COMPETITION ECONOMISTS GROUP

Criteria for assessing fair value curves

Tom Hird
Johnathan Wongsosaputro

January 2016

COMPETITION ECONOMISTS GROUP

Table of Contents

COMPETITION ECONOMISTS GROUP

List of Figures

List of Tables

COMPETITION ECONOMISTS GROUP

1 Executive summary

1. There are two independent fair value curves, published by each of Bloomberg (BVCSAB01 Index – BVCSAB30 Index) and the RBA (RBA Statistical Table F3, Series ID: FNFSBBB3M – FNFSBBB10M), that have been the focus of the AER's regulatory decisions on the return on debt to date. In the past another provider, CBASpectrum, published a corporate debt curve that was used by the AER and other regulators. There is also currently a BBB par yield curve published by Reuters (Reuters instrument code: BBBAUDBMK Par Yield) that has recently been extended to 10 years.

2. In addition to the above independent published sources, the West Australian Economic Regulation Authority (ERA) recently adopted its own methodology for estimating the cost of debt of the ERA determined benchmark efficient entity. While the ERA does not regularly publish a 10 year BBB cost of debt estimate, it has set out a clear methodology that it will use to arrive at such an estimate, and will do so twice a year in the course of regulatory proceedings to annually update the cost of debt for ATCO and DBNGP.[1] Using this methodology, it is possible to follow the process set out by the ERA to estimate a cost of debt on any given day of the year. Alternatively, it is also possible to define a methodology to arrive at a cost of debt – such as variations on the ERA method – to arrive at a bespoke estimate of the cost of debt.

3. While the sources set out above are generally reputable, each of their cost of debt estimates utilise different sample selection criteria and clearly have different properties that may or may not be desirable in the present context of promoting the allowed rate of return objective (ARORO) set out in the NER (and replicated in similar terms in the NGR) as follows:

> *The allowed rate of return objective is that the rate of return for a Distribution Network 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 Distribution Network Service Provider.*

4. The criteria used to assess different sources of estimates for the 10 year BBB cost of debt must be designed such that assessment against these criteria promotes the ARORO. In our view, the following criteria do this:

   a. The source is derived from a dataset that best matches the characteristics of debt issued by a benchmark efficient entity (BEE).

[1] DBNGP's access arrangement for the 2016-2020 regulatory cycle is still at the draft stage and has not been finalised..

b. The source is derived from a sufficiently large data set of the type of bonds specified in criterion (a) (which provides confidence that the result is not unduly influenced by a small number of observations in the data set);

c. The source is derived using a transparent methodology that is accurate and robust – in the sense that the source can be relied on to provide an accurate estimate of the cost of debt for a BEE that is not unduly influenced by a small number of observations in the dataset;

d. The source is regularly published by an independent reputable organisation—independent in the sense that the source is not published for use in regulatory determinations;

e. The source has a track record of accuracy.[2]

5. Table 1 below summarises key results relevant to an assessment of criterion a.

Table 1: Industry norm vs various sources

	Benchmark/Industry norm	Bloomberg#	Reuters^	ERA#	RBA#
Foreign currency bonds	Approx. 83% by $* Approx. 60% by #*	0%	0%	75% by $ 51% by#	74% by $ 54% by #
Long term bonds (>8 years maturity)	Benchmark =10 years	1	1	17	14
Bonds greater than 8 years maturity issued by regulated NSPs	Benchmark = ?**	0%	0%	5	3
Bonds with optionality	20% by $* 12% by #*	0%	0%	27% by$ 18% by #	20% by$ 14% by #
'Foreign'^^ bonds (issued in AUD)	0	0	19	0	0

* For bonds with maturity between 8 and 12 years. ** Whether the BEE is a regulated NSP or an unregulated firm with a similar degree of risk is unclear. #30 October 2015. ^14 December 2015. ^^Neither country of risk nor incorporation in Australia.

6. The RBA and ERA sources have the best performance relative to criterion (a). Foreign currency issuance is the dominant form of issuance for long term bonds in the industry (narrowly or widely defined). The Bloomberg and Reuters bond samples do not include any foreign currency bonds. Moreover, because foreign currency bonds are the primary source of long term debt issuance, the Bloomberg and Reuters datasets are also critically under-represented in relation to long term bonds – both in general and particularly by energy transport businesses that

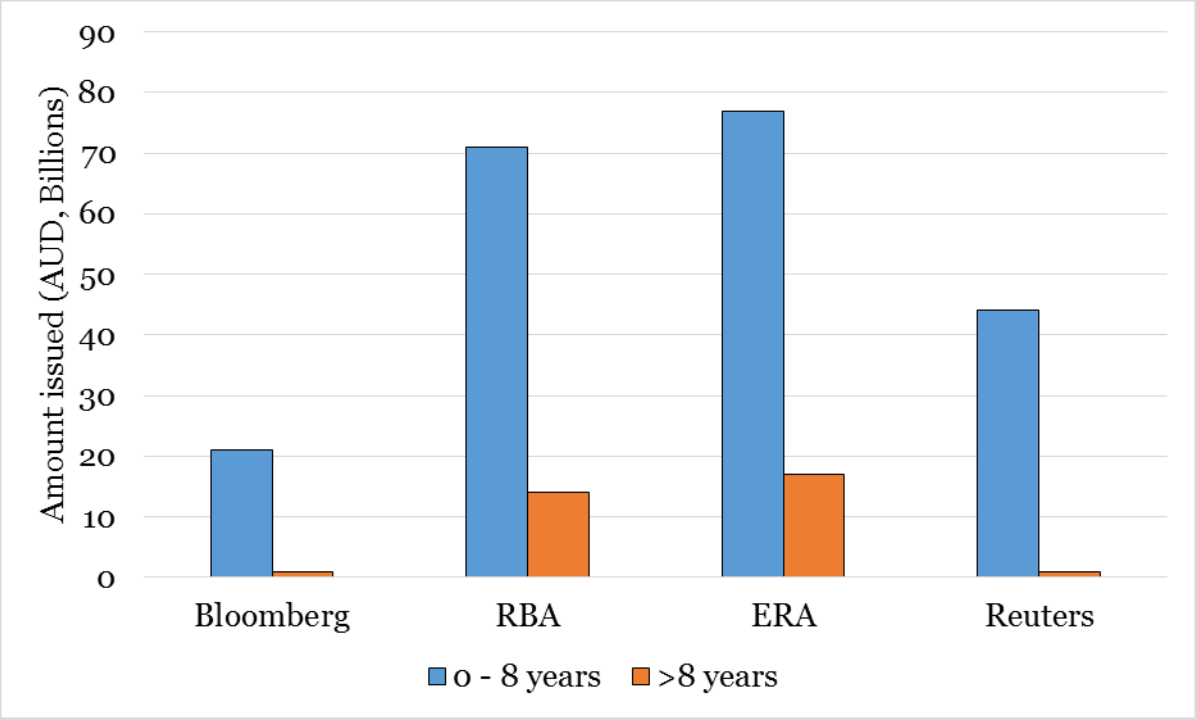
[2] The "accuracy" of a yield estimate generally cannot be defined in a precise manner because the true yield is unobservable. Nevertheless, we consider that two necessary but not sufficient conditions for a source to have a track record of accuracy are that: (1) its estimates – including extrapolated ones – are available for a long enough time period; and (2) its historical time series has generally behaved in line with economic and financial intuition, especially during extreme events, since the direction of movements in estimates are generally more predictable in such circumstances.

provide services including regulated services. Similarly, the industry norm is to issue some bonds with optionality features and Bloomberg and Reuters do not include any of these bonds in their datasets. Reuters includes bonds issued in AUD that are not issued by companies defined by Bloomberg as having a 'country of risk' or 'country of incorporation' in Australia.

7. In terms of criterion (b), the underlying sample of bond constituents should be derived from a sufficiently large dataset. This is necessary in order to ensure that the resulting curve is not unduly influenced by a small number of bonds – especially at or around 10 years.

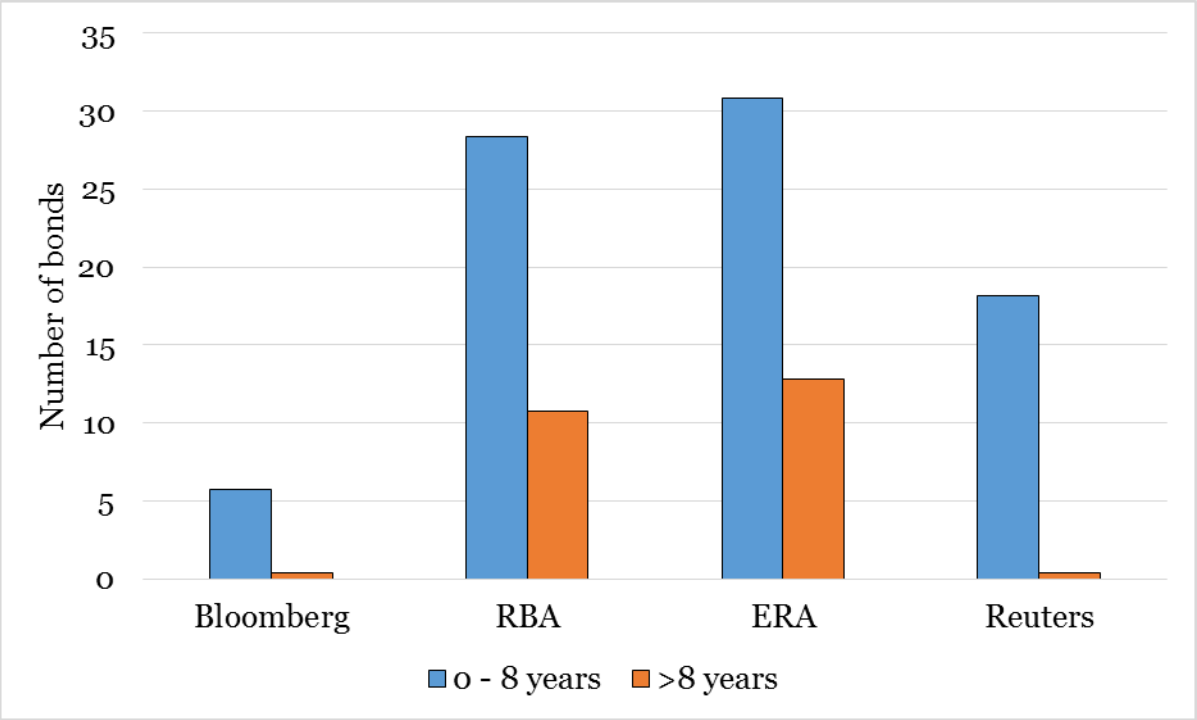
8. The RBA and ERA sources both fulfil this criterion. As at 30 October 2015, the RBA curve uses a sample of 85 bonds, while the ERA curve has a sample of 94 bonds. Of these, 14/17 (RBA/ERA) have maturities in excess of 8 years. By contrast, the Bloomberg sample has only 22 bonds with only 1 bond that has more than 8 years maturity. The Reuters sample contains 45 bonds, of which only 1 has a maturity exceeding 8 years (this is the same long term bond that is in the Bloomberg sample). The same relativities exist when expressed in terms of the value of bonds (as opposed to the number of bonds).

