with the term of debt; and

    ii. the DRP does not vary with the term of debt.

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61 If an efficient benchmark entity initially (in year 1) had a portfolio of debt made up of bonds issued with 5.5 years to maturity, then it is simply not possible that they could manage their affairs to have a portfolio made up of bonds with a term of issuance of 3.5 years in year 2. Even if it is assumed that 18% (1/5.5) of their portfolio matured during year 1 and was replaced with 1 year debt the average maturity of issuance would still be 4.7 years.

62 This discussion leaves to one side the fact that, even if the bond yield approach got the term of debt correct, it would compensate for this based on prevailing rates each year – but the actual DRP cost for any issuer with a staggered debt portfolio would be based on a historical average.

244. The ERA has not made the first claim but it has made the second claim (although the reason why the ERA has made the second claim is unclear, since it concedes no potential error in its approach if this is not the case).

C.4.1 Difficulty of taking term of debt into account

245. In my view there are relatively simple ways in which the relationship between the term of debt and the yield/DRP on that debt can be estimated. The simplest way in which this can be done is to rely on published estimates of the relationship between yield/DRP and maturity. For example, both Bloomberg and the Reserve Bank of Australia (RBA) publish an estimate of the yield curve for corporate debt rated BBB.

246. The ERA did consider and dismiss using the Bloomberg yield curve in this process on the grounds that: it was inaccurate; and that the methodology was *"not disclosed to the public and therefore the Authority could not determine the drivers of the difference or replicate the estimates using Bloomberg's approach"*.[63]

247. Since the ERA published its Guidelines, the RBA has begun publishing its own yield curve for Australian BBB corporates (excluding finance companies). The RBA's approach is completely transparent with a detailed description of the methodology and data sources provided in the December 2013 RBA Bulletin. This methodology is, in fact, similar to the ERA's bond yield approach except that it includes a larger number of bonds (including bonds issued internationally by Australian companies) and derives a relationship with maturity by having a variable weighting on each bond depending on the maturity of interest. That is, when the RBA is estimating a yield at 7 years maturity it gives more weight to the bonds with maturities closer to seven years than to the bonds further away from 7 years. The RBA estimates could be used either directly, or the RBA methodology could be used to derive a yield curve from any sample of bonds.

248. In addition to the RBA methodology there are also curve fitting techniques such as the Nelson Siegel approach. The ERA has considered the use of this approach and states that:

> *The Authority considers, however, that the application of the Nelson-Siegel yield curve may have merit.*[64]

249. The ERA performs this technique on its own samples of bonds from prior regulatory decisions and concludes that it provides similar results to the bond yield approach (using the Nelson Siegel 5 year[65] estimate)[66]. On this basis the Authority concludes:

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63 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 108-109

64 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p.116

65 It is unclear to me why this comparison is made at 5 years when the bond yield sample will have a weighted average maturity different from 5

> *Curve fitting is a complex issue and there are various different techniques which can be used. The Authority considers that the small benefit from this complex technique is not sufficient to outweigh the costs and uncertainties involved in carrying out the exercise.*[67]

250. This statement is a *non-sequitur* because at no stage has the ERA described any benefit that might result from a curve fitting exercise. Indeed, there is only any benefit if one wishes to estimate the yield/DRP at a particular maturity (i.e., the only reason to estimate the relationship between yield/DRP and maturity is if you want to know the yield/DRP at a particular maturity).

251. In my view this is a core problem with the ERA's approach. At no stage has the ERA defined a term to maturity that it believes is the correct term to measure the cost of debt. Of course, without having realised the need to do this, there is no point in estimating a yield curve. However, in my view the error is in not appreciating the need to estimate a yield curve.

C.4.2 Term of debt does not matter (DRP is independent of term of debt)

252. The ERA does find the Nelson Siegel yield curve estimation useful as a basis for concluding that the DRP is independent of the term of debt. The ERA examines the statistical properties of the Nelson Siegel curves fitted to different 'bond yield' samples and concludes:

> *The Authority notes that out of the 6 Nelson-Siegel Yield curves calculated, 1 is statistically significant at the 5% significance level. This implies that for 5 out of the 6 data sets the best statistical model is that of a constant DRP or cost of debt. This detail has been omitted from ESQUANT report. Therefore, the Authority is of the view that the analysis conducted by ESQUANT actually produces evidence against the use of Nelson-Siegel yield curves for the purposes of estimating the DRP rather than advocating its use.*

253. There are several problems with this conclusion. The first being that the conclusions relate solely to the three periods examined (from three former regulatory decisions, each of which appears to have considered two different samples). It might be that the DRP was independent of the term in those periods. However, this does not imply that it will be independent of the term in all periods. The second point is that the samples of bonds are quite small and it is commonly the case that estimated parameters are not 'statistically significant at the 0.05 level' even when it is well understood that an economic relationship exists between these variables in the wider population of observations.

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66 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p.119

67 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p.120

254. The third point is that the ERA makes a serious error of statistical interpretation when it states:

> *… This implies that for 5 out of the 6 data sets the best statistical model is that of a constant DRP or cost of debt.*

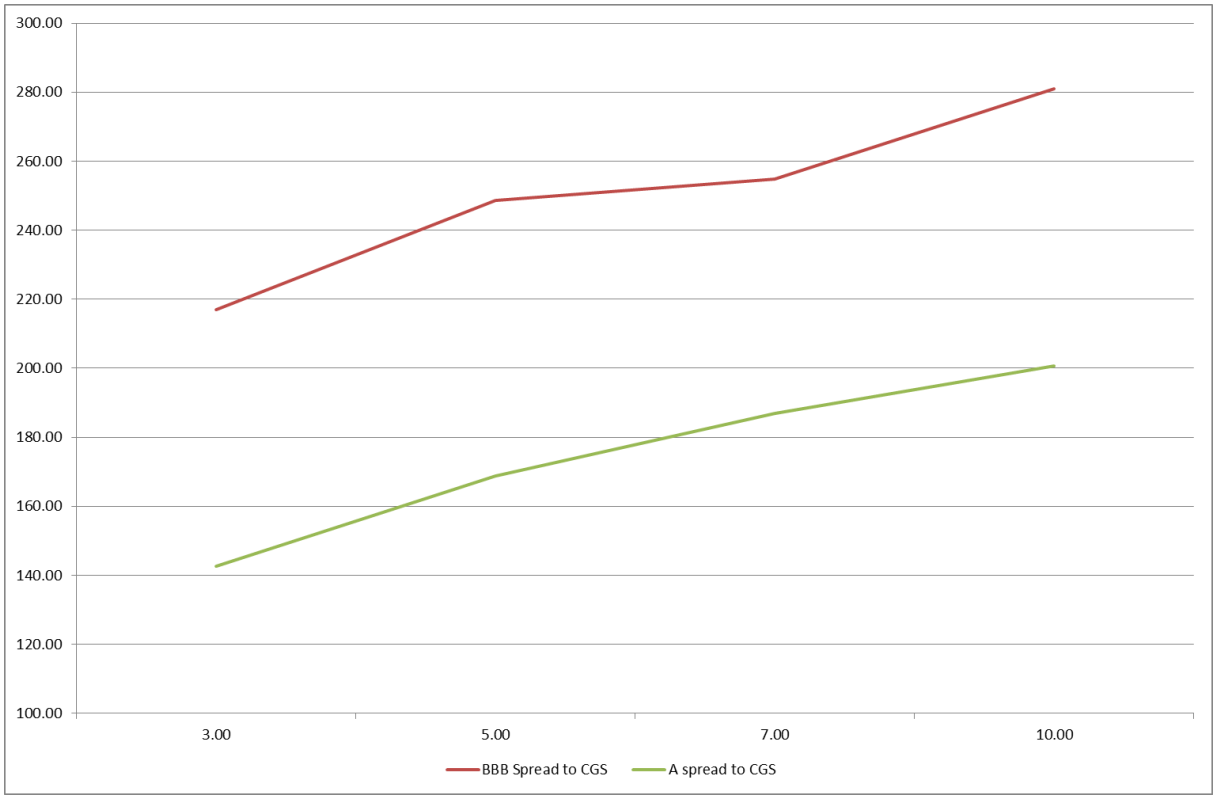
255. This completely misunderstands the meaning of statistical significance. This is best illustrated with an example. Imagine that statistical testing predicted that exposure to a particular chemical increased the probability of dying from, for example, lung cancer within the next five years, from 0.1% to 25.0%. However, the size of the sample and nature of the data is such that you can only be 94% confident that exposure to the chemical will cause lung cancer.

256. In this circumstance, the ERA's logic would suggest that the best statistical model is that exposure to the chemical does not cause lung cancer. This is absolutely wrong and you would be foolish to base your decisions on exposure to the chemical on this logic. The best estimate is that exposure to the chemical will increase your probability of dying of lung cancer by 24.9%. The fact that the estimate is not statistically significant at the 5% level simply means that there is a wide confidence interval around this confidence interval does not exclude zero with a 5% probability.

257. In the context of the Nelson Siegel curves, assuming that the estimation has been carried out correctly, the best estimate of the relationship between DRP and maturity is the relationship actually estimated. Only in one circumstance does this reject out the possibility (with 95% confidence) that there is no relationship. But this does not mean that the best estimate is that there is no relationship.

258. In any event, other sources of data are available and these are consistent with the commonly expressed view that risk premiums increase with maturity. Figure 8 below shows the historical average term structure, as estimated by the RBA, for the DRP on BBB and A rated corporate debt issued by Australian companies.

Figure 8: RBA estimate of average DRP yield curve January 2005 to January 2014



Source: RBA, CEG analysis

259. In my view, this is compelling evidence that, on average, DRP and maturity are positively related.

C.4.3 The "correct" term for the DRP is one year

260. In several places the ERA makes the statement that it is being 'generous' setting the DRP based on the average maturity of the bonds in the 'bond yield' sample. The reason provided is that, because the ERA is resetting the DRP each year, the correct term to use is the one year term.

> *The Authority notes that as the cost of debt will be updated on an annual basis, the term to maturity for the cost of debt is now one year. As a consequence, extrapolation to ten years as suggested by CEG is unnecessary.*

And

> *…CEG stated that the methodology assumes a benchmark term of debt of 5 years, while CEG considers that the appropriate term is 10 years. Furthermore, CEG suggested that the maturity of the benchmark DRP is a*

> *function of the underlying sample of bonds; as a consequence, it is not consistent with any particular maturity.*
>
> *The Authority considers that the criticism by CEG and ENA regarding the average DRP that arises from application of the joint-weighted approach is irrelevant for the purposes of the guidelines. As discussed in Chapter 6 – Return on debt, the Authority has elected to utilise an annual update for the cost of debt. Therefore, the Authority considers that the joint-weighted approach produces a conservative estimate of the DRP, as longer maturity bonds are given a higher weight.*[68]

261. In these passages the ERA appears to be claiming that the correct term for the cost of debt (both risk free rate and DRP) is one year because the DRP is being reset each year. Consequently, the ERA believes that setting the DRP based on bonds that have an average maturity of greater than one year is generous.

262. As already discussed at section 3.2, and not contested by the ERA, the maturity of debt at issuance by a regulated utility is 10 years or more. There is no way for a firm to issue long term debt and alter its exposure to DRP to one year. This is accepted by the ERA as discussed at3.3. For the ERA to, in the above passages, be relying on an argument that assumes efficient debt management practices involve relying on one year bonds or the ability to hedge the DRP to one year is internally inconsistent.

C.5 The 'NPV=0' principle

263. It is finally worth noting that the ERA, relying on the advice of Lally, concludes that setting a term for the DRP in excess of the length of the regulatory period will result in a (slight) deviation from the NPV=0 principle.

> *Whilst this would violate the NPV=0 principle, Lally suggests that this would be a slight deviation of approximately only 0.04% of the WACC per year.*[69]

264. I do not agree that the NPV=0 principle and analysis of Lally is relevant to arriving at a rate of return consistent with Rule 87(3).. However, even if Lally's analysis is accepted as correct, setting the maturity of the DRP at 10 years need not result in a deviation from the NPV=0 principle as expressed by Lally. This is only the case if the DRP is reset once every five years based on prevailing conditions as was the requirement under the old Rules – and which Lally implicitly assumed in arriving at his conclusion.

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68 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p.115

69 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, Appendix 2, p.25

265. If, however, the DRP is set based on a trailing average basis then this will not result in a deviation from the NPV=0 principle because the cost of debt allowance will be equal to the actual cost of debt for a firm issuing 10 year debt on a staggered basis. In fact this is the ERA's own reasoning for the condition that is necessary for the NPV=0 principle to be achieved.

> *In this scenario, the present value principle would be violated. This is because the regulator's allowed cost of debt would diverge from those actually incurred by the firms.*

266. That is, so long as the cost of debt allowance is equal to the actual cost of debt the NPV=0 principle is satisfied. Of course, this requires the regulator to set a cost of debt allowance that is actually replicable. The NPV=0 allowance and replicability are the same thing. Once this is recognised, the ERA's clearly stated position that it does not wish to set a cost of debt allowance that can be replicated is equivalent to saying that it does not wish to achieve the NPV=0 principle.

Appendix D Efficiency of using interest rate swaps

D.1 Interest rate swaps as a component of the benchmark efficient debt management strategy

267. It is well accepted that efficient debt financing practices involve the staggered issue of long-term debt through time. This avoids the need to refinance large portions of an entity's debt portfolio at the same time – reducing the risk that interruptions to capital markets (generally or for the specific entity) will prevent refinancing of its debt and cause it to default or have to pay extreme interest rates on large portions of its debt portfolio. This is consistent with the ERA's observed behaviour of regulated utilities – which the ERA finds tend to issue long term debt (greater than 10 years maturity) at staggered intervals.[70]

268. However, as the ERA notes, it is possible to enter into derivative contracts to alter the effective tenor of its interest costs.