Figure 1: Value of bonds in dataset by maturity



Source: Bloomberg, ERA, RBA, Reuters CEG analysis

Figure 2: Number of bonds in dataset by maturity



Source: Bloomberg, ERA, RBA, CEG analysis

9. The smaller size of the Bloomberg and Reuters samples exposes their estimates to potential inaccuracies arising from not giving sufficient or any weight to available information (from the wider sample).

10. In terms of criterion (c), the RBA and ERA methodologies are transparent while the Bloomberg and Reuters methodologies are not. The AER has stated that the BVAL curve is not a 'black box', on the basis that there is a "fair degree of available information" on its bond selection criteria, as well as "some available information" regarding the curve fitting methodology.[3]

11. However, we disagree with the AER's assessment and note that the AER has previously acknowledged the lack of transparency.[4] Unlike the RBA, Bloomberg has not published an explicit criteria that it uses to identify its sample of bonds, and there is insufficient information on Bloomberg's curve fitting methodology for interested parties to replicate their estimates from the underlying bond constituents and any other reference curves.

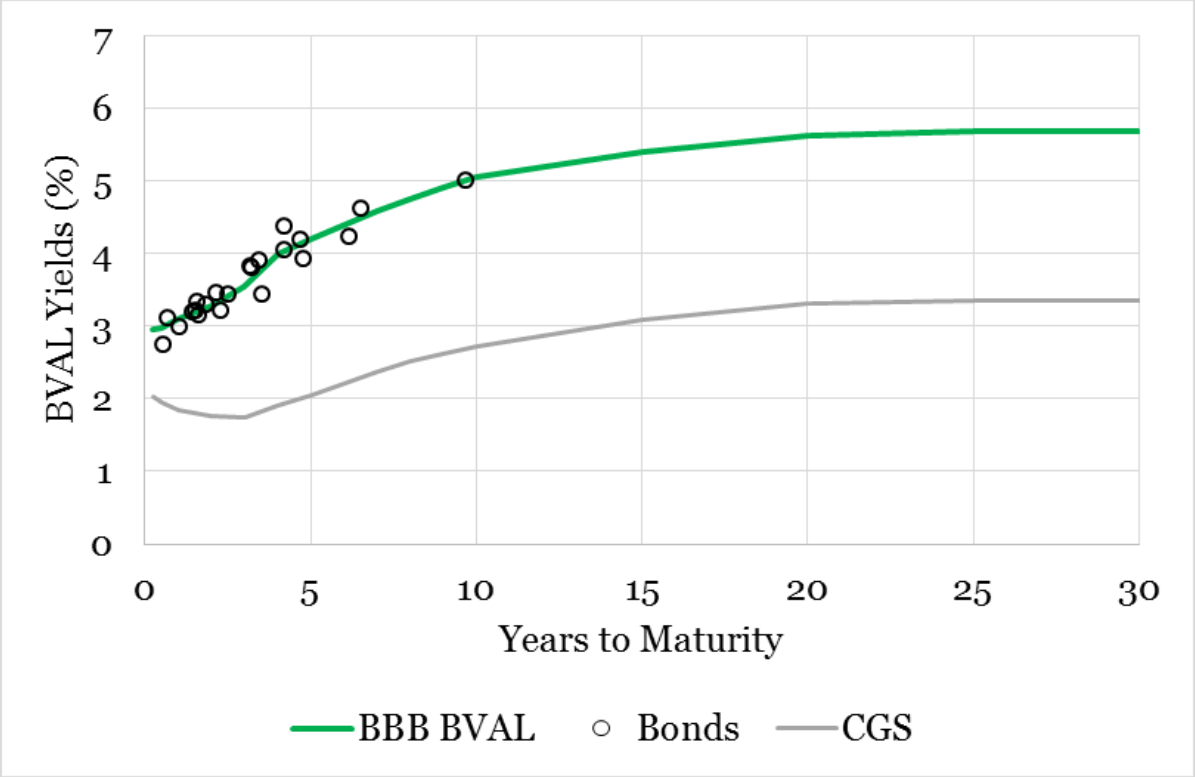
12. This lack of transparency makes it difficult to make definitive statements about how the Bloomberg and Reuters curves are constructed. However, the average BVAL

3 AER, Jemena Gas Networks final decision 2015-20: Attachment 3 – Rate of return, June 2015, p. 3-204.

4 AER, Final decision for Jemena Gas Networks, 11 June 2010, p. 191.

curve over the 20 trading days to 30 September and its bond constituents is shown in Figure 3. The bond with the longest residual maturity is an Asciano bond (EK907291 Corp) with 9.6 years to maturity followed by a Qantas bond (EK784130 Corp) with 6.4 years residual maturity. Depending on the Bloomberg curve-fitting methodology, the Asciano bond could have a very high influence on the 10-year BVAL estimate. In this regard we note that over the 20 trading days to 30 September the average BVAL 10 year yield was almost identical to the average yield on the Asciano bond (5.06% vs 5.01%).

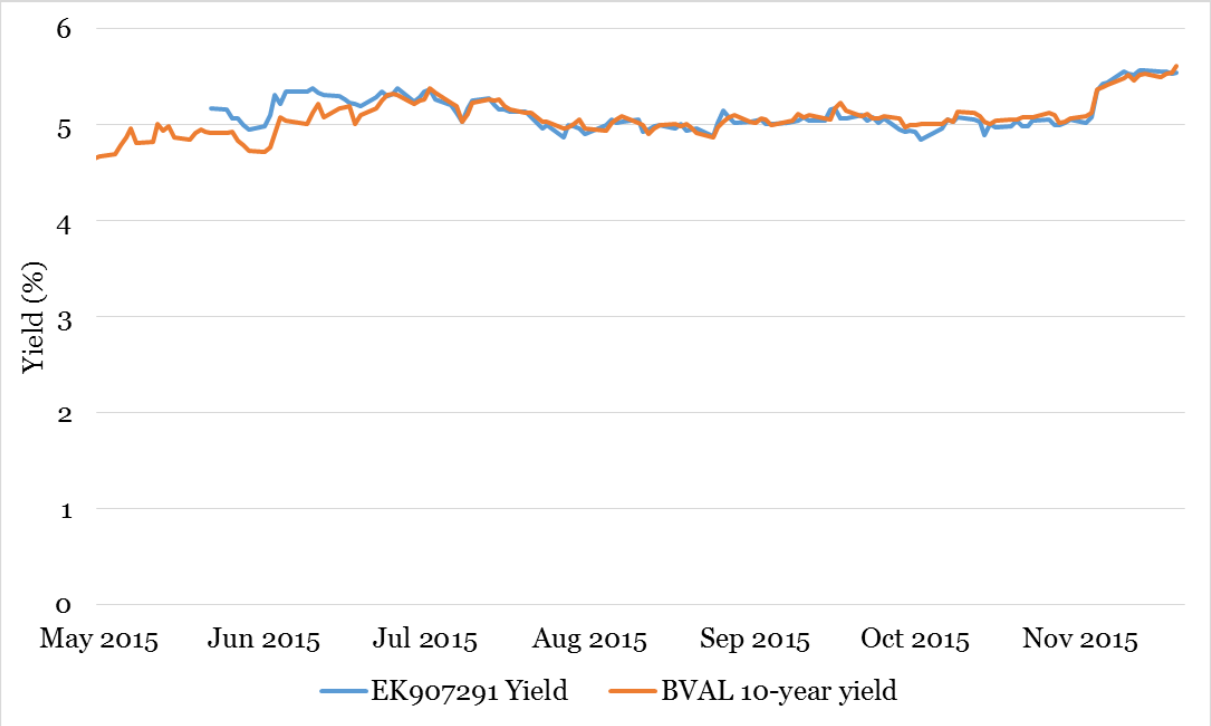
Figure 3: BVAL curve vs constituents 20 trading days to 30 September 2015



Source: Bloomberg, CEG analysis

13. It is also clear from Figure 18 below that the BVAL 10 year yield and the yield on the Asciano bond have moved in something like 'lock step' since at least July 2015 (albeit with minor and temporary deviations at times).

Figure 4 Asciano (EK907291) bond yield vs BVAL 10 year yield



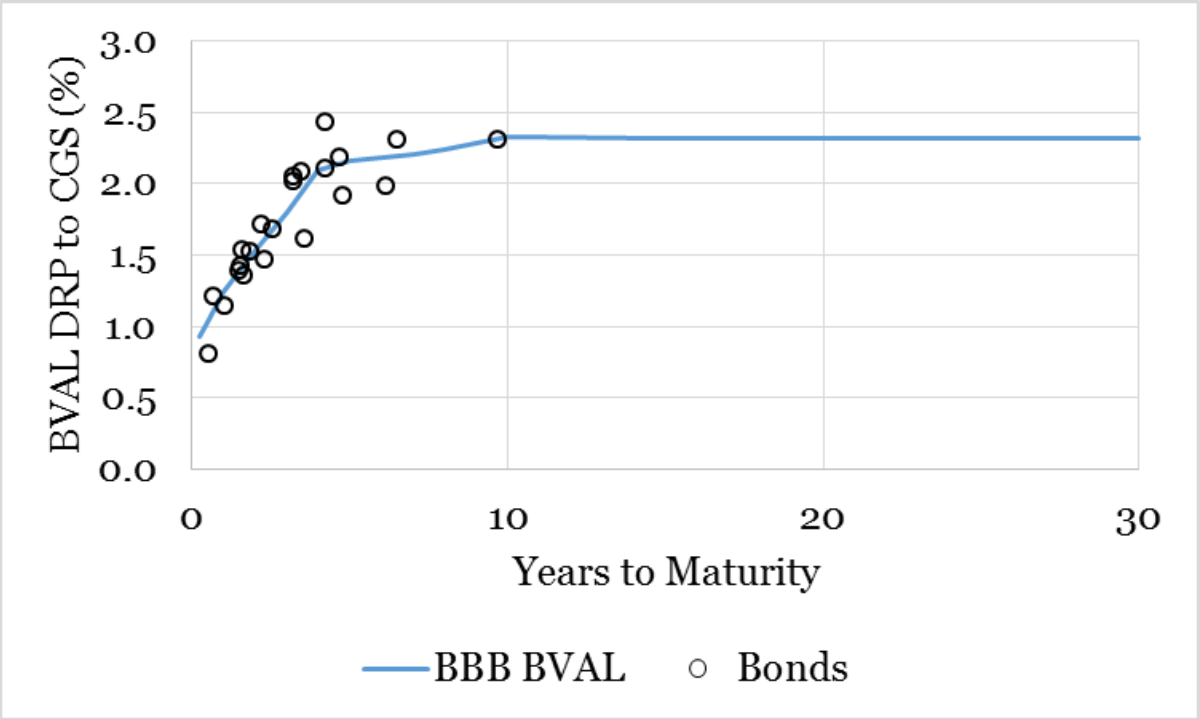
Source: Bloomberg, CEG analysis

14. This suggests that the yield of a single bond is playing a very important role in determining the BVAL yield at 10 years. Of course, we do not know this for certain because Bloomberg is not transparent about its curve fitting methodology. However, in our view, the above analysis is sufficient to conclude that, at least over the period examined, the Asciano bonds played the role of a 'high leverage point' in the Bloomberg regression methodology (whatever that methodology may be). A high leverage point is said to exist where an observation at extreme or outlying values of the independent variables exists (in this case the bond with the longest maturity) such that the lack of neighbouring observations means that the fitted regression model will pass close to that particular observation,[5] thus causing that single observation to have a disproportionately high level of influence on the resulting estimate.

15. It is also the case that the Bloomberg extrapolation beyond the maximum maturity of its dataset tends to give rise to the same result as simply assuming zero change in DRP (i.e., extrapolation is the same 'as if' it were based on the CGS curve). This is illustrated in Figure 20 below over the 20 trading days to 30 September 2015, where the spread to CGS is almost flat for a time to maturity exceeding 10 years.

5 Everitt, B. S. and Skrondal A., (2010). Cambridge Dictionary of Statistics. 4th Edition, Cambridge University Press, p. 247

Figure 5: BVAL spread to CGS curve vs constituents 20 trading days to 30 September 2015



Source: Bloomberg, CEG analysis

16. In terms of criterion (d), the RBA and Bloomberg and Reuters sources are independent reputable organisations that regularly publish fair value curves. The ERA source, which is produced for regulatory determinations, is not independent from the regulatory process. A failure to satisfy criterion (d), however, should not prevent reliance on a particular source. It will, however, increase the importance of satisfying the other criteria – in particular criterion (c) – and it may make it impractical to use if the curve is not published for a given averaging period.

17. In terms of criterion (e), fair value curves published by Bloomberg have come under criticism by a number of experts, including Chairmont, the RBA and the AER. More recently, Bloomberg has introduced a new fair value estimate that it has labelled as BVAL (the previous Bloomberg source was labelled as BFV (or Bloomberg fair value curve)). However, the methodology for neither publication is transparent so it is not possible to provide a meaningful discussion of any differences in methodology that might cause the BVAL estimates to be more reliable than the BFV estimates.

18. It is nevertheless the case that, since the replacement of the Bloomberg BFV curve by the BVAL curve in May 2014[6] (and the introduction of a 10 year estimate in May 2015), the BVAL 10 year estimate (extrapolated using AER methodology prior to May 2015) has exhibited a pattern such that is generally below the RBA 10 year estimate, but does periodically 'jump up' to be more or less equal with the RBA estimate before either dropping or drifting below the RBA estimate.

Figure 6: BVAL vs RBA from May 2014 onwards

Source: Bloomberg and RBA. Both the Bloomberg and BVAL curves are, where necessary, extrapolated to 10 years using the AER methodology. The RBA curve is interpolated between month ends using the AER methodology.

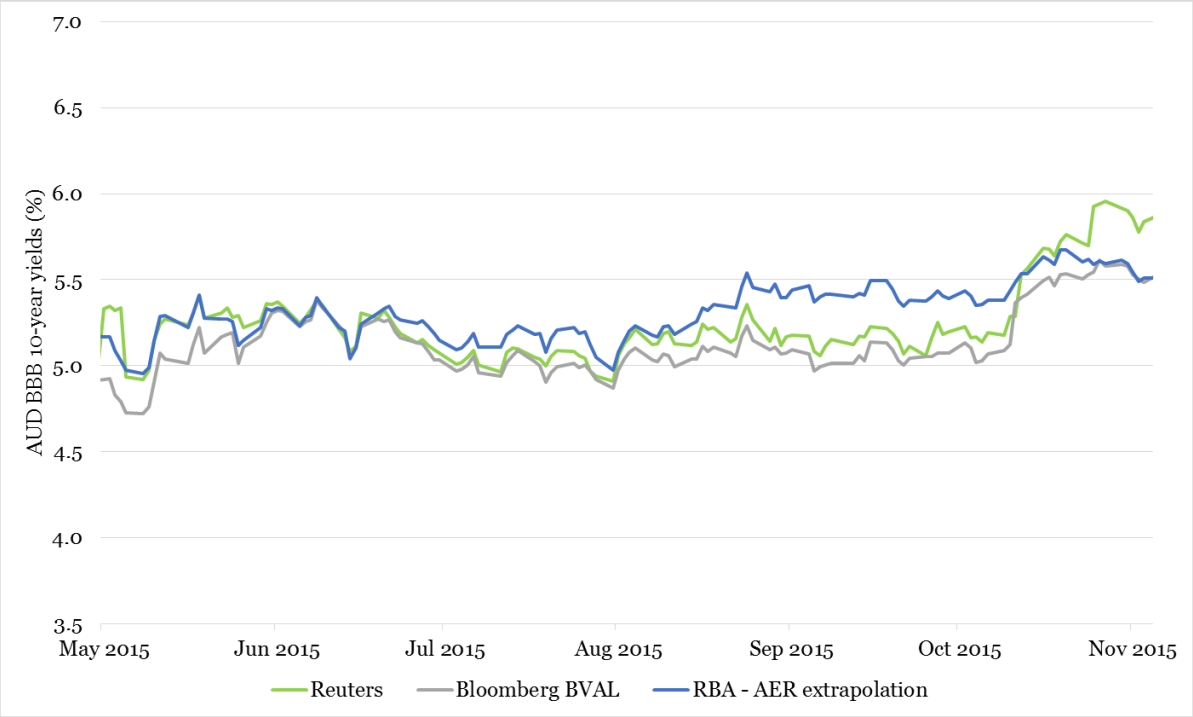
19. The reason for the sharp movements in the Bloomberg curve (indicated with black arrows in the figure above) is unclear. However, it seems possible that they are due to the relatively small sample used by Bloomberg – which may expose the BVAL curve to heightened sensitivity to the movements in estimated yields for a small number of bonds (or even a single bond). However, without transparency in

6 The BVAL curve was first published in November 2013 but was initially published alongside the BFV curve – presumably because it was in beta form (see discussion at paragraph 120 below). From May 2014 the BVAL curve replaced the BFV curve (see ACCC, Regulatory Economic Unit, Return on debt estimation, August 2014, p. 3).

relation to the Bloomberg curve fitting methodology it is only possible to speculate on this issue.

20. The Reuters par yield curve has a much shorter time period of publication. 10 year estimates are available on a daily basis since 25 May 2015 (but intermittently published prior to that – such as in May and June 2013 and for 2 days in January 2008). From 20 December 2013 to 25 May 2015, the longest dated estimate that was available was at seven years maturity.[7]

Figure 7: RBA, Bloomberg and Reuters



Source: Bloomberg, RBA, Reuters

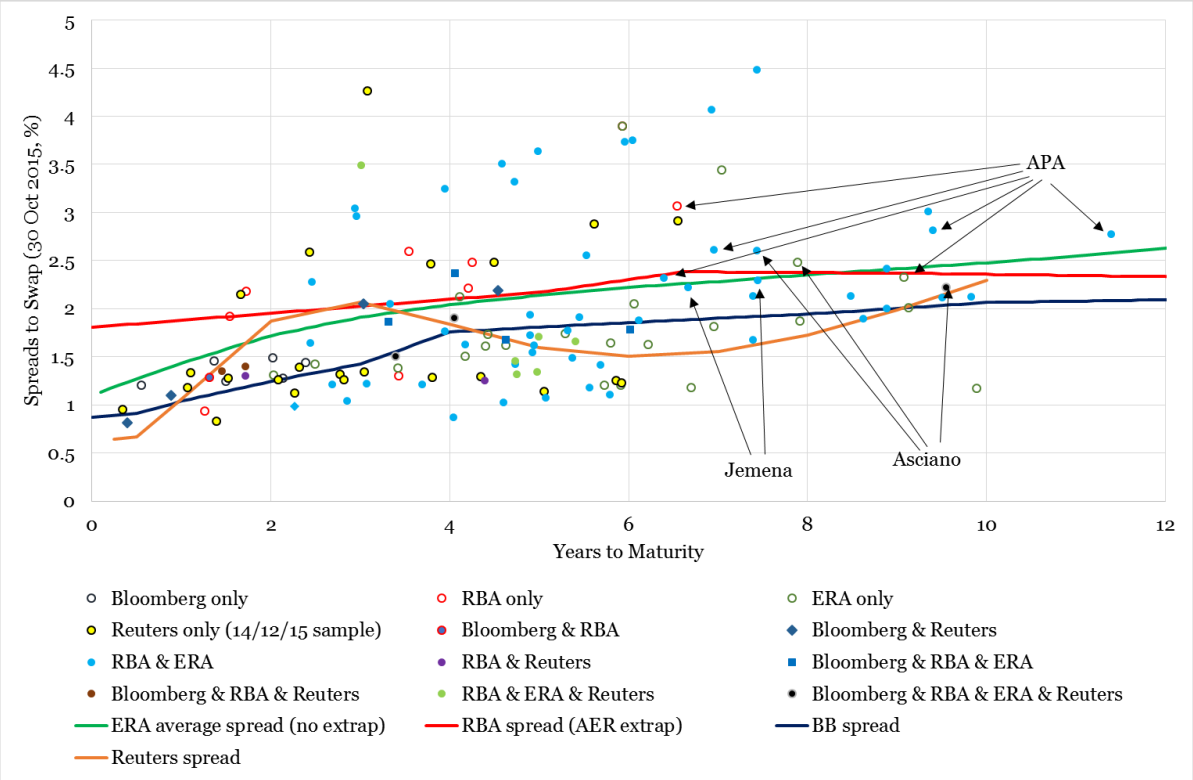
21. It can be seen that the Reuters 10 year estimate has been consistently above the Bloomberg 10 year estimate and below the RBA estimate from June 2015 to October 2015, but shifted materially above the RBA estimate in November 2015.