> *The on-the-day approach has been criticised on the grounds that it somehow does not allow firms to establish a debt portfolio with maturities that are staggered over time in order to avoid 'refinancing risk' (staggering is also known as debt laddering).Hence, stakeholders have argued that the approach is not replicable. The Authority considers that this view is incorrect.*
>
> *The Authority notes that this lack of replicability is predicated on the idea that the firm is unable to hedge its existing portfolio of staggered debt to reflect exactly the return on debt estimated through the on-the-day approach. The implied view is that the regulated firm must issue all of its debt in the averaging period, just prior to the regulatory period.*
>
> *However, the Authority considers that regulated firms may issue debt at any time, and may hedge the risk free rate by undertaking interest rate swaps, in order to convert to the rate that reflects the prevailing on-the-day rate adopted as the regulatory return on debt.*
>
> *The Authority has not been presented with concrete evidence of impediments to hedging the risk free rate, through the use of interest rate swaps.*[71]

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70 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, Appendix 3

71 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, pp.67-68.

269. In this passage the ERA appears to be accepting, or at least not contradicting, the premise that its cost of debt estimate should be 'replicable' in the sense that it should be based on a debt management strategy that a benchmark efficient entity could actually undertake.

270. In this context, the ERA makes the correct point that if derivative contracts (in this case interest rate swaps) exist that allow firms to alter their effective risk free rate exposure then it is open to the ERA to include the use of such contracts in its benchmark efficient debt financing strategy. Provided the ERA accurately estimated and compensated for the costs of using interest rate swaps in this manner the ERA could reasonably base its estimate of the cost of debt on an efficient finance strategy that:

- involves the issuance of staggered long term (e.g., 10 year) debt; but
- entry into interest rate swaps when it issues that debt the effect of which is to have the risk free component of its debt reset at market rates at the beginning of each regulatory period.

271. However, even incorporating the use of interest rate swaps into the benchmark efficient financing strategy, the cost of debt for the benchmark efficient entity following this strategy would be equal to:

- the prevailing 5 year swap rate[72] at the beginning of the regulatory period; plus
- the historical average DRP[73] on all of its past debt issues.

272. This is a cost of debt under a debt management strategy consistent with Rule 87(10)(c) where the firm engages in a staggered debt portfolio but enters into interest rate swaps so that, while the DRP paid is a historical average, the base level interest rate (exclusive of DRP) on its debt portfolio effectively matures every 5 years and the business 'resets' these costs in the swap market for a further 5 years during the ERA's 40 day averaging period.

D.2 Inconsistency of ERA calculation with a financing strategy that uses interest rate swaps

273. The above cost of debt is clearly different to the cost of debt that the ERA's methodology calculates. There are two points of difference. The first relates to the

72 Where, in this financing strategy the relevant risk free rate proxy would actually be the 5 year swap rate not the 5 year CGS rate. This is for the simple reason that the use of interest rate swap rates to hedge base interest rates to a particular period results in interest rate costs being reset in that period by reference to the interest rate swap curve – not the CGS curve.

73 Once more, this DRP would be measured relative to the fixed interest rate swap curve at the time the debt was issued.

definition of the base rate being the 5 year swap rate and not the 5 year CGS rate (and the DRP being consistently measured relative to swap rates). The second point of difference is that the DRP is a historical average DRP – not the prevailing DRP at the beginning of each year.

D.2.1 Wrong definition of the base rate

274. The base rate that is reset every 5 years in the above strategy is the 5 year fixed leg of an interest rate swap contract. The ERA's calculation departs from this by using the 5 year Commonwealth Government Security (CGS) rate. Similarly, the DRP needs to be measured relative to swap rates. This is for the very simple reason that if it is assumed that the an entity manages volatility in the general level of interest rates by trading interest rate swaps then its cost of debt is determined by the level of interest rate swaps.

275. The ERA's adviser, Chairmont Consulting, has advised the ERA of this:

> *As explained in more detail in Chairmont's report to ERA in May 2013, the market usually looks at the 'margin' or 'debt risk premium' of corporate debt in relation to the swap rate, not the Commonwealth Government Securities (CGS) rate used in regulatory price setting terminology. Throughout this report the DRP referred to is that over the swap rate of equal maturity, unless otherwise specified.*
>
> *The margin may vary depending on the term of debt. It is measured as the difference between the total yield of a corporate's debt of any given maturity and the swap rate of the equal maturity. For example, the margin for 12-month fixed rate debt of a corporate would be compared to the 12-month fixed swap rate, with the difference between the two being the margin for a 12-month term. The equivalent calculation for a 5 year bond versus 5 year swap is likely to show a different margin for that term.*

276. The AEMC, in developing the current Rules, anticipated the above logic:

> *The draft rule did not set the return on debt by reference to any particular base rate and DRP. The Commission took this view to allow the regulator sufficient flexibility to determine historical averages of either the entire return on debt or just the DRP component. Furthermore, the Commission's intention was to ensure that there is the flexibility to set a DRP against a base rate other than the Commonwealth government bond rates (e.g. bank bill swap rates), if that was considered appropriate by the regulator. The Commission considered this flexibility to be important to allow the*

> *methodology used to estimate the return on debt to reflect the borrowing and risk management practices of an efficiently run service provider.*[74]

277. In the above passage, the AEMC is anticipating the potential to introduce the use of interest rate swaps in the calculation of the 'base rate' and the DRP. Moreover, it is specifically doing so in the context of a cost of debt estimation methodology that is designed to reflect a well-defined set of *borrowing and risk management practices of an efficiently run service provider*.

278. The ERA's Guidelines explicitly include a, very small,2.5bp allowance for the cost of hedging:

> *In addition, the Authority recognises that there is a cost involved with hedging. The Authority considers that an annual swap allowance of 2.5 basis points should be provided to firms on the whole of the debt portfolio to compensate for the cost of conducting hedging for the exposure to movements in the risk free rate. The hedging cost allowance would also be added to the return on debt.*[75]

279. In short, the ERA justifies its adoption of a 5 year term for the risk free rate on the basis of the existence of interest rate swaps. It includes a transaction cost allowance on the basis that an interest rate swap strategy is put in place. However, when it comes to estimate the cost of debt it does not define the base rate and DRP consistently with the use of an interest rate swap hedging strategy.

280. The ERA does acknowledge its failure to follow Chairmont Consulting's advice and provides the following explanation:

> *As set out by Chairmont Consulting in its June 2013 report to the Authority, the difference between a CGS risk free rate and a swap rate of similar term is called the spread of swap SS). However, it should not matter which rate is used for determining the overall return on debt. If debt risk premiums are estimated consistent with the chosen base – whether that base be the CGS risk free rate or BBSW – there should be no difference in the resulting build-up of the overall return on debt. The two approaches just represent 'two different ways of splitting up the total interest rate'...*

281. This statement is only correct if the spread of swap (SS) is constant through time and across maturities. This is demonstrably not the case and, consequently, the ERA's conclusion is incorrect.

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74 AEMC, *National Gas Amendment (Price and Revenue Regulation of Gas Services) Rule 2012*, pp. 103-104

75 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, para. 147

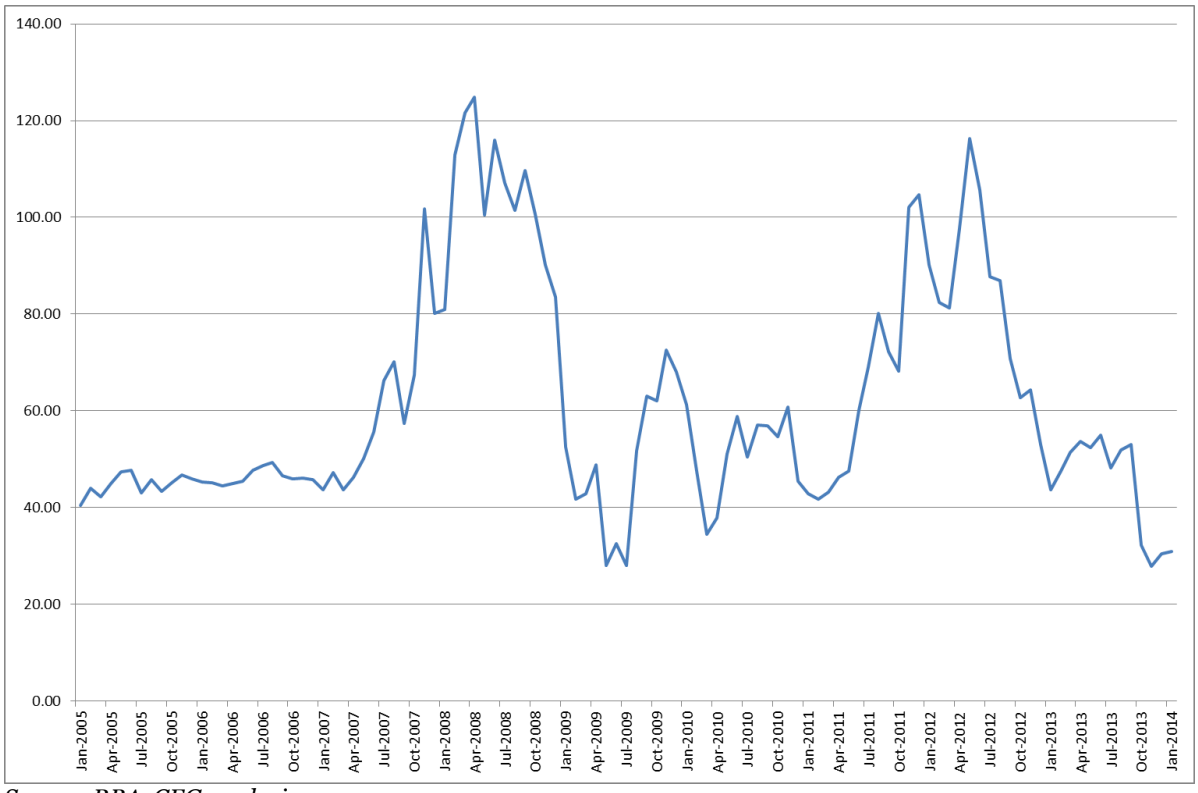
282. By way of illustration note that the ERA methodology sets the cost of debt in the fifth year of the regulatory period based on:

- The CGS yield at the beginning of the 5 year regulatory period; plus
- The DRP calculated at the beginning of the fifth year. This is, in turn, equal to the weighted sum of the bond yield less the contemporaneous CGS yield) for all bonds in its sample.

283. If the swap rate is the same absolute amount above the CGS rate at the beginning of year 5 as it was 4 years earlier (at the beginning of the regulatory period) and if this is true at all maturities across the swap curve then the ERA is correct that the same cost of debt is estimated whether CGS or swap rates are used. However, to the extent that the spread between the swap and CGS yields vary over time (or across maturities), this is not the case.

284. Figure 9 below shows the actual volatility in the spread between 5 year swap rates and 5 year CGS over time. Clearly, it is not correct to describe this variable as being constant over time.

Figure 9: Spread between 5 year swap and CGS rates



Source: RBA, CEG analysis

285. The ERA also states that it "*has concerns that available IRS market data on swap rates for longer maturities – such as beyond 6 months – are less reliable than*

short term BBSW"[76]. This is, indeed, an argument for not assuming a swap strategy as part of the benchmark efficient debt management strategy. However, the way that the ERA uses this fact is to argue for the use of the wrong base rate in its calculation because it believes that it can be measured more accurately.

286. Needless to say, accurately measuring the wrong thing does not make the cost of debt estimate more accurate.

287. Finally, the ERA states that:

> *The Authority notes that using observed market transactions of swap rates will result in estimates of the risk free rate that are biased upward. This is a consequence of the possible counter-party credit risk present in IRS and the implicit premium paid by those hedging when entering into a swap. This approach also relies on the assumption that longer maturity swap markets are sufficiently liquid.*[77]

288. Again, this is inconsistent with the ERA's argument that the difference between CGS and swap rates does not matter. Moreover, if it does matter and if it is true that swap rates include such a premium (I do not understand why the ERA uses the term 'biased up'), then this is precisely why they should be used. That is, if the benchmark efficient strategy involves using swap contracts then the cost of those contracts needs to be included in the cost estimate in full.

289. Of course, the ERA statement equally well serves as a basis for concluding that using swap contracts are an imperfect (costly) way in which to manage interest rate risk to the regulatory benchmark. The ERA is correct that entering into a swap contract exposes you and your counterparty to risk (the risk that one party may be a net payable position but may default on those payments). This risk is costly to you in two ways – it means that the hedge is imperfect (because the counterparty cannot be assumed to make good their promise) it also means that, as the ERA points out, the fixed rate paid will include a premium for this risk.

290. Moreover, the measurement problems alluded to by the ERA are a symptom of imperfect liquidity in these instruments – which itself creates risks in dealing with these derivatives and exposes a business to costs in the form of 'moving the market' in periods where they transact large volumes (as they would have to if they were hedging the entirety of their debt portfolio to a single date). These considerations are certainly important contributions to the volatility observed in the spread between swap and CGS rates described above.

291. Consequently, it would be inappropriate to assume that such a strategy forms part of the benchmark efficient debt management strategy in the long run (consistent

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76 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 83

77 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 83

with the criteria that the benchmark strategy should attempt to lower transaction costs). This is consistent with submission from the Australian Financial Markets Association to the AER that incorporating a swap overlay into the benchmark efficient debt management strategy would raise rather than lower the cost of debt.

> *AFMA submitted that due to recent international regulatory developments it considers that interest rate swaps are likely to increase the cost of debt rather than reduce the cost of debt.*[78]

[78] AER, *Explanatory Statement to the Rate of Return Guidelines*, p. 140.

Appendix E Further discussion of the ERA's economic efficiency analysis

E.1 The ERA's belief that creating risk is necessary to promote economic efficiency

292. The ERA justifies the creation of mismatch risk in its cost of debt allowance on the basis that this is necessary in order to promote economic efficiency. Relevant quotes are provided below.

> *The regulated firm's debt risk premium, under a trailing average approach, would also likely reduce, as lenders would account for the lower risk of future mismatch timing risk and related risks, such as default risk. However, to the extent that this opportunity is not available to other unregulated firms in the economy, such an approach would create a type of financial subsidy to the regulated firm. This creates an economic distortion and an associated reduction in economic efficiency.*[79]
>
> *The Authority also considers that all firms with staggered debt portfolios face a resulting potential mismatch pricing risk, which may not be able to be eliminated completely as interest rates fluctuate. The Authority considers that, as far as possible, it should match the signal provided by prevailing rates. The regulated firms will then have the maximum incentive to adopt efficient financing practices, similar to other firms in the economy.*
>
> *The Authority further concludes that it would not be in the long term interests of consumers to provide regulated firms with the financial advantages that would accrue from the trailing average approach. The resulting financing practices would not be consistent with efficient financing practices elsewhere in the economy. The resulting financing practices would provide an effective interest cost subsidy to the regulated firm.*[80]

...

79 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 71.

80 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 71.

> *The Authority considers that the mismatch timing risk for the regulated firm could be made closer to that faced by unregulated firms if it updated the on-the-day cost of debt for each regulatory year.*[81]

...

> *To the extent that the mismatch timing risk of the regulated firm would then be aligned with that faced by the unregulated firm in an effectively competitive market, then the outcome would be consistent with efficient financing costs, and with the requirement for efficiency more generally.*[82]

293. I have explained in the body of this report why the above conclusions are incorrect.

E.2 Other statements by the ERA on economic efficiency

294. The ERA believes that setting the cost of debt allowance based on the DRP (and ideally the 1 year risk free rate) prevailing at the beginning of each regulatory year will promote economic efficiency.[83] However, as a concession to customers who argued that this would introduce too much uncertainty and volatility into regulated tariffs, the ERA only proposes to update the DRP annually.[84]

295. The ERA attempts to explain the basis for its views in section 6.2.1.3 "Efficiency considerations". In this section the ERA makes a number of statements about 'productive', 'allocative', and 'dynamic' efficiency. In what follows I reproduce the most relevant statements and make observations in return:[85]

> ***Productive efficiency*** *is achieved when firms in the economy produce any given level of output at lowest input cost. The following outcomes will contribute to the achievement of productive efficiency:*
>
> > *The regulated firm funds its investments utilising the lowest input cost of debt, which reflects the prevailing interest rates that are consistent with efficient financing costs.*
> >
> > *The prevailing cost of capital will also influence the decisions made by the regulated firm with regard to its use of factors of production. While investments in major capital assets owned by the firm are sunk in the short run, it may be possible to substitute capital for labour – at the*

81 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 73.

82 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 74.

83 See ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, para. 388

84 See ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013,paras. 396-397

85 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, p. 59.

> *margin – over the medium term. Appropriate pricing for the cost of capital will contribute to efficient decision making in this regard during the regulatory period.* [Emphasis added.]

296. The definition of productive efficiency is correct. However, the ERA fails to appreciate that, given this definition, the ERA should be seeking to set the cost of debt allowance in a manner that facilitates the regulated entity to lower mismatch risk and lower its cost of finance.

297. Second, it is not the case that *"utilising the lowest input cost of debt"* is associated with *"the prevailing interest rates that are consistent with efficient financing costs"*. Clearly, if interest rates are currently higher than past interest rates then a debt financing strategy that uses a staggered cost of debt rather than rolling over debt every year will result in a lower cost of debt.

298. Thirdly, in the last paragraph of the above quote, the ERA seems to be saying that annual updating is required to ensure that a regulated entity's allowance for new investment reflects their actual cost of new debt – in order to ensure that they have the correct incentives to undertake this new investment. In particular, the ERA seems to be concerned that if the allowance for the cost of debt in a particular year is higher/lower than the true cost of debt facing the entity then it will have an incentive to bias operational decisions in favour too much/too little capital intensity.

299. This logic, while having a plausible intuition to it, is fatally flawed. First, the nature of the regulatory regime is that, within the regulatory period, businesses do not receive an additional allowance for the cost of debt the more they invest (and *vice versa*). The ERA's annual update to the cost of debt will be applied to the RAB that was forecast to apply in that year at the beginning of the regulatory period.[86]

300. The first time that a regulated business will receive any additional allowance for the cost of debt based on higher investment (and *vice versa*) will be at the beginning of the next regulatory period – and that will be based on the ERA's future risk free rate and DRP estimates. Consequently, the interest rates that feed into the allowance that is provided in the year an investment is made is irrelevant to a business's incentives to invest in that year. Rather, it is the expected future interest rates that will apply in the next and subsequent regulatory periods over the assets life that matter. There is no reason that an entity will expect a different level of cost of debt allowance in future regulatory periods as a result of having their cost of debt allowance updated in this regulatory period.

301. Secondly, the correct solution to the alleged problem would not be annual updating of the entire RAB allowance for the prevailing cost of debt. The correct solution would be to have different cost of debt allowances for different parts of the RAB

86 See paragraph 419 of the explanatory statement.

depending on when those assets were invested. That is, the correct solution would be a weighted trailing average cost of debt where the weights in the trailing average are determined by the amount of investment (and refinancing of investment) in any given year. This will ensure that a business will expect to recover the efficient debt financing costs associated with its investment. Annual updating of the DRP, even though the DRP the entity pays is fixed for the life of the loan taken to finance the investment, does not ensure an expectation of efficient cost recovery. In fact, it creates the potential for precisely the kind of problem that the ERA appears to think it corrects.[87]

302. Finally, actual incentives to invest in maintaining existing regulated networks are not solely, or even primarily, driven by a comparison of the entity's actual cost of debt with the expected allowed cost of debt. Rather, they are driven by the need to keep the service in operation and to meet safety and other quality of service standards. It will be economic to make such investments, and avoid the potential costs of service interruptions etc., even if the allowed cost of capital is temporarily below the actual cost of capital.

> ***Allocative efficiency*** *is achieved when the economy produces only those goods and services which are most valued by society. This occurs at the point where the marginal cost of producing a good or service equals the willingness to pay for that good or service, which will be reflected in marginal revenue*
>
> > *The choice between investment and consumption in the economy needs to be based on the relative value of that investment to society as a whole. This requires that alternative investments throughout the economy, including by the regulated firm, are based on the prevailing cost of funds. The cost of capital used by regulated firms – when deciding to invest in additional infrastructure – needs to be updated as market conditions change.[Emphasis added.]*

87 By way of example, let a regulated efficient entity be considering whether to make a debt funded investment of $Xm in a particular year. In order to do so the most efficient (lowest cost) strategy is to borrow for a term of Y years at an interest rate of R% (or a DRP of D% if a swap strategy is assumed). The entity will have an expectation that it will recover this cost if, over the next Y years, the cost of debt allowance is structured such that it includes an amount of R%*$X. (For simplicity, this assumes that the asset never depreciates. For a depreciating assets the value of $X will be falling over time.) In Y years the entity will need to refinance this debt at then prevailing interest rates. Consequently, the cost of debt allowance will be an average of interest rates (or DRPs if an assumed swap strategy is in place) over time weighted by the amount of investment that is funded at those interest rates (DRPs). The ERA's proposal is to reset the DRP every year and the risk free rate every five years and apply this to all past investments – irrespective of the actual risk free rate/DRP that a business is paying on those investments. At best, this creates an expectation of cost recover in one year only of an assets life. In reality, not even this given that, as already explained, new investments only enter the RAB in subsequent regulatory periods

303. The definition of allocative efficiency is correct. The reasoning below the definition is wrong. The required return on ATCO's asset base is a fixed and sunk cost – it does not vary with the usage of the pipeline assets (fixed cost) and there is no alternative economic use for the gas pipeline assets (sunk cost).[88]

304. The cost of financing such fixed and sunk assets does not enter into the assessment of ATCO's marginal cost of delivering incremental gas throughput. That is, consistent with the ERA's own definition of allocative efficiency, the efficient level of usage for the pipeline is independent of the cost of financing the assets (however this is defined). Therefore, there is no basis on which to conclude that variations in the cost of financing the asset must be passed through to customers in order to promote allocative efficiency.

305. A simple example illustrates this point. Imagine that a sunk gas pipeline asset had excess capacity relative to current and plausible future demand and had a marginal cost of providing additional throughput of very close to zero. For this asset, allocatively efficient usage of the asset requires the marginal price faced by users is equal to marginal cost (i.e., close to zero). This will send them the efficient signal that they should not curtail consumption of pipeline transport services because the additional cost of providing additional service is zero.[89] This is the allocatively efficient marginal price signal and this is true whether current interest rates are 5% or 20%.[90]

306. This highlights the well understood tension between the need to compensate investors for investment in sunk cost assets (otherwise this investment would not occur and dynamic efficiency, discussed below, would be damaged) and the desire to set prices in a manner that signals marginal cost (which promotes allocative efficiency). In short, recovering the costs associated with fixed and sunk assets creates a wedge between the marginal cost of using the service and the price charged for using the service.

307. There is a considerable literature that considers pricing structures that minimise the distortions associated with this wedge. The recognised tools that minimise this distortion (and promote allocative efficiency) includes various forms of price

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88 An asset is a 'sunk asset' when there is no plausible conditions under which it would be efficient to use that asset to produce a different service. ATCO's gas pipelines are 'sunk assets' because there is no plausible scenario under which it would be efficient to dig up those pipelines and transplant them to provide gas transport services in other locations.

89 The opposite is true when a pipeline asset is capacity constrained – in that case the marginal cost of additional usage by one customer is the value that another displaced customer places on usage. This can sometimes be very high. However, the point remains that it is not a function of the cost of financing sunk assets.

90 There is no allocative efficiency argument for raising prices charged to users when interest rates are higher and reducing them when interest rates are lower because the costs of financing fixed and sunk assets simply does not constitute an element of the marginal cost of supply.

discrimination aimed at charging high value usage more than low value usage (because high value usage will not be deterred by a high price but low value usage will).

308. In addition, it is recognised that smoothing the recovery of fixed and sunk costs overtime will promote allocative efficiency. This is because the economic distortion associated with recovering fixed sunk assets by charging above marginal cost prices increases more than proportionally with the size of the wedge between price and marginal cost.[91] Consequently, it is more efficient to attempt to recover sunk costs evenly overtime than in a variable fashion overtime. This is because the damage to economic efficiency associated with a high 'wedge' in one period are not offset by having a lower 'wedge' in a different period.

309. Consistent with this basic economic theory, the exact opposite of the ERA's conclusion is the correct one. That is, having a volatile allowance for the cost of debt based on prevailing interest rates will be less allocatively efficient than having a smooth allowance for the cost of debt that recovers the same value overtime. The latter smooths variation in the wedge between marginal cost and price while the former accentuates it.

310. The same is true in other industries. The ERA seems to believe that in unregulated infrastructure industries prices reflect prevailing finance costs – as if the assets were 100% funded at prevailing rates. This is simply not true. The services of many unregulated infrastructure assets (e.g., uncovered gas pipelines, commercial real estate toll roads etc.) and are sold to customers on the basis of long term contracts – the prices in which do not vary based on annual variations in the level of interest rates etc.

311. Even in industries where prices are reset hourly based on supply and demand these prices do not reflect short term (annual or longer) variability in interest rates. For example, oil prices are continually reset and are volatile. However, supply is a function of investments with very long lead times and these investments, once sunk, continue to produce until 'the well is empty'.[92] Volatility in annual interest costs will have little or no effect on the supply in the oil market. If anything, higher interest rates will act to suppress demand and reduce prices rather than the opposite.

312. The ERA has the incorrect notion that it should set prices for gas distribution based on the prevailing cost of debt finance because this is what happens in unregulated

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91 Initially, with small increases in price above zero, the value of discouraged demand will be small – as only users who marginally value the service above the marginal cost of supply will initially be discouraged by small price increases above marginal. However, as the size of the wedge between prices and marginal cost increases then increasingly higher and higher value usage is discouraged. Consequently, the first $1 price increase above marginal cost has a smaller efficiency cost than the second $1 price increase above marginal cost and so on.

92 Or, more correctly, marginal extraction costs exceed marginal prices.

industries. This is wrong on two counts. First, it is not what happens in other industries. Second, even if it was, that would not be a basis for imposing this feature on ATCO and its customers (and in so doing departing from Rule 87(3)).

> *Dynamic efficiency is achieved when firms make those investments which maximise the returns to the firm and society as a whole over time.*
>
> > *The firm's investment decision should be based on the cost of capital expected to prevail over the life of the investment. Again, the cost of capital used by regulated firms – when deciding to invest in additional infrastructure – needs to be updated as market conditions change.*

313. This statement appears to be a repeat of the logic expressed under the heading of productive efficiency. Specifically, the ERA appears to be arguing that annual updating of the cost of debt allowance for variation in the DRP is required in order to give businesses an incentive to make new investments. The intuition behind this statement is that new investments must be funded at market rates, so, if the cost of debt allowance always reflects market rates, new investment will be correctly incentivised.

314. As already explained in paragraphs 309 to 302 above, this intuition is flawed. The most obvious, but not only, reason is that is that while new assets are financed at market debt rates, the DRP paid on that debt is fixed for the term of the debt. Unless the term of the debt is 1 year, updating the cost of debt allowance annually is as likely to move the allowance for the DRP away from the actual DRP paid as it is to move it towards it.

Appendix F Mismatch risk and benchmark credit rating

315. The ERA argues that if it sets a cost of debt allowance based on finance strategy that an entity could actually follow then this would require that the ERA set a lower cost of debt and a lower beta in the CAPM.