22. We have examined each of the (RBA/ERA[8]/Bloomberg/Reuters) curves on 30 October 2015 against the various samples of constituent bonds (RBA/ERA/Bloomberg/Reuters). The results are shown in Figure 26 below.

7 With the exception of a single day (13 February 2015) when an 8 year estimate was available.

8 We have estimated this following the ERA estimation procedure as set out in ERA, Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems, September 2015.

Figure 8: Curves vs bond yields on 30 September 2015



Source: Bloomberg, RBA, ERA, Reuters, CEG analysis

23. In Figure 8 above, Bloomberg's longest dated (Asciano) bond is marked in the chart as well as bonds with maturity above 7 years that were issued by firms whose portfolios include gas and/or electricity infrastructure businesses regulated under the NER or NGR (plus, for comparison, any other bonds issued by the same entity with maturity above 6 years). These bonds are issued by APA and Jemena. These bonds sit above and below the RBA curve but sit wholly above the Bloomberg curve. On 30 September 2015 the Reuters spread to swap curve had a peculiar shape – with estimated DRP falling between 3 and 6 years and then rising between 6 and 10 years. We note that the RBA, ERA and Reuters estimates at 10 years were higher than the Bloomberg estimate.

24. Table 5 below summarises the performance of each source against the five criteria.

Table 2: Assessment against criteria

Criteria	RBA	Bloomberg	ERA	Reuters
Dataset matches benchmark	Yes	No	Yes	No
Large dataset	Yes	No	Yes	No
Transparent bond selection and curve fitting methodology	Yes	No	Yes	No
Independent and reputable and regularly published	Yes	Yes	Not independent or regularly published	Yes
Track record of accuracy	Yes	No	No	No

25. Relative to the RBA, the Bloomberg and Reuters sources perform less strongly against four of the five criteria. The RBA curve is the only curve that performs well against all criteria. For these reasons we consider that the RBA is clearly the best performer against the five criteria. Consequently, if one were to limit oneself to choosing one, or a set of predetermined sources, with predetermined weights we consider that the RBA source should be selected with 100% weight. However, if detailed examination of the performance of each curve during a specific averaging period was feasible this could be used to perform a 'real time' assessment of the relative accuracy of the curves. Such analysis could include applying goodness-of-fit tests on the curves against a broad sample of bonds[9] and other bespoke analysis relevant to the dataset available and available given any restrictions applied under the NER/NGR relating to the requirement for automatic updating of cost of debt estimates.

26. In the alternative it may be argued that, it is not practicable to 'second guess' the methodological decisions of independent and reputable third party publishers of the yield on a benchmark 10 year BBB corporate debt issue. That is, it may be argued that each methodology has 'strengths and weaknesses' and that one should give weight to each. This is not our view for the reasons set out above and in the body of the report. However, if one did take this view then some average of all three curves (being the RBA, Bloomberg, and Reuters) should be used. Specifically, there is no reason to give equal weight to the RBA and Bloomberg and zero weight to Reuters. Reuters' performance against the relevant criteria is at least as good at Bloomberg's performance.

9 We have previously set out such an approach in CEG (2015) for the January 2015 averaging period. CEG, Critique of the AER's JGN draft decision on the cost of debt, March 2015, p. 41-55; Our analysis showed that the RBA curve provided the best fit for the January 2015 averaging period

2 Introduction

27. CEG has been engaged by Jemena Electricity Networks, ActewAGL Distribution, AusNet Services, Australian Gas Networks, Citipower, Powercor and United Energy to prepare an expert report[10] which provides an assessment of the AER's October and November 2015 preliminary and draft decisions[11] in relation to the most appropriate source from which to derive an estimate of the cost of debt that meets the requirements of the NEL / NGL and the NER / NGR.

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

    - **Section 3** describes different philosophies for selection of data sources concerning the return on debt for a benchmark efficient entity, what we ascertain as being the AER's philosophy and why we consider that an alternative philosophy is superior;
    - **Section 4** describes the criteria we consider are appropriate to apply in making an assessment of data source for estimating the return on debt for a benchmark efficient entity and our assessment of different data sources against those criteria;
    - **Section 5** discusses an approach where no predetermined selection as to data source occurs to be applied over the entire regulatory period but the most accurate curve is selected at a given point in time;
    - **Section 6** considers the views of Lally and the AER on these issues.

29. I acknowledge that we 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.

30. I have been assisted in the preparation of this report by Johnathan Wongsosaputro in CEG's Sydney office. However, the opinions set out in this report are my own.

Thomas Nicholas Hird

[10] Terms of reference are provided in Appendix C.

[11] For electricity and gas transport companies.

3 Philosophy for selection of independent third party provider

31. The AER's recent decisions assume that the BEE holds a credit rating in the broad BBB band and issues debt with 10-year maturities.[12] These assumptions form part of the calculation of the BEE's cost of debt. However, the yield of a hypothetical BBB (or BBB+) rated bond with a 10-year residual maturity cannot be observed in practice. This is because BBB (or BBB+) bonds with residual maturities at exactly 10 years are rare, and, even if a large number of 10 year BBB (or BBB+) bonds existed at a given time, not all would have the same yield.

32. It is therefore common practice to estimate the cost of debt by estimating a yield curve based on a sample of bonds with credit ratings in the broad BBB band, allowing the 10-year yield estimate to be read directly from the curve. Under this approach, the resulting return on debt is usually not sourced from actual trade data, but is instead an estimate of the yields that these bonds would trade at in the secondary market.

33. If the sample of bonds is sufficiently large – especially around the 10-year tenor – the resulting curve should provide a good estimate of the benchmark cost of debt. Such an approach implicitly assumes that the sample of bonds is reflective of the debt issuance characteristics of a BEE.

3.1 Potential sources of cost of debt estimates

34. There are two independent fair value curves, published by each of Bloomberg (BVCSAB01 Index – BVCSAB30 Index) and the RBA (RBA Statistical Table F3, Series ID FNFSBBB3M – FNFSBBB10M), that have been the focus of the AER's regulatory decisions on the return on debt to date. In the past another provider, CBASpectrum, published a corporate debt curve that was used by the AER and other regulators. There is also currently a BBB par yield curve published by Reuters (Reuters instrument code: BBBAUDBMK Par Yield) that has recently been extended to 10 years.

35. In addition to the above curves estimated by independent providers, the Western Australian Economic Regulation Authority (ERA) recently adopted its own methodology for estimating the cost of debt of the regulated entities under its jurisdiction. While the ERA does not regularly publish a 10 year BBB cost of debt estimate, it has set out a clear methodology that it will use to arrive at an estimate, and will do so twice a year in the course of regulatory proceedings to annually

[12] The AER adopts a BBB+ credit rating for the BEE, but uses a BBB band curve to estimate the cost of debt in practice.

update the cost of debt for ATCO and DBNGP. Using this methodology, it is possible to follow the process set out by the WA ERA to estimate a cost of debt on any given day of the year.

36. Alternatively, it is also possible to define a methodology to arrive at a cost of debt – such as variations on the ERA method – to arrive at a bespoke estimate of the cost of debt.

3.2 Three distinct approaches to arriving at a single estimate

37. Given that there are multiple sources of information that may be utilised in estimating a return on debt for regulatory purposes, it is necessary to implement a robust assessment of the appropriateness of each estimate against the requirements of the NEL / NGL and NER / NGR. This is because, even though the sources set out in Section 3.131 may be considered to be generally reputable (although not always independent of the regulatory process), the cost of debt estimates generated or drawn from these sources ultimately rest upon decisions made by the sources as to sample selection criteria. None of the independent sources has as an explicit objective to rely on a sample of bonds that have similar characteristics to that which would be issued by a BEE. Given different sample selection procedures, the curves that are based on these samples will clearly have different properties and these may or may not be desirable in the present context of estimating the cost of debt for a BEE under the NEL / NGL and NER / NGR.

38. There are a number of ways to obtain a single return on debt estimate from the various sources, including:

    a. Give equal weight to all published estimates/methods as equally good estimates of financing costs of a BEE. Or, alternatively, establish some minimum criteria that a curve must meet, assess each source against that criteria once at the beginning of a regulatory period, and give:
        - equal weight to estimates from within that subset; and
        - zero weight to estimates outside that subset.

    b. Establish criteria by which each published estimate/methodology can be assessed and then make that assessment once at the beginning of the regulatory period. On the basis of that assessment select:
        i. the single source that performs best against those criteria; or
        ii. assign individual weights to each source consistent with their relative performance against those criteria.

c. Perform analysis, in any given period, aimed at determining which of the published estimates gives rise to the best estimate(s) and give weight to the estimate accordingly.

3.3 Preferred approach

39. Among the three options set out above, we favour the use of options (b) or (c), and consider option (a) to be inferior. This is because option (a) assumes that no useful information is available about the curves, which can then be used to evaluate the suitability of the resulting estimates in the context of the cost of debt faced by a BEE. Comparing options (b) and (c), the former has the advantage of simplicity and thus increased certainty, while the latter has the advantage of reducing the likelihood of estimation errors and is consistent with previous Australian Competition Tribunal decisions.[13] However, the latter approach would need to be sufficiently well specified such that it would be capable of being effected through the automatic application of a formula that is specified in the regulatory decision – as required under NER cl. 6.5.2(l) and NGR r.87(12). It is important to note that the automatic formula requirement only refers to the process of updating the return on debt within the regulatory cycle, and does not apply to the cost of debt determination as part of the decision itself.

---

[13] Application by Jemena Gas Networks (NSW) Ltd (No 5) [2011] ACompT 10 (JGN (2011)).

At p. 3-232 to 233 the AER's October 2015 Jemena preliminary decision quotes from this Tribunal decision (specifically paragraph 83 of the Tribunal decision). In that passage the Tribunal explains that it has selected the Bloomberg fair value curve over the CBASpectrum curve on the basis that tests performed by CEG pointed to the superiority of the Bloomberg curve in the relevant averaging period. In the same passage the Tribunal also noted that the CBASpectrum fair value curve had since been discontinued. The AER, on page 3-232, goes onto place weight on this later fact as distinguishing the current circumstances (where the relevant fair value curves have not since been discontinued) from those considered by the Tribunal in JGN (2011). The AER also states, referring to the RBA and Bloomberg, that "there is strong expert support for each data source". The AER relies on these grounds to discount the relevance of empirical tests of the accuracy of the curves and argues that not doing so is consistent with the Tribunal's decision in JGN (2011). We do not consider that this is a reasonable conclusion. In JGN (2011) the Tribunal states "*The Tribunal's statement in ActewAGL that the published curves be widely used and market respected is critical. JGN argues that the CBASpectrum fair value curve should not be adopted in any way – by itself, or as a component in an average. This curve is no longer published, its originators giving as reasons for its discontinuance, what we think is a concession as to its unreliability. **Besides, we re-iterate that in ActewAGL the Tribunal did not recommend averaging as a default procedure***" (emphasis added). We read this passage as saying that, putting aside the (subsequent) discontinuance of CBASpectrum, there is no presumption from the Tribunal in its ActewAGL (2010) (Application by ActewAGL Distribution [2010] ACompT 4 (17 September 2010)) or JGN (2011) decisions that averaging is a default position. In our view, the Tribunal's ActewAGL (2010) decision (where it explicitly set out a procedure for applying empirical tests to choose between curves (para 77(3)(a)) and JGN (2011) decisions (where it selected a curve based on such tests) is strongly supportive of the relevance of such tests in shedding light on the best estimate of the cost of debt.