316. The first question to ask in this context is 'lower than what'? In my view it is the case that, holding other things constant, if an entity's actual debt raising strategy is aligned to the strategy implicit in the regulators calculation of the allowance then that entity will have lower volatility of cash-flows after interest costs. This lower volatility of cash-flows after interest costs will tend, other things equal, to lower the probability of default, a higher credit rating, and, ultimately, a lower the risk premium demanded by debt investors.

317. However, it is incorrect of the ERA to believe that this means setting an allowance for the cost of debt that was based on an actually implementable debt financing strategy would lower the credit rating below the credit rating the ERA has estimated. This would be correct if the ERA's benchmark credit rating was estimated based on the observed credit ratings of firms subject to the ERA's idiosyncratic methodology for estimating the cost of debt. However, this is not the case.

318. As can be seen from Appendix 6 and section 8 of the ERA explanatory statement, the ERA's basis for arriving at a credit rating estimate is based on the average credit ratings for a sample of network businesses from 2008 to 2012. Most of these firms are regulated by the AER who, over that period, set the cost of debt based on a 10 year risk free rate and DRP (as did the ERA up to 2010 for ATCO). Setting a 10 year risk free rate and DRP will, in the face of an upward sloping yield curve, increase the compensation for the cost of debt and, therefore, tend to reduce the risk of default (raise the credit rating) of firms regulated by the ERA - relative to the ERA's current position that a 5 year term for the risk free rate (and an approximately 5.7 year term for the DRP).

319. In addition, even those two firms (ATCO and DBP) regulated by the ERA have in the past been compensated for the cost of debt based on the debt financing strategy set out in Rule 87(10)(a) - which is at least conceptually implementable by a service provider. They have not yet been subject to the ERA's idiosyncratic methodology of updating the DRP allowance each year but fixing the risk free rate at the beginning of the regulatory period.

320. Put simply, it is correct that if the ERA were to set a cost of debt consistent with achieving Rule 87(3) then this can be expected to lower the benchmark credit rating relative to the benchmark credit rating that would prevail were it to apply the

approach set out in the guidelines. However, the credit rating that would apply were the ERA to apply the approach in the guidelines can be expected to be lower than the credit rating that the ERA has actually adopted in those guidelines – which is based on observations for firms whose cost of debt has been set very differently.

321. I similarly note that up until 2010 ATCO was regulated with a CAPM equity bet of around 0.95[93] and most of the businesses in the ERA credit rating sample were had regulated revenues based on an assumed CAPM equity beta of 1.0. The ERA's guideline sets the range for equity beta at 0.5 to 0.7. This involves a dramatic reduction in the size of the equity buffer, and can be expected reduce credit ratings for any entity regulated by the ERA relative to the observed credit ratings for firms regulated under more generous allowances for the cost of equity.

322. The logic set out in the paragraph 320 applies doubly in this regard. While complying with Rule 87(3) will tend to reduce risk and raise credit ratings relative to the credit ratings that would apply if the unamended guidelines were applied. This does not mean that it will raise credit ratings relative to the credit rating that the ERA estimates – which is based on observations that do not include the negative impacts of the ERA guidelines because they are based on observations that are prior to its implementation.

323. The ERA also argues that equity beta should fall as a result of adopting a cost of debt calculation that is based on an actually replicable debt financing strategy. [94]

> *Mismatch timing risk has a cost, in that it leads to increased volatility for cash flows to equity. This volatility would result in a higher β, all other things being equal, so would still be compensated for the regulated firm. To the extent that this volatility was reduced, such as by moving to some kind of portfolio trailing average approach, then historic observations of the β would need to be adjusted down, to account for the reduction of this mismatch timing risk.*[76]
>
> [76] *SFG Consulting 2012, Rule change proposals relating to the debt component of the regulated rate of return, www.aemc.gov.au, p. 22. …*

324. In this quote, and in the accompanying footnote not fully reproduced here, the ERA reasons that reducing cash-flow volatility will also reduce beta risk faced by equity investors (not just default risk faced by debt investors). The ERA assumes that this

93 The ERA is not specific but sets a range of 0.8 to 1.0 and then choses a value for the overall WACC that is based on the upper end of the range for the WACC by combining the various parameters – including beta. See, ERA, MWSWGDS, Final Decision, pg 89 "…the Authority is satisfied that a value of Total Revenue that is based on a Rate of Return of 6.60 percent – which is in the upper range but not the upper limit of the range of values of the Rate of Return that would comply with the Code".

94 ERA, *Explanatory Statement for the Rate of Return Guidelines*, December 2013, Appendix 3, p. 41

must be the case. However, in reality, it could just as easily raise beta risk as reduce beta risk.

325. Consider an entity that funds itself using a staggered debt approach where its cost of debt reflects the costs of the financing strategy in 87(10)(c) (staggered debt issuance with swap contracts). However, let that entity be regulated under the ERA's guidelines such that the DRP is reset every year 'as if' the firm paid current rather than historical average risk premiums. This entity will face considerable 'mismatch risk'.

326. However, that mismatch risk may well serve to lower beta risk. Consider a scenario where strong/weak economic conditions and stock market performance is associated with low/high debt risk premiums. For example, DRPs rise in a crisis and fall in good economic times – as actually tends to happen.[95] In this case, there is a negative correlation between DRP and stock market performance. But, under the ERA guidelines, there is a positive correlation between rising DRP and the entity's cash flows. This is because compensation for the cost of debt would rise by 100% of the rises in DRP but the actual DRP paid would rise much more slowly – as firms gradually issued debt at the new DRP.

327. In this example, exposure to mismatch risk creates a source of volatility in cash-flows but this volatility has negative beta risk – with the effect that removing this source of volatility would raise not reduce beta risk.

328. Of course, while plausible this is just one scenario and is speculative in nature. The key point, however, is that the ERA is wrong to assume that a reduction in mismatch risk reduces beta risk. The opposite could just as easily be true and, absent any further empirical estimates, the best assumption is that beta risk would be unaffected.

95 See RBA, New Measures of Australian Corporate Credit Spreads, RBA Bulletin, December 2013, Graph 9 on p. 23.

Appendix G Criteria for a benchmark efficient debt management strategy

G.1 Criteria a benchmark efficient debt management strategy must satisfy

329. I set out five criteria that I consider a benchmark efficient debt management strategy should satisfy.

    i. It should be hedgeable/replicable in the sense that it is able to be implemented by the benchmark efficient entity – the strategy must be feasible for a business to implement.

    ii. Implementation of the strategy involves low transaction costs for the business – if there are two equally implementable debt raising strategies, the strategy that involves the lowest transaction costs (direct and indirect) should be preferred.

    iii. It minimises the prospect and consequences of estimation error – a business should be able to be confident that, if it manages to the benchmark strategy, its cost of debt will move with the ERA's estimate of costs.

    iv. It gives rise to relatively low price volatility for customers. Customers are not well placed to hedge against the resulting volatility in network prices and especially do not want to be facing higher prices when they are facing broader budgetary pressures, e.g., due to a financial crisis.

    v. The benchmark debt management strategy should reflect the standard practice of businesses operating in similar environments to network energy businesses.

330. Each of these criteria is discussed in more detail below.

G.1.1 Well defined implementable strategy

331. For the reasons described in section 3, I consider that the ERA should specify a benchmark debt management strategy that will be used by it as the basis for estimating debt financing costs of a benchmark efficient entity.

332. A benchmark debt management strategy adopted by the ERA is said to be implementable/hedgeable if an entity could arrange its own debt management strategy to align its costs with those associated with the benchmark. The use of the phrase 'hedgeable' in this context should not be confused with a suggestion that business needs enter into derivative contracts to align to the benchmark – if there are no derivative contracts built into the benchmark debt management strategy then

an entity will be able to 'hedge' to that benchmark simply by implementing it (i.e., without entering into derivative contracts).

333. If a firm is able to "match" the incurrence of costs with the receipt of revenue, so that the two monetary streams are broadly "in sync", this can reduce its exposure to insolvency/bankruptcy costs (discussed in more detail in Appendix B). Other things equal, it will be efficient for a business to attempt to incur costs in a manner that is matched to their revenue stream and thereby reduce their exposure to expected insolvency/bankruptcy costs. If the two move together then, during periods in which revenues are lower, costs will also be lower. Similarly, when costs are high, so too will be revenues.

334. Put simply, if costs tend to move in the same proportion and direction as revenues then the potential for an adverse operating environment to lead to insolvency/bankruptcy is reduced. This is because periods when revenues are low will tend to be periods when costs are lower and periods when costs are high will tend to be periods when revenues are high.

335. As already discussed in section 3, the ERA's cost of debt allowance does not allow businesses to align/make their debt costs commensurate with the regulatory allowance. This is one reason why I consider that the ERA's proposed methodology is not consistent with Rule 87(3).

G.1.2 Low transaction costs

336. A cost of debt benchmark that is actually implementable by businesses means that transaction costs associated with the potential for insolvency/bankruptcy can be reduced if the business funds itself in accordance with that benchmark strategy.

337. However, two different potential benchmark debt management strategies may both be implementable by businesses but might have different transaction costs associated with each other. In which case, other things equal, the strategy with the lower transaction costs is more efficient and a more suitable benchmark.

338. As an example of two different implementable strategies with potentially different transaction costs consider:

- one strategy involving issuing large parcels of debt relatively infrequently; and
- another strategy involving issuing smaller parcels of debt more frequently.

339. The first strategy will take advantage of economies of scale associated with each individual debt issuance (such as fixed legal and other fees) and will minimise transaction costs of this nature. However, the second strategy, by spreading refinancing more evenly through time, reduces the potential for debt issuance by that company to strain the liquidity of the market for its debt. Issuing debt more frequently also limits the potential for the business/customers to be 'caught out' by

particularly poor market conditions coinciding with a need to refinance a large proportion of its debt. (Assuming regulatory measurement of market debt costs for the benchmark strategy is accurate it is customers who will suffer when the benchmark strategy assumes a large volume of debt is to be raised in poor market conditions. Of course, if regulatory measurement is not accurate, or if the business has not aligned its strategy to the benchmark strategy, then the business may suffer. Regulatory measurement error is discussed further in the next section.)

340. Clearly, this example establishes a trade-off to be optimised between the benefit of avoiding incurring 'too many' of the fixed costs associated with each debt issue and also avoiding transaction costs associated with having 'too lumpy' a debt issuance/refinance program. The most efficient strategy is one that minimises the sum of these transaction costs.

341. It is worth noting that there may be more than one benchmark debt management strategy that has the property of being implementable at low transaction costs. Additionally, there may be some benchmark debt management strategies that have this property for one efficient firm in operating in one environment but do not have this property for another efficient firm operating in a different environment.

G.1.3 Potential to manage to the benchmark in the presence of measurement error

342. The ability of a firm to feasibly manage to the benchmark debt raising strategy can also be compromised if there is material scope for estimation error by the regulator. If, due to data problems or for other reasons, the ERA cost estimates do not reflect actual market costs associated with the benchmark strategy then the benefit to a business from attempting to manage to the benchmark is diminished.

343. This is especially problematic if estimation errors are more likely to occur when the consequences are the most serious – such as in times of financial crisis.

344. This suggests that it is appropriate to include an additional criterion to guide the determination of the benchmark debt raising strategy. Namely, the benchmark debt raising strategy should minimise the potential for estimation error and the impact of such errors if they do occur. In practice, this might mean adopting, say, a benchmark strategy that gives rise to less volatile costs (to the extent that volatility and estimation error are likely to be correlated).

G.1.4 Potential for customers to manage their exposure to the cost of debt

345. Provided that a debt management strategy exhibits the three attributes described above – it is implementable, it is low transaction costs and it has low potential for (impact of) estimation error – it will be efficient from the perspective of businesses. A business will be able to "manage its debt costs to its debt cost allowance", and do

so in a way that does not cause it to incur unnecessary costs (including trading costs). However, this does not necessarily mean that the absolute level of transaction costs has been minimised.

346. Rather, the above scenario may correspond to a scenario in which unnecessarily high levels of volatility (and therefore high levels of transaction costs) are being borne by customers. For example, imagine a benchmark debt strategy that was able to be perfectly implemented by the network business, but gave rise to high levels of volatility in the allowed debt costs. In these circumstances:

- investors in the business are not troubled. Provided that the volatility in allowances is also reflected in their debt costs – they are "protected" from the potential insolvency/bankruptcy costs that might otherwise flow from volatile allowances; but
- it may well trouble customers if they are unable to manage the volatility in network prices and their energy costs resulting from the fluctuating debt costs. That is, if customers income (salaries / government benefits/ business sales) are not correlated with the cost of debt benchmark then volatility in the cost of debt benchmark will flow through into volatility in customers' net cash-flows; and
- this will be especially problematic if the volatility is likely to result in energy costs increasing during periods in which their own budgets are under stress, e.g., during financial crises.

347. Individual consumers have only a limited capacity to enter into arrangements that mitigate such volatility in the prices they pay for delivered energy – especially where that arises from network prices. For this reason, final consumers will generally prefer a benchmark strategy that minimises volatility in network debt costs (and so network prices and energy costs) – even if businesses are themselves indifferent to such fluctuations (due to their ability to manage their debt costs to the benchmark allowance).

348. This is consistent with the submissions from customers to the AER where there was broad support for the adoption of a trailing average precisely due to the stability that it would deliver to network prices. This is also reflected in the submissions the ERA received on the cost of debt from users. The MEUG supported the use of the actual embedded cost of debt for regulated businesses. This is similar to a notional trailing average but, instead of using an estimate of the benchmark efficient entity's past cost of debt issuances the actual cost of the debt of the service provider is used.

349. Wesfarmers and alintaenergy put in submissions to the ERA where they explicitly request that the ERA not create price volatility by annually updating the DRP.

> *WesCEF believes that the other approaches suggested by Chairmont will create unnecessary and unwarranted volatility in tariff prices, as*

compared to the five yearly resets of the cost of debt under the "Option A: Current Model" method. The potential for annual volatility in tariff prices is a significant risk for WesCEF and its customers. It will add complexity and cost uncertainty for a key input cost, impacting our ability to make effective and timely investment and operational decisions.[96]

And

Alinta believes it's important for the ERA to consider the impact on end users of regulated assets when determining the rate of return to apply during an access period. In particular, network customers such as Alinta require price certainty to minimise financial risks when entering into energy contracts with end users for an extended period. Without certainty the only way to manage this risk is by passing it on to end use customers via higher overall energy prices. The ERA should take this issue into account particularly when setting the Debt Risk Premium (DRP).

Alinta understands the ERA's consideration of Option B given that fixing the value of the DRP for five years creates a risk that at any point in time the value being used in a Weighted Average Cost of Capital (WACC) calculation may not be consistent with prevailing capital market evidence. However, this risk needs to be balanced against:

- *the impacts of a more volatile WACC on both investment decisions and end use customers; and*
- *the additional cost and complexity associated with annually reviewing the DRP value.*

Specifically the ERA should ensure that network owners remain incentivised to continue to invest in the network. A volatile DRP means that any fixed interest rate loans used to underwrite an investment may be "out of the money" during the relevant period. The only option is for investors to invest at a variable interest rate which could increase their refinancing and rollover risk of their financing. This will jeopardize any maintenance or development programmes during the relevant access arrangement period, thereby potentially impacting on security of supply.

Greater volatility in the DRP will also flow through to end use customers via higher and potentially more volatile prices from network customers who seek to minimise their financial risks (as referred to above). Alinta notes that it is not in the best interests of end use customers to be subject to tariffs that vary significantly year on year. [97]

96 Letter to the ERA on behalf of Wesfarmers Chemicals, Energy & Fertilisers, dated 15 November 2013.

97 Letter to the ERA on behalf of alintaenergy, dated 18 November 2013.

On balance, given the significant value that investors and end users place on price certainty Alinta considers that the Authority should continue with its previous practice of fixing the value of the DRP for five years (Option A) to allow certainty for investors and consumers and ensuring continual investment in the network.

Alinta provides no comments at this time on the other aspects of the ERA's proposed rate of return guidelines.

350. Retailers may be in a position to hedge some part of debt costs on behalf of final consumers, but this is costly and not always possible. For example, volatility in the DRP cannot be hedged by businesses or retailers.

G.1.5 Consistent with business practice

351. In relation to the second criterion, it may not always be possible for any single regulator, academic or business person to fully understand and explain all of the transaction costs that might be relevant to an assessment of the transaction costs (direct and indirect) associated with a particular strategy. This is because capital markets, through the price signal and well understood rules of thumb, may guide businesses to particular debt management strategies without any one market participant fully understanding why this is the case.

352. However, it will often be possible to observe whether a particular debt management strategy is widely adopted by businesses in similar operating environments. If that debt management strategy is widely practiced then this will be evidence that it is implementable at low transaction costs. Indeed, this is one of the key contributions of Modigliani and Miller, who demonstrated that the only reason for commonly observed debt management strategies must be that these minimise transaction costs (broadly defined).

353. This suggests a fifth criterion– that the benchmark debt management strategy should reflect the standard practice of businesses operating in similar environments to network energy businesses. This, in reality, simply a way of operationalising the first and second criteria above:

G.2 Consistency of these criteria with the NGR and NGL

354. I consider the consistency of these criteria with the requirements of the NGR and the NGL. In find that:

- all five criteria support achievement of the NGO as they relate to the long term interests of customers.
- criteria i. and iv. support achievement of the NGO as they relate to providing investors with a reasonable opportunity to recover efficient costs.

G.2.1 Rule 87 of the NGR

355. For the reasons set out previously, I consider that criteria i, ii, and iii follow directly from Rule 87 and, in particular, Rule 87(3) of the NGR. I also consider that satisfying these criteria will also satisfy the revenue and pricing principles as discussed in section 2.5 above.

G.2.2 NGO and revenue and pricing principles

356. The allowed rate of return should still be consistent with the National Gas Objective (NGO), and the revenue and pricing principles. More specifically:

- the rate of return must be set to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers, and
- a regulated network service provider should be provided with a reasonable opportunity to recover at least the efficient costs the operator incurs.

357. In this context, it is important to demonstrate that applying the above criteria is consistent with achieving these objectives.

G.2.2.1 Long term interests of consumers

358. Consumers have a long term interest in minimising the costs of funding network businesses including direct and indirect transaction costs. Assuming full compensation is provided to investors for the costs associated with a benchmark efficient strategy, then customers' total payments will only be minimised if ERA chooses a benchmark strategy that minimises those costs. Modigliani and Miller demonstrated that this requires that transaction costs (broadly defined) are minimised.

359. For this reason, meeting criteria i., ii., and v. above is in the long term interests of consumers. For similar reasons, meeting criterion iii. is in consumers long term interests because if this criterion is not met then the business will have unnecessarily high insolvency/bankruptcy risk and the expected transaction costs associated with that. Criterion iv. is in customers long term interest assuming that they prefer, other things equal, less volatile energy prices.

360. I further note that the long term interests of consumers are promoted if the cost of debt allowance does not create an incentive for regulated businesses to over or under invest in the network. This is a further reason why the benchmark debt management strategy should satisfy criteria i., ii., and v. If these criteria are satisfied then the cost of debt allowance associated with any capital expenditure will, over the life of the asset, be expected to reflect efficient costs associated with

standard business practice. As such, the level of this allowance will neither promote nor discourage efficient investment.

G.2.2.2 A reasonable opportunity to recover at least efficient costs

361. In order to support the achievement of the NEO and NGO, the cost of debt benchmark adopted by the ERA should:

- be able to be achieved by businesses (criteria i. and iii);
- give rise to an efficient level of debt costs (criterion ii. and v.);

G.3 Proposed benchmark efficient debt management strategy

362. I consider that a 10 year trailing average of 10 year fixed rate debt costs is the benchmark debt management strategy that best satisfies the five criteria I have set out above.

363. In reality, almost all businesses, including regulated infrastructure businesses, raise debt in a staggered fashion over time. Moreover, for infrastructure businesses with very long lived assets, the average maturity of this debt at the time of issue tends to be long term (10 years or more). It is very likely that this is a response to a desire to minimise expected transaction costs, in particular insolvency/bankruptcy costs, that are heightened if too much debt must be refinanced in a short period of time. Consequently, a business's cost of debt at any given time will reflect the costs incurred when issuing debt over the last decade and not just over the last 10 to 40 days.

364. In order for a cost of debt benchmark to reflect this practice it is necessary for it to capture the cost of debt issued a long period into the past as well as more recently. One simple way to do this would be to estimate, and periodically update, a trailing average cost of debt over the last 10 years (consistent with the average term of debt issuance for Australian regulated businesses). This would be updated periodically (either annually within the regulatory period or every five years).

365. In this section I assess the efficiency of a 'trailing average' debt management strategy that involves issuing staggered 10 year fixed rate debt. In my assessment, this potential benchmark performs well against the criteria I set out above.

i. It is hedgeable/implementable. In order to implement this benchmark all a business must do is engage in staggered issuance of 10 year debt so that it is refinancing around 10% of its portfolio each year. Provided that the interest rate the business pays is correlated with the 10 year BBB+ cost of debt, its debt costs will tend to move in line with the benchmark (even if its actual credit rating is not BBB+).

ii. It is low transaction cost for the business. The business must simply issue staggered debt at a rate of about one 10th of their portfolio every year. Similarly, by spreading refinancing over 10 years this will prudently manage refinancing risk and minimise the associated transaction costs.

iii. The potential cost of estimation error is low. A business can be confident that, if it issues staggered 10 year debt its costs will move with the AER's estimate of costs. This is because a trailing average can be updated regularly – at least annually and potentially quarterly. Consequently, any one estimate of the cost of debt will have a weight in the trailing average of at most 10% (2.5% if quarterly estimates are used). An error in one period's estimate will not have a significant impact on the overall allowance. Only if the cost of debt was repeatedly mis-estimated, and in the same direction each time, would the benchmark estimate depart materially away from the actual market cost of debt associated with that benchmark.

iv. It gives rise to relatively low cost volatility and does not result in higher costs when their budgets are under stress. The gradual updating of the benchmark estimate means that it is relatively stable. Moreover, this stability has the effect of preventing cost of debt allowances materially contributing to network price increases at precisely the time that customers would most value lower prices (and vice-versa with respect to cost of debt reductions contributing to price reductions when these are less important to customers).

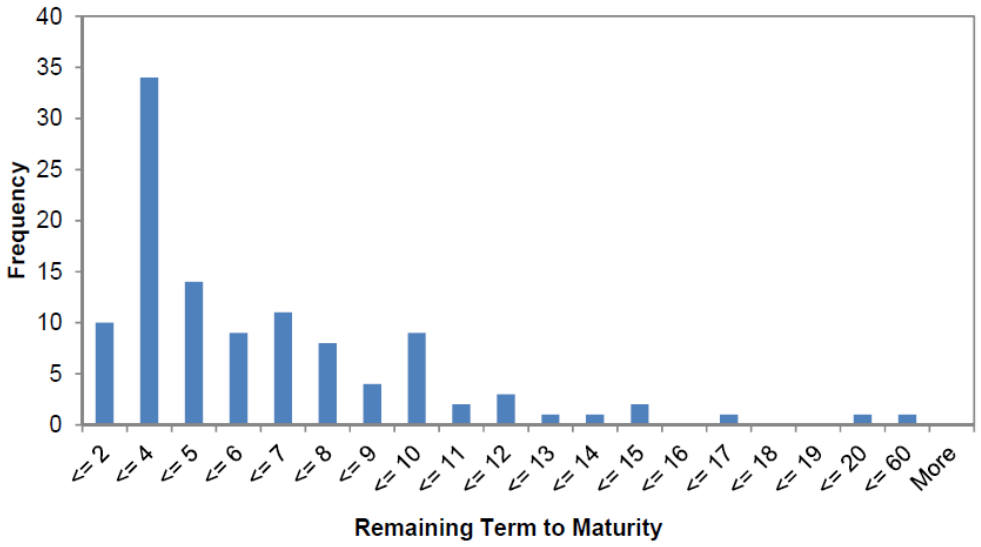
v. It is consistent with standard business practice. It is standard practice for infrastructure businesses to engage in staggered issuance of long term debt. Consistent with the reasoning in Appendix B that this approach is likely to minimise transaction costs.

366. In the following sections I elaborate on the reasons why the strategy is efficient when assessed against each of these conditions.

G.3.1 Implementable at low transaction costs

367. A 10 year trailing average approach would largely mimic the debt management strategy employed by infrastructure businesses (regulated and unregulated) around the world. The ERA's analysis confirms this – consistent with Figure 3 from Appendix 3 of the explanatory statement – reproduced below.

Figure 10: Reproduction of Figure 3 Appendix 3 of the ERA's explanatory statement

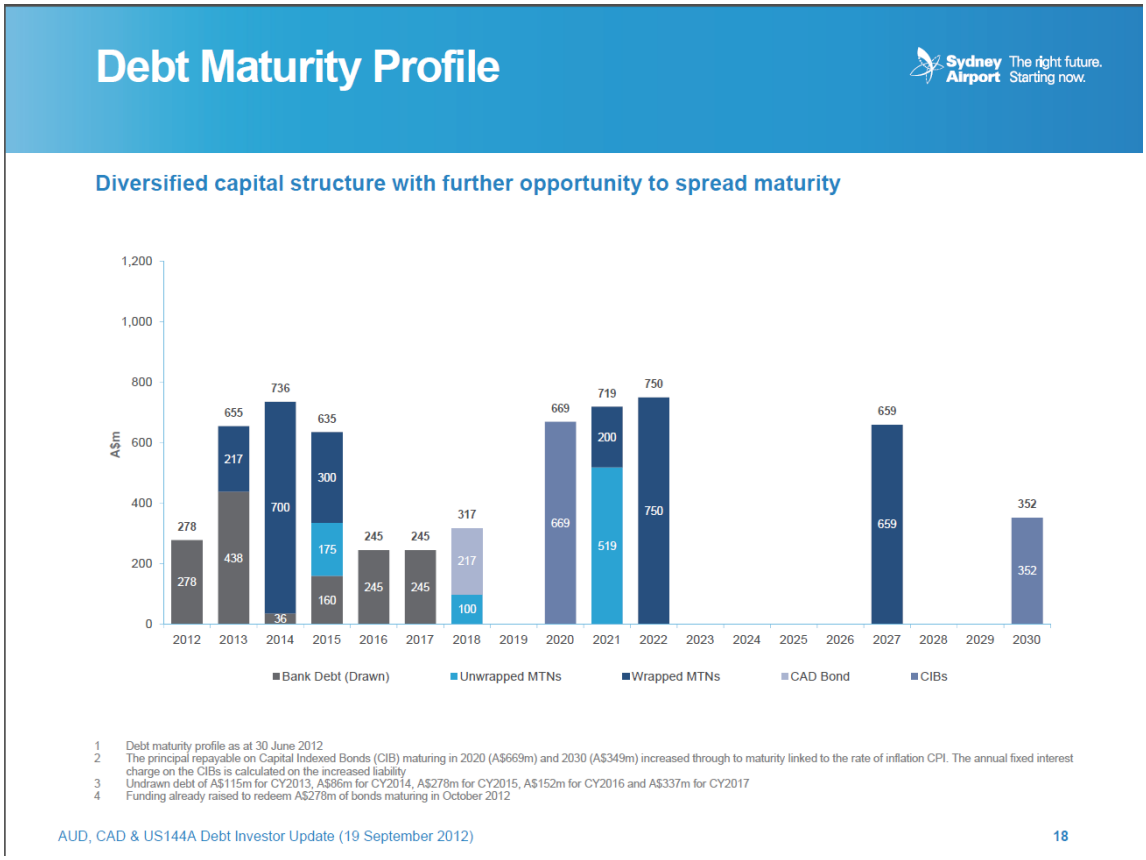


Source: ERA

368. In this regard, it is worth noting that that it is also quite common for infrastructure businesses subject to "lighter-handed" forms of regulation to adopt the same strategy. This is important because regulated business financing activity may well be distorted by the particular way in which the relevant regulator compensates for the cost of debt. Examining similar infrastructure businesses that are only lightly regulated, such as Toll Roads and Airports, provides an insight into the way in which infrastructure businesses manage their debt absent incentives created by the regulatory regime.