3.4 AER approach

40. In its preliminary and draft decisions, the AER stipulates its approach for estimating the cost of debt incurred by the Benchmark Efficient Entity (BEE) using the simple average of the BVAL and RBA BBB yield curves at the 10-year effective tenor:[14]

> *In choosing that third party series (or combination of series), we are satisfied that adopting a simple average of the broad BBB rated Reserve Bank of Australia (RBA) and Bloomberg Valuation Service (BVAL) curves, with the RBA data series extrapolated to a 10 year term, is commensurate with the efficient financing costs of a benchmark efficient entity.*

41. Where necessary, the curves will be extrapolated to the 10-year effective tenor using the "AER method", which is based on the difference between RBA estimates of the 7- and 10-year DRPs, as well as their corresponding effective tenors.

42. We have examined the AER's reasoning (discussed further in section 6) and consider that its approach is best described as consistent with the approach set out in paragraph 38.a above. Specifically, we consider that the AER has tested the RBA and Bloomberg curves against a minimum set of criteria, found that they both satisfy these criteria, and, on this basis, assigned equal weight to each. We do not consider that the AER has sought to form a judgement as to which of the available sources / methodologies best satisfies the set of criteria that we discuss in Section 4.1 below. We discuss our interpretation of the AER's reasoning in section 6 below.

3.5 Approach of other regulators

43. There are a variety of approaches adopted by other regulators in Australia as summarised by the AER:[15]

> *IPART has switched from having its own approach to using an independent data service provider (the RBA). The ERA has developed its own bond yield approach and the QCA engaged PwC to develop its own econometrically derived approach (and combines this with using a third party data series as a cross check). The ESCV and ESCOSA have been using an independent data service provider (Bloomberg).*

[14] AER, Jemena preliminary decision, October 2015, p. 3-210.

[15] AER, Jemena preliminary decision, October 2015, p. 3-219.

4 CEG assessment against criteria

4.1 Specification of the criteria

44. The NER (and NGR) specify the allowed rate of return objective (ARORO) as follows:

> *The allowed rate of return objective is that the rate of return for a Distribution Network 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 Distribution Network Service Provider.*

45. The criteria used to assess different sources of estimates for the 10 year BBB cost of debt must be designed such that assessment against these criteria promotes the ARORO. In our view, the following criteria do this:

    a. The source is derived from a dataset that best matches the characteristics of debt issued by a benchmark efficient entity (BEE).

    b. The source is derived from a large data set of the type of bonds specified in criterion (a);

    c. The source is derived using a transparent methodology that is accurate and robust – in the sense that the source can be relied on to provide an accurate estimate of the cost of debt for a BEE, and is not unduly influenced by a small number of observations in the dataset;

    d. The source is regularly published by an independent reputable organisation that is not a stakeholder in regulatory determinations;

    e. The source has a track record of accuracy.

46. The reason that the first criterion promotes the ARORO is, we believe, self-evident. If the source is not derived from a dataset that reflects the characteristics of debt issued by a BEE it is unlikely that it will result in an estimate of costs that is commensurate with those incurred by a BEE. By way of example, one characteristic of the debt that a BEE is assumed to issue is that it is long term (around 10 years maturity). If a source arrives at a cost of debt based on a dataset that does not include any long term debt then it is unlikely that it will result in an estimate of costs that is commensurate with the costs of a BEE.

47. Assessment against the second criterion promotes the ARORO because a source can be expected to be more accurate when it is estimated from a larger dataset of the type specified in criterion (b). Once more, consider the inclusion of long dated bonds. One source may have 1 or 2 long dated bonds in its dataset and another may have 10 or 20. The source with the larger number of long dated bonds is

more likely, other things equal, to result in an accurate estimate of costs commensurate with those of a BEE issuing long term debt.

48. Assessment against the third criterion promotes the ARORO because an estimate that is biased and/or not statistically robust (i.e., that is overly sensitive to changes in one or more of the observations in the dataset) is liable to lead to inaccuracy and volatility in the estimated cost of debt that does not reflect volatility in the efficient financing costs of a BEE. A transparent methodology is important to allow for an informed assessment of the accuracy and robustness of a methodology.

49. Assessment against the fourth criterion promotes the ARORO because an estimate that is produced by a stakeholder, or stakeholder's representative, may be perceived as being influenced by the stakeholder such that its accuracy is impaired. It is also important for the estimate to be published on a regular basis in order to ensure that the estimate remains current for a given averaging period, since estimates based on old data will no longer form the best estimate for the circumstances. For these reasons, the fourth criterion generally does not support bespoke estimates formulated by/for a regulator or by/for another party to the regulatory proceedings, but we note that this criterion has to be weighed against the other four.

50. Assessment against the fifth criterion promotes the ARORO because it provides a means for assessing the performance of each source in the past and (in the absence of information that indicates that past performance will be different to future performance) implicitly, assessing the likely future performance of each source.

4.2 Criterion (a): Dataset that best matches the characteristics of debts issued by a BEE

4.2.1 Characteristics of debts issued by a BEE

51. The AER's view is that debt raising practices of privately owned firms should be taken into account when considering issues related to debt financing costs:[16]

> *… we rely on industry norms among the privately owned firms in estimating aspects of the debt methodology, including debt term, credit rating, the use of staggered debt and hedging practices.*

52. We agree that the financing practices of entities engaged in the provision of services similar to those provided by regulated electricity and gas network entities is an appropriate starting point in considering the costs that are likely to be

[16] AER, Jemena preliminary decision, October 2015, p. 3-558.

incurred in workably competitive markets (that is, efficient financing costs).[17] This in turn, will allow that strategy to be costed such that an estimate of the efficient costs of a BEE can be arrived at. However, we recognise that there may be a difference of views as to whether the BEE is a regulated or an unregulated entity with a similar degree of risk as that which applies to the Distribution Network Service Provider. Therefore, we have examined a broad and narrow dataset of business practices in making an assessment of what types of debt BEEs issue.

4.2.1.1 Foreign currency bonds

53. One of the critical differences between potential data sources in estimating the return of debt is the inclusion of bonds issued in foreign currency (and then swapped back into AUD). The RBA source includes a large number of such bonds as does the ERA methodology. By contrast, the Bloomberg and Reuters curves do not include any such bonds (see Appendix B for a full list of constituents in the Reuters curve on 14 December 2015 – all of which are denominated in AUD).

54. Therefore, we have examined both a broad and a narrow dataset of businesses in an attempt to identify an 'industry norm' in relation to the issuance of foreign currency bonds.

55. In doing so, we have started from a broad sample of bonds and loans with S&P credit ratings ranging from BBB- to A and the following criteria as at 7 December 2015:[18]

- Issued by firms incorporated in Australia;
- Issued by firms domiciled in Australia; or
- Country of risk listed as Australia.

56. This defines the broad sample for which there are 588 debt instruments. The percentage of all debt that is issued in AUD is 39% of face value. We also examine the proportion of long dated debt (8 to 12 years maturity) issued in AUD and this is smaller at 21% of face value.

57. We narrow this sample down in a number of ways as set out below:

---

17 We are not suggesting that such entities will face the same risks as regulated electricity and gas network entities, but argue instead that that the efficient financing practices of the former are likely to be sufficiently similar to that of the latter.

18 Bloomberg's search ("SRCH") function can identify both bonds and loans, and we included both categories of debt for this context of identifying the debt issuance characteristics of a BEE. However, cost of debt estimates are usually carried out for bonds alone, since loans are generally not traded on the open market, and are thus difficult to price.

a. by using the Bloomberg Industry Classification System (BICS) to establish a base "Utilities" subset with 53 debt instruments (18 bonds between 8 and 10 years maturity) and 13 unique issuers.[19] The proportion of AUD debt/AUD long term debt for this subset is 33%/14% of face value;

b. Adding APT and Jemena debt (which Bloomberg classifies under energy/pipeline industry) resulting in 89 debt instruments (28 bonds between 8 and 12 years maturity). The proportion of AUD debt/AUD long term debt for this subset is 33%/14% of face value;

c. Subtracting businesses that have no regulated energy transport assets from the set in b. resulting in 79 debt instruments (25 bonds between 8 and 10 years maturity).[20] The proportion of AUD debt/long term debt for this subset is 37%/17% of face value. If we also add unrated bonds by these issuers[21] then the resulting proportions are:

   - 44% of all debt by value is AUD debt (96 debt instruments in total in this category);
   - 17% of all bonds by value with 8 to 12 years maturity is AUD debt (25 debt instruments in total in this category (i.e., unchanged by the inclusion of unrated bonds). The equivalent proportion by number of instruments is 40%.

58. This data suggests that issuance in foreign currency, especially for long dated debt, is largely the norm for Australian businesses with credit ratings between A and BBB-. This is true whether the sample is restricted to utility businesses or not.

59. It is worth considering what may explain the preference of businesses for foreign currency debt issuance. In our view, there are two primary and related reasons:

   - First, the demand for long dated corporate debt is deepest in foreign currency markets, which means that this will often be the least expensive market in which to issue long dated debt. This is consistent with the data that suggests that the use of foreign currency debt is higher for longer dated debt;
   - Second, there are benefits from diversifying funding sources and maintaining a presence (relationship with funders) in a number of markets so that these markets can be used in future as needed.