369. Sydney Airport and Transurban provide two examples. Figure 11 illustrates Sydney Airport's debt maturity profile – which involves an approximately 8 year average maturity profile of the existing portfolio (consistent with a roughly 16 year average maturity for debt at the time of issuance).

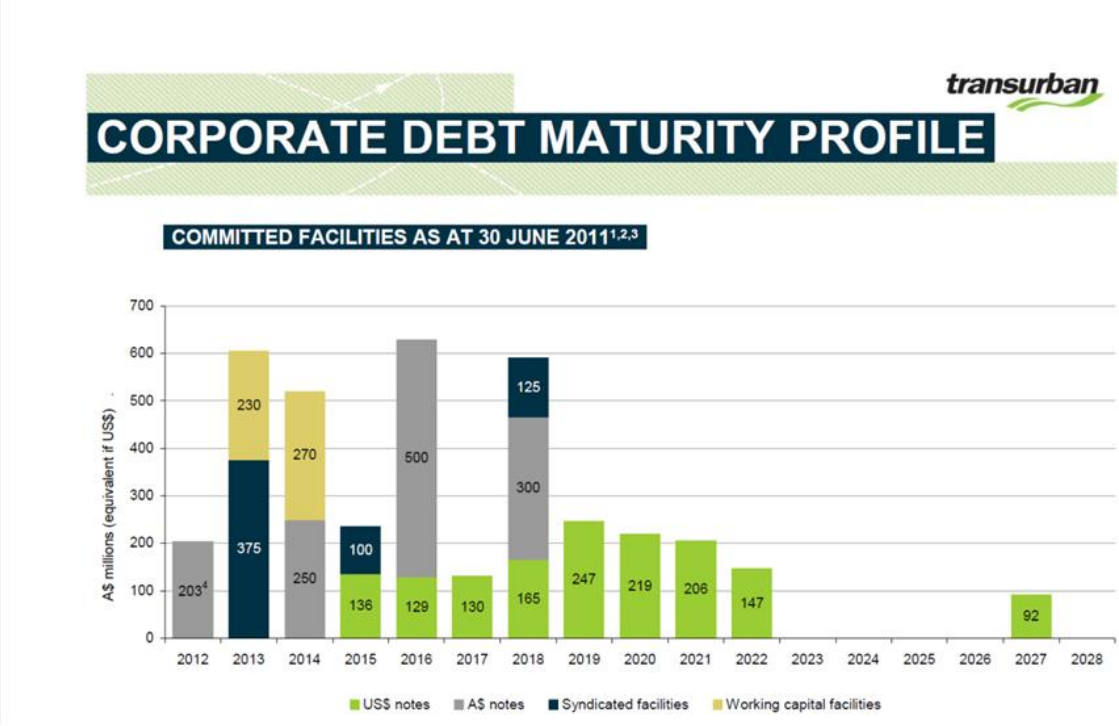
Figure 11: Sydney Airport debt maturity profile – as at 30 June 2012



Source: Sydney Airport presentation, AUD, CAD and US144A debt investor update, September 2012.

370. Figure 12 shows Transurban's corporate debt maturity profile – which involves an average time to maturity of slightly over 5 years – consistent with maturity at the time of issue of 10 years. However, this does not include non-recourse debt (debt that is secured over only one of Transurban's asset where the lender does not have recourse to Transurban's other assets). When non-recourse debt is included the average maturity rises to 8.9 years –consistent with an average 17 year maturity at time of issue.

Figure 12: Transurban debt maturity profile – as at 30 June 2011



Source: Transurban, Debt investor presentation, October 2011, slide 24.

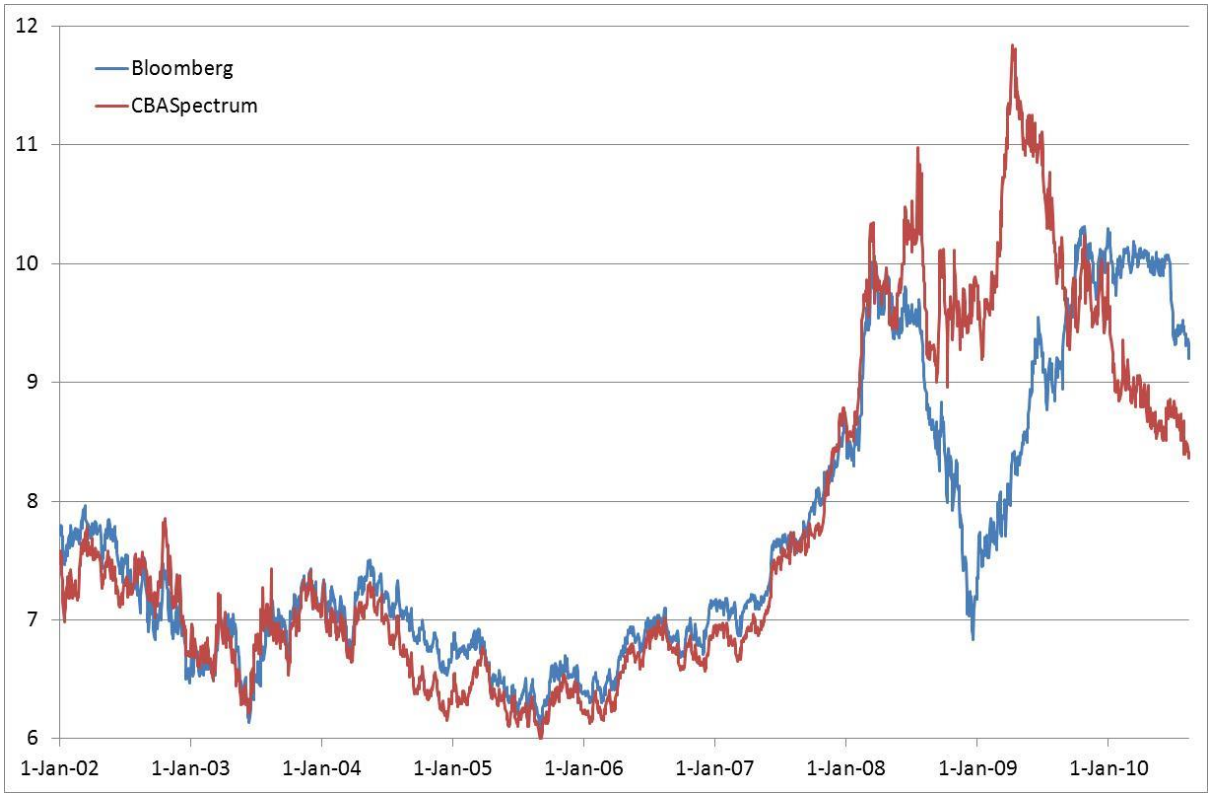
371. While these debt maturities are not perfectly smooth (i.e., the same amount is not maturing each year) they are consistent with the firms in question having a cost of debt that is consistent with a trailing average based on the assumption of relatively more smooth debt issuance.

372. Consistent with the reasoning I set out in section 3.2the near universal adoption of staggered long term debt issuance by infrastructure businesses suggests that such a strategy is efficient (minimises transaction costs). Indeed, the presentations from which these slides are taken make clear that staggered debt issues are an important selling point to investors in terms of reducing refinance risk and transaction costs associated with any consequent disruption to the business.

G.3.2 Estimation error and volatility

373. The potential for estimation error and volatility in prices is significant if the benchmark cost of debt (or just the DRP) is reset at a single point in time. This can be seen in Figure 13 below, which shows the estimates of the 10 year BBB fixed rate cost of debt published by two independent sources: CBASpectrum and Bloomberg. Both estimates are highly volatile and there is significant divergence between the two series from 2008 onwards. This provides a stark illustration of the potential for estimation error. Simply put, the divergence between these providers suggests significant uncertainty in all estimates over this period.

Figure 13: Bloomberg and CBA Spectrum fair value yields



Source: CBASpectrum and Bloomberg. CEG analysis

374. It is also worth noting that the average levels of both estimates are much higher post-2008. In other words, the benchmark cost of debt rose materially following the onset of the financial crisis (and this is reflected in AER regulatory decisions of the time). This meant that all businesses having their prices reset in this period – including NSW businesses – had their regulatory cost of debt allowance based entirely on the higher costs of debt (and higher DRP) that prevailed during the crisis.

375. Of course, in many cases business' costs of debt largely reflected interest rates locked in prior to the inception of the financial crisis. Consequently, the purely forward looking approach bestowed a windfall gain on those businesses. In different circumstances this could easily have been a windfall loss and, indeed, that is precisely what happened to those businesses that had their cost of debt reset in January 2007 for 5 years but started paying inflated "post crisis" interest rates shortly thereafter.

376. For customers, this volatility could not have been more poorly correlated with their own operating environments or personal circumstances (as the case may be):

- business customers faced higher network prices (driven in large part by escalating cost of debt contributions) at a time when their own debt costs were escalating and when uncertainty about future revenues was likely at a high;
- many households were facing higher prices during a time of heightened uncertainty about their own economic prospects.

377. These outcomes are almost inevitable if a benchmark debt management strategy is based on the spot cost of 10 year BBB debt (as observed during a 20 day trading window) – as opposed to long term averages. This is because spot BBB debt yields are likely to be negatively correlated with the general state of the economy and economic perceptions. Indeed, the spread between AAA and BBB yields is a commonly used proxy for the level of risk perceptions in the economy. This means that:

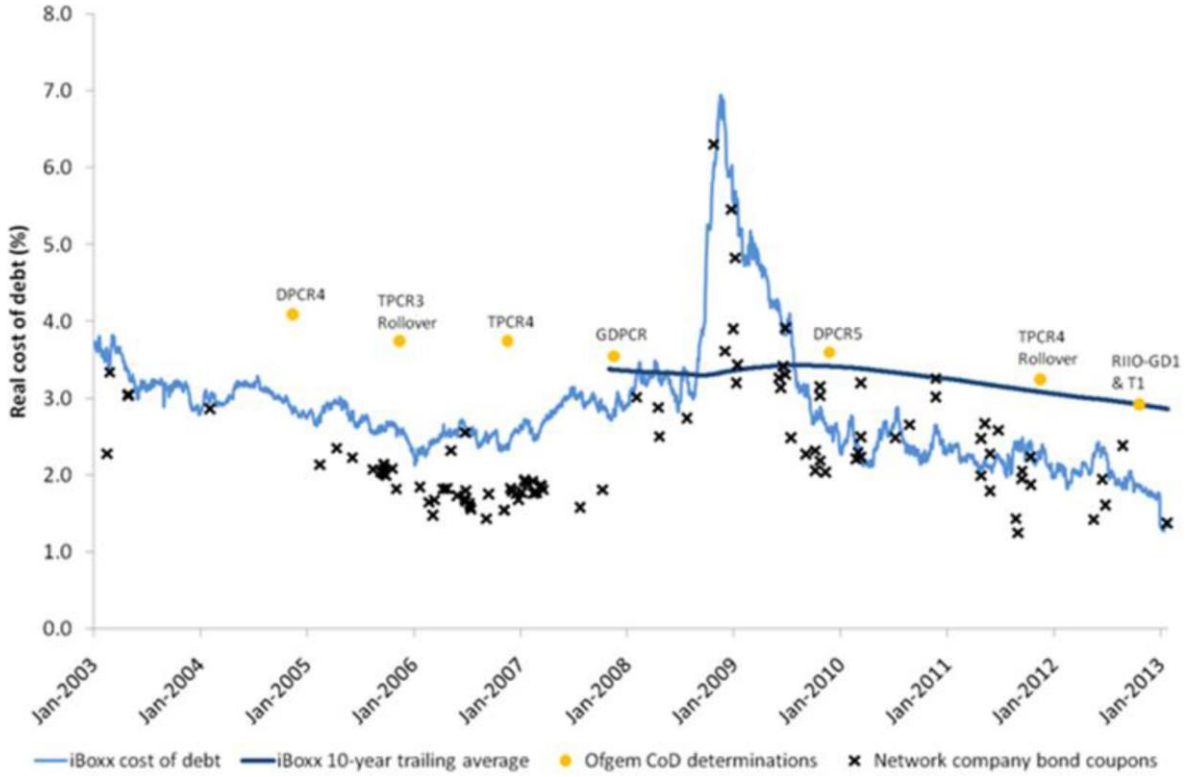
- if the economy is traveling smoothly and risk perceptions are low then BBB yields are likely to be low; but
- if the economy is troubled and risk perceptions are heightened, BBB yields are likely to be high.

378. Under a trailing average approach debt allowances would be much more stable and less susceptible to systematic material estimation bias. This can be illustrated by reference to Figure 14 below, which is taken from a decision of the UK energy regulator's (Ofgem) in which it resolved to adopt a 10 year trailing average approach.

379. Ofgem's benchmark assumes that a business is issuing 10 year debt that is constantly being rolled over. In each year of the regulatory period the cost of debt is therefore equal to a rolling average of the cost of debt over the preceding decade.