---

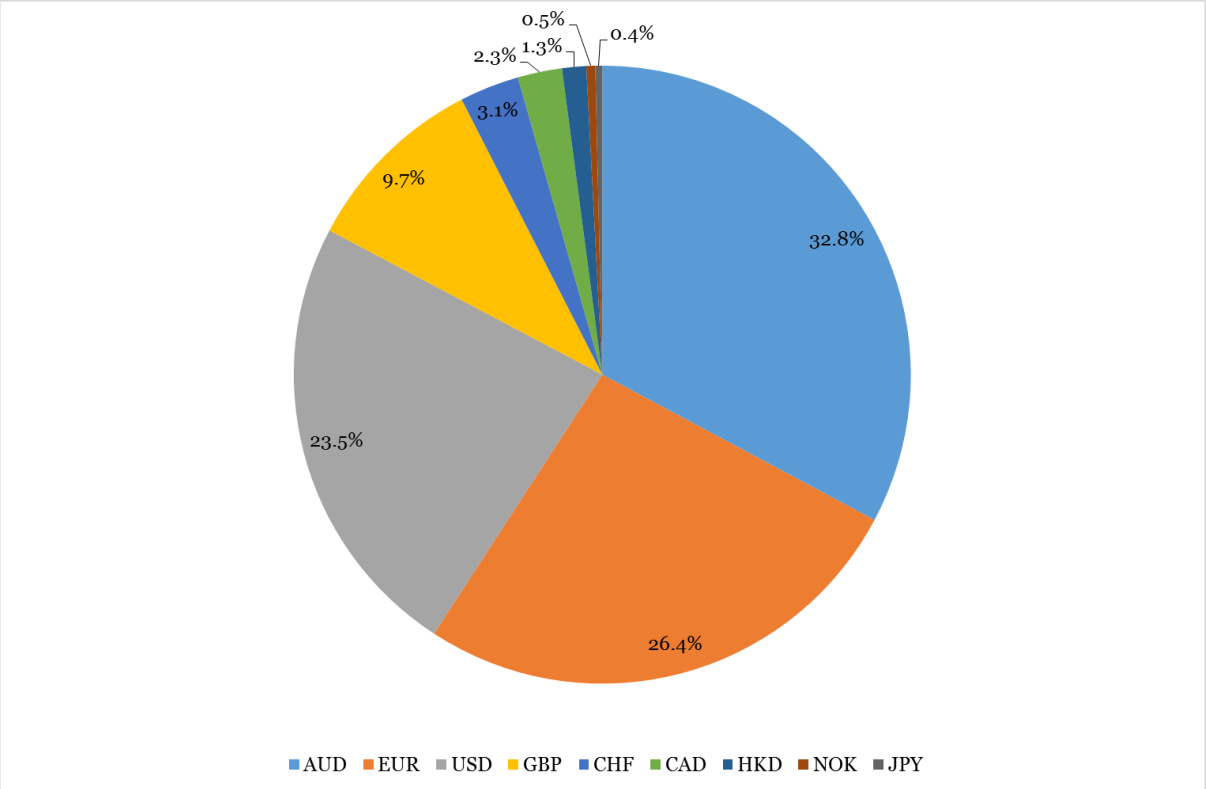
19 AGL Energy, ATCO Gas Australia, AusNet Electricity Services, AusNet Holdings Partner, AusNet Services Holdings, Brookfield Infrastructure, DBNGP Finance, Envestra Victoria, ETSA Utilities Finance, Origin Energy Finance, SGSP Australia Assets, SPI Electricity, United Energy Distribution

20 This removes AGL Energy, Brookfield Infrastructure, and Origin Energy.

21 There are unrated bonds issued by Spark Infrastructure Victoria (a part owner of Powercor/Citipwer/SAPN), Powercor Australia, DBNGP Finance, United Energy Distribution, and CitiPower.

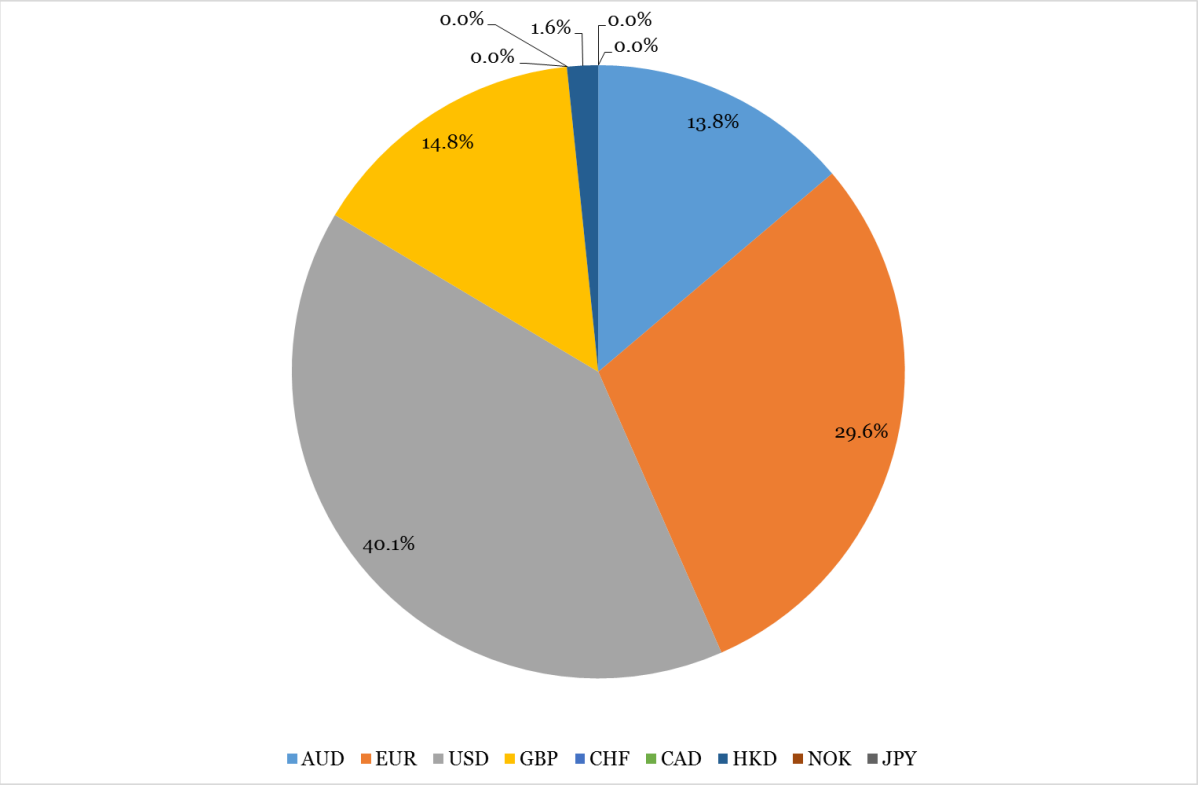
60. The following two charts provide more detail on the currency of issuance for our narrowest sample (utilities with regulated activities rated and unrated bonds). Appendix A provides the same details for all samples. It can be seen that USD, Euro and GBP issues dominate the foreign currency issues and, for debt with 8-12 year debt terms, are each individually more important than AUD issues.

Figure 9: Currency of issue for narrow sample including unrated debt – all debt terms (% of face value)



Source: Bloomberg, CEG analysis

Figure 10: Currency of issue for narrow sample including unrated debt – 8-12 year debt terms only (% of face value)



Source: Bloomberg, CEG analysis

61. Our findings are in contrast to the views expressed by Lally:[22]

> *Thirdly, the use of a bond index that includes foreign currency bonds implies that they will be weighted in proportion to their inclusion in the index rather than in proportion to their usage by Australian regulated energy businesses. Amongst these firms, PwC (2013, pp. 18-19) estimates that 25% of the debt (presumably in face value terms) is foreign-currency bonds. By contrast, Arsov et al (2013, page 3) report that over 80% of the BBB bonds in the RBA index are foreign-currency ones (in face value terms). Thus, the RBA index overweights foreign-currency bonds at the present time by even more than the BVAL underweights them, and the consequence is that the RBA estimate for the cost of debt will exhibit greater bias than the BVAL if the cost of debt on local-currency bonds differs from that on foreign ones (of the same term and after the currency swaps).*

[22] Lally, Implementation issues for the cost of debt, November 2014 p. 13.

62. The PwC,[23] report identifies only listed regulated businesses (which gives five businesses). However, the estimates of foreign currency issuance are unreliable. PwC reports SKI (Spark Infrastructure) as having zero debt issued in foreign currency. However, when the relevant operating companies of which it owns 49% (Powercor, SAPN and Citipower) all have foreign currency debt.[24] It may be that PwC has only picked up debt issued by the ASX listed legal entity (and not the regulated operating companies that actually build and maintain the assets). If so, this would also affect PwC's estimate for DUET which is a part owner in several operating companies.

63. A related problem with the PwC estimates relates to Envestra which it attributes zero foreign currency debt to. However, it is apparent that Envestra (now AGN) has around half of its debt in foreign currency.[25] These errors make the PwC estimates an unreliable basis on which to form a view on the number of foreign currency issues by regulated entities.

4.2.1.2 Bonds with options attached

64. Another difference between potential sources is the inclusion of bonds with optionality features. The RBA source includes a large number of such bonds as does the ERA methodology. By contrast, the Bloomberg curve does not appear to include any such bonds and neither does the Reuters curve (see Appendix B for a full list of constituents in the Reuters curve on 14 December 2015 – none of which are callable).

65. Therefore, we have examined both a broad and a narrow dataset of businesses in an attempt to identify an 'industry norm' in relation to the issuance of bonds with optionality features. Once more, we have started from the same broad sample of 588 debt instruments. The percentage of all debt that is issued without optionality features is 66%. We also examine the proportion of long dated debt (8 to 12 years maturity) issued in AUD and this is smaller at 62%.

66. We narrow this sample down in a number of ways as set out below:

    a. by using the Bloomberg Industry Classification System (BICS) to establish a base "Utilities" subset with 53 debt instruments (18 bonds between 8 and 10

---

23 PwC, A cost of debt estimation methodology for businesses regulated by the Queensland Competition Authority, June 2013, Table 2.2 on p. 19.

24 Chairmont, Financing practices under regulation, October 2015, p. 69 and p. 72.

25 Chairmont, Financing practices under regulation, October 2015,p. 67.

years maturity) and 13 unique issuers.[26] The proportion of debt with no optionality features for this subset is 86%/94% of total face value;

b. Adding APT and Jemena debt (which Bloomberg classifies under energy/pipeline industry) resulting in 89 debt instruments (28 bonds between 8 and 10 years maturity). The proportion of debt with no optionality for this subset is 77%/83% of total face value;

c. Subtracting businesses that have no regulated energy transport assets from the set in b. resulting in 79 debt instruments (25 bonds between 8 and 12 years maturity).[27] The proportion of debt with no optionality for this subset is 73%/80% of total face value. If we also add unrated bonds by these issuers[28] then the resulting proportions are:

   - 66% of all debt has no optionality (96 debt instruments in total in this category);
   - 80% of all debt with 8 to 12 years maturity has no optionality (25 debt instruments in total in this category (i.e., unchanged by the inclusion of unrated bonds).

67. This data suggests that issuance of debt with optionality features is common but does not dominate the portfolio of Australian businesses (utilities and otherwise).