380. The below figure compares Ofgem's proposed trailing average approach with its past decisions (which were based on a benchmark similar to that previously in the NER) and with actual debt raising by regulated utilities. The smooth black line represents the 10 year trailing average cost of debt (i.e., the 10 year average of the more volatile blue line) that Ofgem now proposes to use to compensate regulated businesses. The large yellow dots represent the allowances that Ofgem has set in the past. The crosses represent debt actually issued by regulated businesses.

Figure 14: Ofgem trailing average



Source: Ofgem, Strategy decision for the RIIO-ED1 electricity distribution price control, March 2013, p.12

381. This chart highlights a number of the issues that I have discussed up to this point. An 'on the day' benchmark compensates businesses as if they adopted a different strategy, e.g., refinancing 100% of their debt once every five years. The ERA methodology takes this further and assumes, in so far as it resets the DRP every year, that 100% of the cost of debt is refinanced each year. This creates a potentially significant mismatch between the compensation those businesses received and the costs they incurred.

382. By way of example consider the above figure. First, ignore the yellow dots that represent actual regulatory decisions by Ofgem. Imagine that Ofgem used an 'on the day' benchmark to set the cost of debt for five years by taking an averaging period from the beginning of 2010. In that case:

- the prevailing (real) cost of debt is about 2% (given by the volatile blue line); but
- the 10 year average is a little over 3%, which implies that a prudently financed business (which I assume would finance consistent with the smooth black line) would be under-compensated by around 1%).

383. The opposite is also true where the smooth black line is below the prevailing cost of debt (which it will be, on average, half of the time – although this is not the case in

the above figure because the timeline does not begin from 1998 (i.e., 10 years prior to the first trailing average estimate in 2008).

384. It is also interesting to note that Ofgem's cost of debt allowances (the yellow dots) tended to reflect a 'de facto' application of the 10 year trailing average approach, despite the 'benchmark' ostensibly being quite different. Indeed, the previous benchmark appeared to be "more honoured in the breach than the observance".

Appendix H Benchmark credit rating

385. The ERA has determined a credit rating range based on a benchmark sample of Australian utilities which are subject to a similar level of risk as the benchmark efficient entity. It concludes that the median credit rating for Australian network service providers (electricity and gas) is in the range BBB- to BBB+. It also concludes that the median, and thereby appropriate, credit rating for gas only networks is in the range BBB- to BBB. As the rate of return guidelines pertain to both electricity and gas businesses, it considers that the BBB band, from BBB- to BBB+, is the appropriate credit rating for the benchmark efficient entity.

386. I would argue that, because ATCO Gas Australia is a 'gas only' network provider, the appropriate credit rating for the benchmark efficient entity is BBB- to BBB in this instance. A credit rating range of BBB- to BBB for a gas network provider is clearly supported in the ERA's own empirical analysis.

387. The ERA's analysis demonstrates that, across its benchmark samples and over a five year period, the median credit rating for gas companies does not rise above BBB, and is in most instances BBB-. Similarly, the median based on the ERA's analysis for all companies only rises to BBB+ in some instances, and is primarily BBB across the three benchmark samples and over a five year period.[98]

H.1 AER credit rating analysis

388. The AER has conducted similar analysis to the ERA on a sample of regulated utilities (gas and electricity) over the period 2002 to 201399. The AER's sample of regulated energy network businesses (both gas and electricity) includes 13 of the 22 businesses relied on by the ERA:

- APT Pipelines Ltd
- ATCO Gas Australian LP
- DBNGP Trust
- DUET Group
- ElectraNet Pty Ltd
- Energy Partnership (Gas) Pty Ltd
- Envestra Ltd
- ETSA Utilities

98 ERA (2013), *Explanatory Statement for the Rate of Return Guidelines,* Figures 7 – 9 on p. 97 – 99.

99 AER (2013) *Explanatory Statement, Draft rate of Return Guideline,* p. 111 - 112

- Powercor Australia LLC
- SP AusNet Group
- SPI (Australia) Assets Pty Ltd
- The CitiPower Trust
- United Energy Distribution Pty Ltd

389. The AER does not provide the basis for its calculation, but concludes that the median credit rating over the periods 2002 – 2012 and 2002 - 2013 is BBB+, whereas the median credit rating in June 2013 is BBB. The AER's results are summarised in Table 1 below. The AER concludes that adopting BBB+ as a benchmark credit rating is consistent with recent determinations and the 2009 WACC review.

Table 1: Median credit rating of AER's sample

Measure	Energy Networks
Median credit rating (2002 – 2012)	BBB+
Median credit rating (2002 – 2013)	BBB+, negative watch
Median credit rating (June 2013)	BBB

Source: AER (2013)

390. CEG has replicated the AER's analysis by collecting historical S&P credit ratings for the stated benchmark sample in order to calculate a median credit rating in each year. The results of this replication is summarised in Table 2 below. I note that the median credit rating over the period from 2004 (i.e. 10 years prior to 2013) is BBB, not BBB+. As such the AER results support a credit rating of BBB for energy (electricity and gas) network businesses.

Table 2: Median credit rating 2002 – 2013 for AER sample

Year	Median credit rating
2002	A-
2003	BBB+
2004	BBB+
2005	BBB+
2006	BBB+
2007	BBB+
2008	A-
2009	BBB
2010	BBB
2011	BBB
2012	BBB
2013	BBB

Source: CEG analysis

391. As discussed in Appendix F, these observed credit ratings are based on actual cost of equity allowances for the actual businesses. These have, in the past, been materially higher than those that would result from the application of the ERA guidelines. The equity buffer is a material determinant of credit metrics and the risk of lending to a business. As such, the above observations may tend to overstate the appropriate credit ratings going forward if the guidelines are implemented.

Appendix I Terms of reference

392. The specific questions I have been asked to submit are set out below. The full letter, including background, is provided separately.

The ERA in its Rate of Return Guidelines proposes:

1 *In respect of the risk free rate (for both the cost of debt and the cost of equity), to use as a proxy the observed yield on a 5 year term Commonwealth Government Security averaged over a 40 day period just prior to the regulatory period. (page 14 and 18). The primary basis for using the a 5 year term to maturity to estimate the risk free rate is said to be that the present value principle reflects that the term of debt should match the regulatory update period. (see Chapter 7 of the ERA's Explanatory Statement)*

2 *In respect of the debt risk premium (DRP) the ERA proposes to derive the DRP from the yield to maturity of an observed sample of bonds issued by comparator firms with similar credit ratings as the regulated entity. The bond yield approach will be used with a joint weighting mechanism and the DRP will be updated annually. The criteria for selection of the bonds in the benchmark sample is set out at paragraph 103 of the Rate of Return Guidelines. (see also chapters 8 and 9 of the ERA Explanatory Statement).*

Opinion

In this context ATCO Gas wishes to engage you to prepare an expert report which provides:

1. *An assessment of the ERA's approach to estimating the return on debt set out in the Rate of Return Guidelines, including:*

   1.1 a critique of the ERA's reasoning for adopting a 5 year term for the risk free rate (cost of debt and cost of equity); and

   1.2 an analysis of the ERA's proposed bond yield approach to the debt risk premium and the proposal to update the DRP annually.

2. *Your opinion on whether the ERA's proposed approach to the return on debt would result in the best estimate of the return on debt that contributes to the achievement of the allowed rate of return objective and meets the requirements of Rule 87.*

3. *Your opinion on whether the return on debt estimate using the ERA approach would produce a result consistent with the achievement of the NGO and the RPP.*

4. *If in your opinion the ERA's approach does not meet the requirements set out in paragraph 2 and 3 above, what method (or methods) for estimating the cost of debt should be used in order to produce the best estimate (or range of estimates) possible in the circumstances that complies with Rule 87 (including the matters in sub rules 87(8) to 87(12)) and the achievement of the NGO and RPP?*

CEG Asia Pacific
Suite 201, 111 Harrington Street
Sydney NSW 2000
Australia
T +61 2 9881 5754
www.ceg-ap.com

Mr Warwick Anderson
General Manager Network Regulation Branch
Australian Energy Regulator
GPO Box 3131
Canberra ACT 2601

11 November 2013

Dear Mr Anderson

Response to AER criticisms of estimates of average term of debt at issue

This letter is in response to the Australian Energy Regulator's (AER's) critique of CEG's debt term analysis in our June 2013 report[1]:

> *"The CEG analysis used Bloomberg data only for estimating the term at issuance which does not represent the full data on debt portfolios.[2] In particular, the Bloomberg dataset does not include comprehensive data on bank debt. We understand that bank debt accounts for around one third of the businesses portfolio. Given that bank debt tends to be a much shorter term at issuance, the lack of bank debt data in CEG's sample means that the term at issuance for the total debt portfolio is likely to be shorter than the estimates presented by CEG."*[3]

The explanatory statement does not provide a source for the claim that bank debt accounts for around one third of the businesses' debt portfolios. Having examined the actual debt portfolios of private Australian energy network businesses regulated by the AER,[4] I can confirm that drawn bank debt, on average, comprises only 11% of these businesses' debt portfolio, which is significantly less than the amount claimed by the AER.

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1 CEG, *Debt strategies of utility businesses*, June 2013.

2 CEG, *Debt strategies of utility businesses*, June 2013, footnote 3, p. 8.

3 AER, *Better Regulation, Explanatory statement, Draft rate of return guideline*, August 2013, p. 155.

4 Cheung Kong group (SA Power Networks, CitiPower and Powercor), Envestra, Electranet, SP AusNet, DUET group (Multinet Gas and United Energy), and APA group. A confidential spreadsheet that will be forwarded to the AER at the same time as this letter contains the details of these portfolios. The only additional information I have relied on is the $81m value of cash and cash equivalents reported in APA's 2013 annual report.

In addition to this use of drawn bank debt, firms also use undrawn bank debt to provide the liquidity reserves[5] for credit rating and operational purposes and working capital necessary to run a business (smooth cash flows and receipts and ensure funding is available to repay debt as it falls due). Available bank debt comprises 22% on average, of the comparable businesses total available (drawn plus undrawn) debt portfolio. However, most of this is undrawn bank debt which represents 14% of total drawn debt – which is higher than the 8% estimate figure used by PwC to estimate the costs of liquidity management.[6]

This data suggests that CEG overestimated the proportion of available bank debt (24%) in our previous report. Consistent with this, the data of individual company's average term of issuance is, actually, higher than estimated in our report.

The sample of businesses originally examined by us was as set out in footnote 4 but did not include (the non-listed) ElectraNet. For this sample, the simple[7]/weighted average of term to maturity at issue for all drawn debt is 11.3/10.6 years. However, we have also been provided debt portfolio information for ElectraNet which is another privately owned energy network business regulated by the AER (albeit not listed). Including ElectraNet in the sample reduces the simple/weighted average of term to maturity at issue of all drawn debt to 10.9/10.5 years.

These estimates treat all debt in the same way. Specifically, one dollar of short term drawn bank debt is treated equivalently (given the same weight) as $1 of debt raised by bond issuance. In our view this artificially depresses the measure of term below that which we are interested in. Specifically, we are interested in debt used to fund the regulatory asset base (RAB) – which is the debt that is compensated through the cost of debt allowance. However, liquid short term debt is used to fund liquid financial assets in addition to, or instead of, the long term fixed assets in the RAB.

In order to account for this use of bank debt each business has provided the value of cash and cash equivalents or other liquid funds put aside for the purpose of repayment of near term debt maturity. That is, short term cash assets and short term bank debt are essentially the same thing with the opposite sign (if you borrow a dollar from a liquid bank facility and hold it as a dollar in liquid cash your net debt has not increased nor has the term of your net debt altered). We have treated such liquid financial assets as 'negative bank' debt with the same term as the shortest term bank debt on each company's books (the effect of which is to 'cancel out' that bank debt – consistent with the fact that rather than funding the RAB the bank debt is funding liquid assets). When we do this the simple/weighted average of term to maturity at issue of all drawn debt is:

---

5 Standard & Poor's, Methodology and Assumptions: Liquidity Descriptors for Global Corporate Issuers, 28 September 2011

6 PwC, Debt Financing Costs, June 2013.

7 This is a simple average of each company's weighted average term at issuance for drawn debt.

- 11.4/10.8 years for the original CEG sample of privately owned listed regulated energy companies; and
- 11.0/10.7 years for the original CEG sample plus ElectraNet.

We have also analysed further sensitivities to this analysis.

The first sensitivity analysed is associated with the exclusion of SP AusNet. SP AusNet has some private ownership but its majority ownership is, ultimately, the Singapore Government. The Singapore Government has recently (in May of this year) agreed to sell part of its ownership to the Chinese Government owned SGID – although this sale is not yet complete. It is clear that majority ultimate ownership by the Singapore Government has been positive for SP AusNet's perceptions in credit markets – as evidenced by the announcement by Moody's that SP AusNet's credit rating would likely be downgraded as a result of the sale:

> *The likely downgrade of SP AusNet's rating to A3 would reflect our view that the high likelihood of parental support from SP -- and which has been incorporated in the rating through a 2-notch uplift -- would no longer hold following the divestment to a minority interest.* [8]

If I exclude SP AusNet on the basis that its debt management policy to date is likely affected by its majority Government ownership then the simple/weighted average of the sample rises to 11.5/11.3 years. I also note that the Chinese Government, through SGID, owns 47% of ElectraNet - although I have no evidence of a similar nature to suggest that this minority shareholding give ElectraNet support in credit markets. Nonetheless, I report that also excluding ElectraNet raises the simple/weighted average of the sample to 12.1/11.5 years.

Another sensitivity examined relates to by far the longest dated bond issued by the companies in the sample. This is a 60 year bond ($515m outstanding) issued by APA. This bond is callable 6 years after issue and must pay a 'step up' margin of an additional 1% if it is not called within the first 26 years of its life.[9] The above estimates of average term ascribe a 60 year term to this bond – consistent with the full flexibility it provides APA in the management of its debt portfolio. However, the fact remains that APA can call this bond before 60 years and will be expected to do so within 26 years (before the 1% step up margin must be paid) unless it's perceived credit risk (debt risk premium) worsens by 1% or more.

8 Moody's investors service. Announcement: Moody's maintains review for possible downgrade of SP AusNet and SPIAA's ratings, August 2013.

9 APA bond prospectus lodged with ASIC on 9 August 2012.

In light of the above we have included two sensitivities to the above calculations. The first treats the maturity of this bond at 26 years (the date of the first step up margin). The second simply excludes the bond from the analysis altogether.[10] When we:

- treat the APA bond in question as having a maturity of 26 years the simple/weighted average of term to maturity at issue of all drawn debt (treating liquid assets as negative bank debt) is:
    - 10.4/9.9 years for the full sample;
    - 10.7/10.3 years excluding SP AusNet; and
    - 11.1/10.4 years excluding both SP AusNet and ElectraNet.
- exclude the APA bond in question from the analysis the simple/weighted average of term to maturity at issue of all drawn debt (treating liquid assets as negative bank debt) is:
    - 10.0/9.5 years for the full sample;
    - 10.3/9.8 years excluding SP AusNet; and
    - 10.6/9.9 years excluding both SP AusNet and ElectraNet.

In conclusion, based on the complete set of information provided by the businesses, the simple/weighted average term of debt at issuance for energy businesses regulated by the AER with (at least minority) private ownership is 11.0/10.7 years (treating liquid assets as negative bank debt for the purpose of this calculation). This rises to 12.1/11.5 years if firms with substantial Government ownership are excluded.

The lowest estimate of the simple/weighted average term of debt at issuance is associated with including firms with substantial Government ownership and the complete exclusion of the longest dated bond in the sample (the 60 year APA bond). Even this only brings the simple/weighted average term estimate down to 10.0/9.5 years.

[10] A further potential sensitivity would be to assign the first call date as the maturity date for the bond. This would, in my opinion, clearly be wrong. It would amount to assigning a 6 year fixed maturity to an instrument that has a potential maturity of 60 years (i.e., which provides APA with a potential control on refinance risk for up to 60). That is, it would take the bond that offers APA the longest possible maturity in its portfolio and assign it one of the shortest maturities in its portfolio. However, even if this was done the simple/weighted average across all companies, adjusted for cash and cash equivalents, would be 10.0/9.4 years (10.5/9.7 years if SP AusNet and ElectraNet were excluded).

This data strongly supports the original conclusion by CEG that the benchmark term of debt at issuance should be at least 10 years and also supports the 10 year term of debt determined by the AER in the 2009 WACC Review.

Yours sincerely

Dr Tom Hird

Director

Competition Economists Group

Partner: Roxanne Smith +61 8239 7108
Email: roxanne.smith@jws.com.au
Our Ref: B1299
Your Ref:
Doc ID: 65650433.1

13 March 2014

Dr Tom Hird
Competition Economist Group
Suite 201
111 Harrington Street
SYDNEY NSW 2000

Dear Sir

ATCO GAS AUSTRALIA PTY LTD- ERA Price Determination

We act for ATCO Gas Australia Pty Ltd (ATCO Gas) in relation to the Economic Regulation Authority's review of the Gas Access Arrangement for ATCO Gas under the National Gas Law and Rules.

ATCO Gas owns and operates the Mid West and South West Gas Distribution System in WA. ATCO Gas wishes to engage you to prepare an expert report in connection with the ERA's review of the access arrangement for the period 1 July 2014-December 2019.

This letter sets out the matters which ATCO Gas wishes you to address in your report and the requirements with which the report must comply.

Terms of Reference

Legal Framework

The terms and conditions upon which ATCO Gas provides access to its gas network are subject to five yearly reviews by the ERA. The ERA undertakes that review by considering the terms and conditions proposed against criteria set out in the *National Gas Law* and *National Gas Rules*.

Rule 76 of the *National Gas Rules* provides that the total revenue for each regulatory year is determined using a building block approach, which building blocks include a return on the projected capital base and depreciation on the projected capital base.

Rule 87 provides for the determination of a rate of return on the projected capital base. The amended Rule 87 now in force requires a rate of return to be determined on a *nominal* vanilla basis. Rule 87 now requires that the allowed rate of return be determined such that it achieves the allowed rate of return objective, being:

…that the 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 serviced provider in respect of the provision of reference services.

Rule 87(5) requires that in determining the allowed rate of return, regard must be had to, *inter alia, relevant estimation methods, financial models, market data and other evidence.*

In respect of the return on debt, the return on debt is to be estimated such that it contributes to the allowed rate of return objective. The return on debt may be estimated such that it is the same for each regulatory year of the access arrangement period, or such that it differs from year to year (Rule 87(9)).

Rules 87(10) and (11) set out other important considerations for the estimating the return on debt.

Rule 74(2) requires a forecast or estimate to be arrived at on a reasonable basis and must represent the best forecast or estimate possible in the circumstances.

As you are aware, Rule 87(13) also provides for the making of rate of return guidelines. The ERA published its Final Rate of Return Guidelines on 16 December 2013. The ERA proposes to apply the approach set out in the Guidelines to ATCO Gas. The Guidelines are no mandatory but if there is a departure from the Guidelines, the reasons for the departure must be given in the ERA's decision (Rule 87(18)).

Also relevant is the overarching requirement that the ERA must, in performing or exercising its economic regulatory function or power perform or exercise that function or power in a manner that will or is likely to contribute to the achievement of the national gas objective (**NGO**).

The NGO is to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas.

You should also have regard to the Revenue and Pricing Principles (**RPP**) in section 24 of the National Gas Law.

In preparing your report you should consider the relevant sections of the National Gas Rules and Law and the ERA's Guidelines and Explanatory Statement.

Return on Debt

The ERA in its Rate of Return Guidelines proposes:

1 In respect of the risk free rate (for both the cost of debt and the cost of equity), to use as a proxy the observed yield on a 5 year term Commonwealth Government Security averaged over a 40 day period just prior to the regulatory period. (page 14 and 18). The primary basis for using the a 5 year term to maturity to estimate the risk free rate is said to be that the present value principle reflects that the term of debt should match the regulatory update period. (see Chapter 7 of the ERA's Explanatory Statement)

2 In respect of the debt risk premium (DRP) the ERA proposes to derive the DRP from the yield to maturity of an observed sample of bonds issued by comparator firms with similar credit ratings as the regulated entity. The bond yield approach will be used with a joint weighting mechanism and the DRP will be updated annually. The criteria for selection of the bonds in the benchmark sample is set out at paragraph 103 of the Rate of Return Guidelines. (see also chapters 8 and 9 of the ERA Explanatory Statement).

Opinion

In this context ATCO Gas wishes to engage you to prepare an expert report which provides:

1. An assessment of the ERA's approach to estimating the return on debt set out in the Rate of Return Guidelines, including:
   1.1 a critique of the ERA's reasoning for adopting a 5 year term for the risk free rate (cost of debt and cost of equity); and
   1.2 an analysis of the ERA's proposed bond yield approach to the debt risk premium and the proposal to update the DRP annually.
2. Your opinion on whether the ERA's proposed approach to the return on debt would result in the best estimate of the return on debt that contributes to the achievement of the allowed rate of return objective and meets the requirements of Rule 87.
3. Your opinion on whether the return on debt estimate using the ERA approach would produce a result consistent with the achievement of the NGO and the RPP.
4. If in your opinion the ERA's approach does not meet the requirements set out in paragraph 2 and 3 above, what method (or methods) for estimating the cost of debt should be used in order to produce the best estimate (or range of estimates) possible in the circumstances that complies with Rule 87 (including the matters in sub rules 87(8) to 87(12)) and the achievement of the NGO and RPP?

Use of Report

It is intended that your report will be submitted by ATCO Gas to the ERA with its Access Arrangement Proposal. The report may be provided by the ERA to its own advisers. The report must be expressed so that it may be relied upon both by ATCO Gas and by the ERA.

The ERA may ask queries in respect of the report and you will be required to assist in answering these queries. The ERA may choose to interview you and if so, you will be required to participate in any such interviews.

The report will be reviewed by ATCO Gas' legal advisers and will be used by them to provide legal advice as to its respective rights and obligations under the *National Gas Law* and *National Gas Rules*.

If ATCO Gas was to challenge any decision ultimately made by the ERA, that appeal will be made to the Australian Competition Tribunal and your report will be considered by the Tribunal. ATCO Gas may also seek review by a court and the report would be subject to consideration by such court. You should therefore be conscious that the report may be used in the resolution of a dispute between the ERA and ATCO Gas Due to this, the report will

need to comply with the Federal Court requirements for expert reports, which are outlined below.

Timeframe

ATCO Gas's Access Arrangement proposal must be submitted by ***16 March 2014.*** Your report will need to be finalised by late February 2014.

Compliance with the Code of Conduct for Expert Witnesses

Attached is a copy of the Federal Court's Practice Note CM 7, entitled "*Expert Witnesses in Proceedings in the Federal Court of Australia*", which comprises the guidelines for expert witnesses in the Federal Court of Australia (**Expert Witness Guidelines**).

Please read and familiarise yourself with the Expert Witness Guidelines and comply with them at all times in the course of your engagement by the Gas Businesses.

In particular, your report prepared for the Gas Businesses should contain a statement at the beginning of the report to the effect that the author of the report has read, understood and complied with the Expert Witness Guidelines.

Your report must also:

1 contain particulars of the training, study or experience by which the expert has acquired specialised knowledge;

2 identify the questions that the expert has been asked to address;

3 set out separately each of the factual findings or assumptions on which the expert's opinion is based;

4 set out each of the expert's opinions separately from the factual findings or assumptions;

5 set out the reasons for each of the expert's opinions; and

6 otherwise comply with the Expert Witness Guidelines.

The expert is also required to state that each of the expert's opinions is wholly or substantially based on the expert's specialised knowledge.

It is also a requirement that the report be signed by the expert and include a declaration that "*[the expert] has made all the inquiries that [the expert] believes are desirable and appropriate and that no matters of significance that [the expert] regards as relevant have, to [the expert's] knowledge, been withheld from the report*".

Please also attach a copy of these terms of reference to the report.

Terms of Engagement

Your contract for the provision of the report will be directly with ATCO Gas. You should forward ATCO Gas any terms you propose govern that contract as well as your fee proposal.

Please sign a counterpart of this letter and return it to us to confirm your acceptance of the engagement.

Yours faithfully

Johnson Winter & Slattery

Enc: Federal Court of Australia Practice Note CM 7, "Expert Witnesses in Proceedings in the Federal Court of Australia"

……
Signed and acknowledged by Dr Tom Hird

Date ……..

Yours faithfully

Johnson Winter & Slattery

Enc: Federal Court of Australia Practice Note CM 7, "Expert Witnesses in Proceedings in the Federal Court of Australia"

.....
Signed and acknowledged by Dr Tom Hird

Date 13/3/14

COMPETITION ECONOMISTS GROUP

Economics of competition, regulation and damages

Curriculum Vitae

Dr Tom Hird / Director

Contact Details

T / +61 (3) 9095 7570

M / +61 422 720 929

E / tom.hird@ceg-ap.com

Key Practice Areas

Tom Hird is a founding Director of CEG's Australian operations. In the seven years since its inception CEG has been recognised by Global Competition Review (GCR) as one of the top 20 worldwide economics consultancies with focus on competition law. Tom has a Ph.D. in Economics from Monash University. Tom is also named by GCR in its list of top individual competition economists.

Tom's clients include private businesses and government agencies.

In terms of geographical coverage, Tom's clients have included businesses and government agencies in Australia, Japan, Korea, the UK, France, Belgium, the Netherlands, New Zealand, Macau, Singapore and the Philippines. Selected assignments include:

Selected Projects

- Expert evidence to Chorus New Zealand on the estimation of the cost of capital.
- Expert evidence to NSW electricity distributors on the cost of capital
- Expert evidence to the Australian Energy Networks Association on a range of issues in relation to estimating the cost of capital for regulated energy infrastructure businesses.
- Expert evidence to Everything Everywhere in relation to the cost of capital for UK mobile operators - including oral testimony before the UK Commerce Commission.
- Advice to Wellington Airport on the estimation of the cost of capital.
- Expert evidence to Vector on appeal of the New Zealand Commerce Commission decision on the cost of capital.
- Expert evidence in relation to the cost of capital for Victorian gas transport businesses.
- Expert evidence to the Australian Competition Tribunal on the cost of debt for Jemena Electricity Networks.
- Advice to Integral Energy on optimal capital structure.
- Expert evidence to ActewAGL on estimation of the cost of debt
- Expert evidence NSW, ACT and Tasmanian electricity transmission and distribution businesses on the cost of capital generally and how to estimate it in the light of the global financial crisis.
- Expert evidence in relation to the appeal by the above businesses of the Australian Energy Regulator (AER) determination.

- Expert testimony to the Federal Court of Australia on alleged errors made by the Australian Competition and Consumer Commission (ACCC) in estimating the cost of capital for Telstra.
- Expert evidence to T-Mobile (Deutsche Telekom) on the cost of capital for mobile operators operating in Western Europe.
- Advising Vivendi on the correct cost of capital to use in a discounted cash flow analysis in a damages case being brought by Deutsche Telekom.
- Expert evidence the AER on the cost capital issues in relation to the RBP pipeline access arrangement.
- Expert evidence to the ENA on the relative merits of CBASpectrum and Bloomberg's methodology for estimating the debt margin for long dated low rated corporate bonds.
- Expert evidence the Australian Competition and Consumer Commission, Australia on the correct discount rate to use when valuing future expenditure streams on gas pipelines.