4.2.1.3 Long dated bonds and long dated bonds issued by regulated energy NSPs

68. The BEE is assumed to issue long dated (10 year maturity) debt.[29] To the extent that the BEE is a regulated energy NSP then this may also be relevant criteria. In this regard we note that, the Bloomberg[30]/Reuters[31] dataset had only one bond with maturity greater than 6.5 years; a bond issued by Asciano with 9.5 years

---

26 AGL Energy, ATCO Gas Australia, AusNet Electricity Services, AusNet Holdings Partner, AusNet Services Holdings, Brookfield Infrastructure, DBNGP Finance, Envestra Victoria, ETSA Utilities Finance, Origin Energy Finance, SGSP Australia Assets, SPI Electricity, United Energy Distribution

27 This removes AGL Energy, Brookfield Infrastructure, and Origin Energy.

28 The sample contains unrated bonds that are issued by Spark Infrastructure Victoria (a part owner of Powercor/Citipwer/SAPN), Powercor Australia, DBNGP Finance, United Energy Distribution, and CitiPower.

29 This assumption is also supported by empirical evidence. For example, see: CEG, letter to Warwick Anderson, General Manager Network Regulation Branch, Australian Energy Regulator, dated 11 November 2013 (which describes practice of regulated businesses) and PwC, A cost of debt estimation methodology for businesses regulated by the Queensland Competition Authority, June 2013, p. ii (which describes practice of Australian businesses more generally).

30 As at 30 October 2015.

31 As at 14 December 2015.

maturity. Thus these sources had one long dated bond and no long dated bonds issue by regulated energy NSPs.

69. By contrast the RBA/ERA sources had 14/17 bonds with maturity of greater than 8 years and 3/5 of these were issued by regulated energy NSPs (all of which are issued by APA).

4.2.1.4 Bonds issued by 'foreign' companies

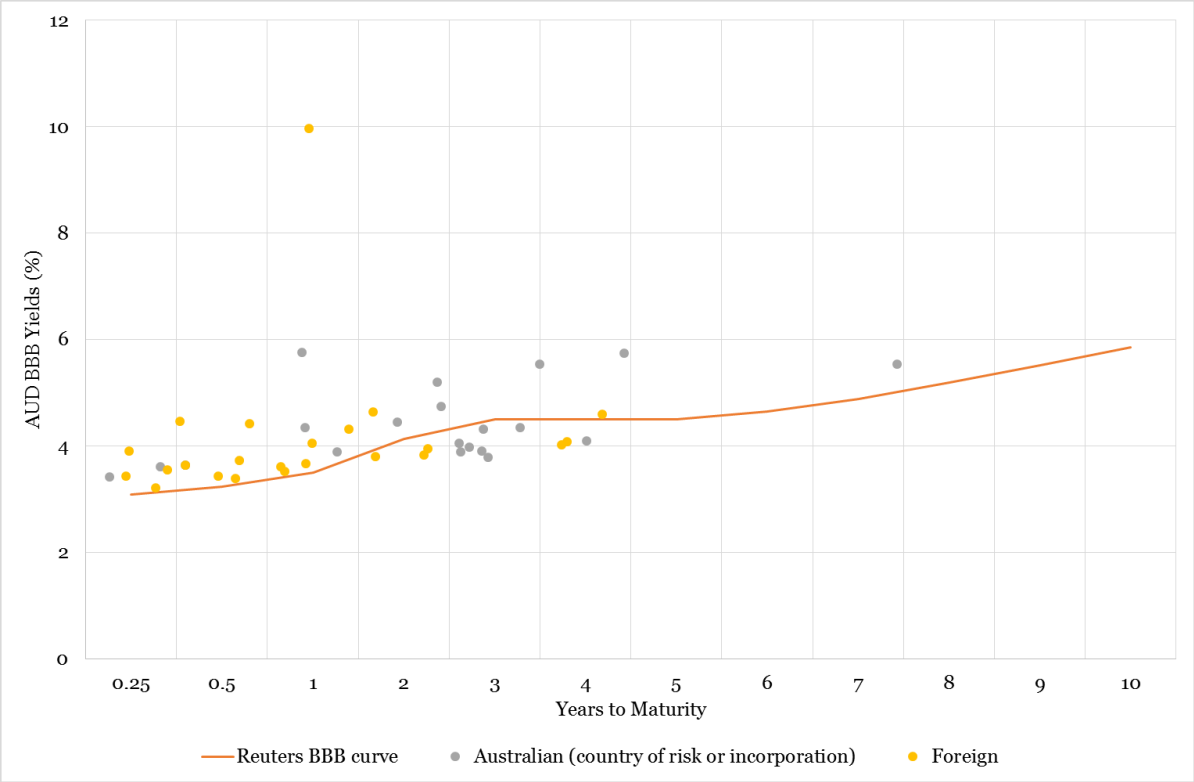
70. The RBA and ERA bond samples explicitly apply a criterion that the country of incorporation/risk is Australia. The Bloomberg curve also appears to have applied a similar criterion.[32] However, the Reuters curve includes AUD denominated bonds issued by companies whose primary operations/country of risk is not Australian. If, notwithstanding that they have operations in Australia, we characterise these companies as 'foreign' then as at 14 December 2015 the Reuters dataset included 19 AUD bonds issued by 8 foreign companies[33] that were not classified by Bloomberg as having Australia as the country of risk or incorporation. The longest dated of these was an Emirates bond with 6.2 years to maturity.

71. We assume that the country of risk and incorporation for a BEE under the NER and NGR would be Australian. That said, it is an open question as to whether the inclusion of foreign companies that issue in AUD and have some operations in Australia (as do all of the 'foreign' companies in the Reuters sample) will lead to bias in the estimates. In this regard we note that most of the 'foreign' bonds have yields that lie below the Reuters curve on 14 December 2015.

[32] Bloomberg has not listed this criterion explicitly, but our analysis of the underlying bond constituents of the BVAL curve suggests that this is the case.

[33] Morgan Stanley, Goldman Sachs, Daiwa, Citigroup, Anglo American, Ford Motor Credit and Emirates.

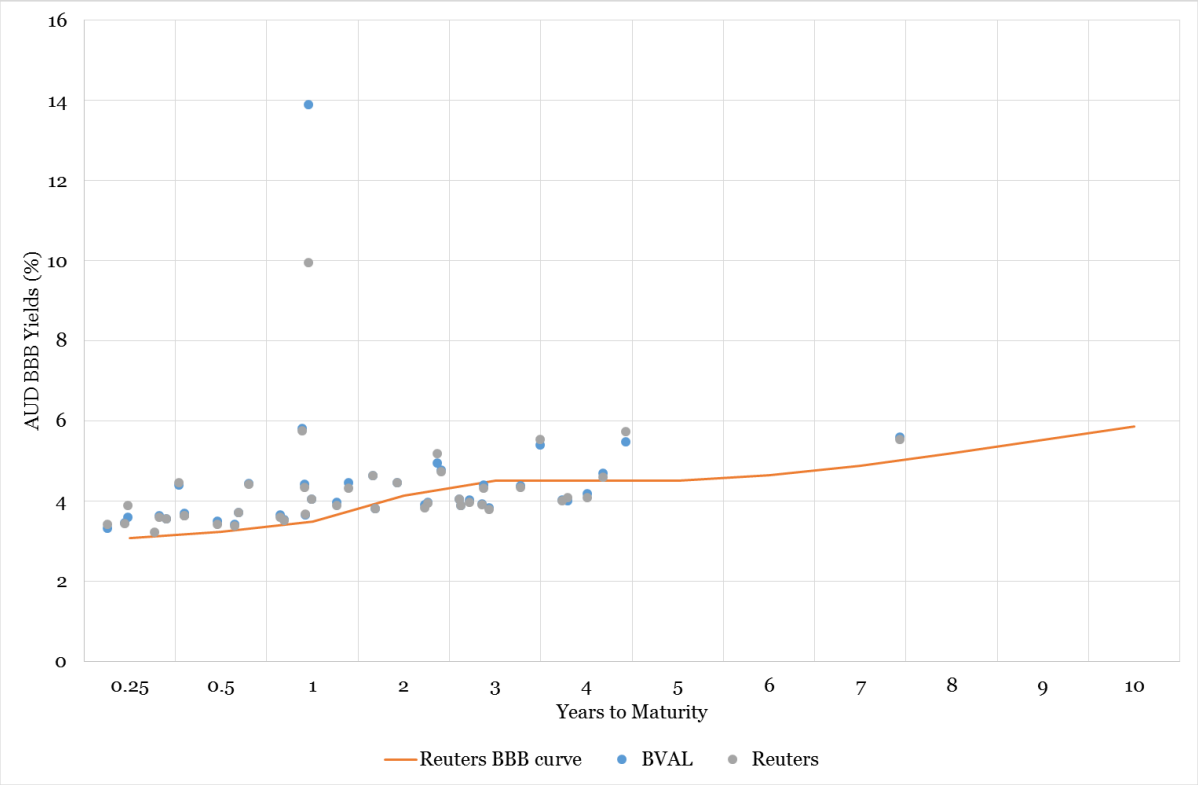
Figure 11: Reuters constituent – domestic vs foreign



Source: Reuters, Bloomberg, CEG analysis

72. It should be noted that the above chart compares the Reuters curve to Reuters estimates of yields for the Reuters constituents. This is the only place in this report where BVAL yields for individual bonds are not shown. However, it is worth noting that BVAL and Reuters yields are very similar as can be seen in Figure 12 below, also for 14 December 2015. This shows that for all but one bond (issued by Anglo American) where Reuters has a materially lower yield than BVAL, the Reuters and BVAL yields for individual bonds are very similar. Excluding the Anglo American bond, the average difference in yields is just 0.7bp.

Figure 12: Reuters constituent – BVAL vs Reuters individual bond yields



Source: Reuters, Bloomberg, CEG analysis

4.2.2 Assessment

Table 3: Industry norm vs various sources

	Benchmark/Industry norm	Bloomberg#	Reuters^	ERA#	RBA#
Foreign currency bonds	Approx. 83% by $* Approx. 60% by #*	0%	0%	75% by $ 51% by#	74% by $ 54% by #
Long term bonds (>8 years maturity)	Benchmark =10 years	1	1	17	14
Bonds greater than 8 years maturity issued by regulated NSPs	Benchmark = ?**	0%	0%	5	3
Bonds with optionality	20% by $* 12% by #*	0%	0%	27% by$ 18% by #	20% by$ 14% by #
'Foreign'^^ bonds (issued in AUD)	0	0	19	0	0

* For bonds with maturity between 8 and 12 years. ** Whether the BEE is a regulated NSP or an unregulated firm with a similar degree of risk is unclear. #30 October 2015. ^14 December 2015. ^^Neither country of risk nor incorporation in Australia.

73. The RBA and ERA sources are demonstrably the best relative to criterion a. Foreign currency issuance is the dominant form of issuance for long term bonds in

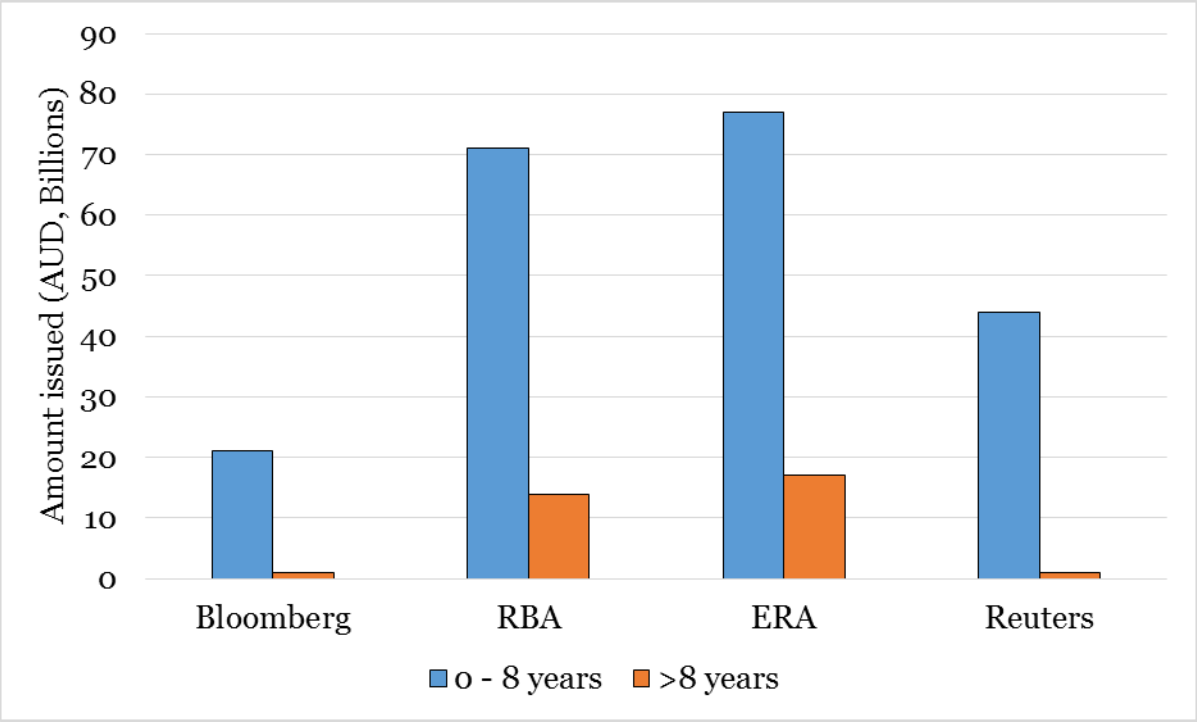
the industry (narrowly or widely defined). The Bloomberg and Reuters bonds do not include any foreign currency bonds. Moreover, because foreign currency bonds are the primary source of long term debt issuance, the Bloomberg and Reuters datasets are also critically under-represented in relation to these bonds – both in general and by regulated energy NSPs in particular. Similarly, the industry norm is to issue some bonds with optionality features, but Bloomberg and Reuters do not include any of these bonds in their datasets.

4.3 Criterion (b): A large dataset that is consistent with criterion a

74. The underlying sample of bond constituents that is used to obtain the estimated cost of debt should be derived from a sufficiently large dataset. This is necessary in order to ensure that the resulting curve is not unduly influenced by a small number of bonds.

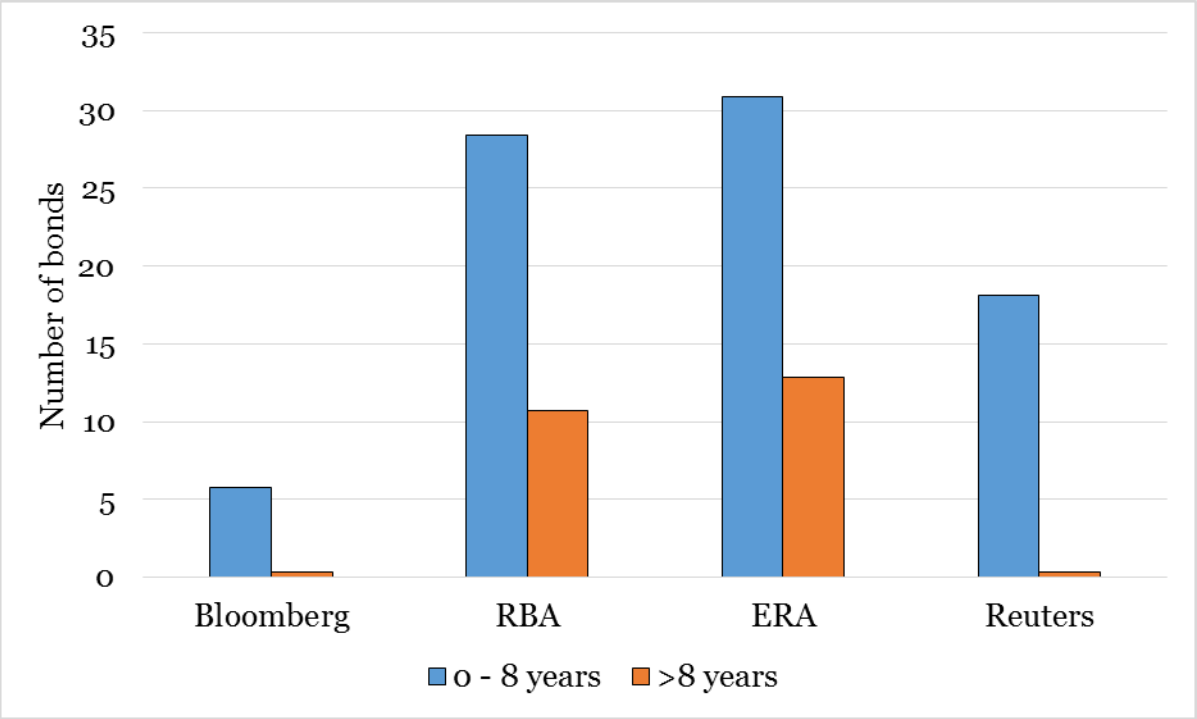
75. The RBA and ERA curves both fulfil this criterion. As at 30 October 2015, the RBA curve uses a sample of 85 bonds, while the ERA curve has a sample of 94 bonds. Of these, 14/17 (RBA/ERA) have maturities in excess of 8 years maturity. The Reuters curve has 45 bonds but only one with more than 8 years to maturity. By contrast, the Bloomberg sample has only 22 bonds in total and, as is the case for the Reuters curve, has only 1 bond with more than 8 years maturity. The same relativities exist when expressed in terms of the value of bonds (as opposed to number of bonds). The following charts illustrate these differences.

Figure 13: Value of bonds in dataset by maturity



Source: Bloomberg, ERA, RBA

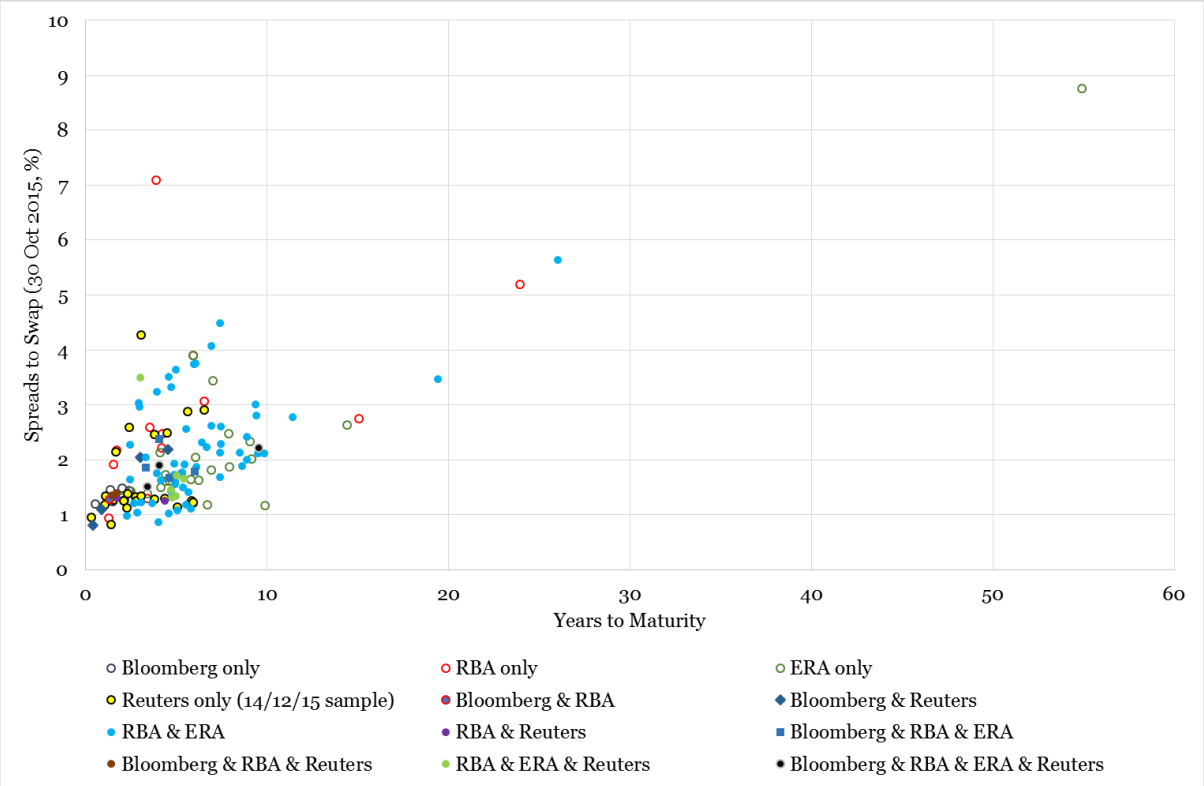
Figure 14: Number of bonds in dataset by maturity



Source: Bloomberg, ERA, RBA

76. The RBA curve includes most of the observations in the Bloomberg curve plus numerous additional bonds. Not all bonds in the Bloomberg sample are in the RBA sample because, for example, the RBA excludes bonds with less than 1 year to maturity or issues by financials. Similarly, not all the bonds used to compile the Reuters curve are used to compile the Bloomberg curve. This is illustrated by showing the average yield[34] as at 30 October 2015 for the widest set of bonds and colour coding these in terms of the various subsets that they belong to. For example, Reuters only, Reuters and RBA only, Bloomberg Reuters and RBA only etc.

Figure 15: Various bond samples for 30 October

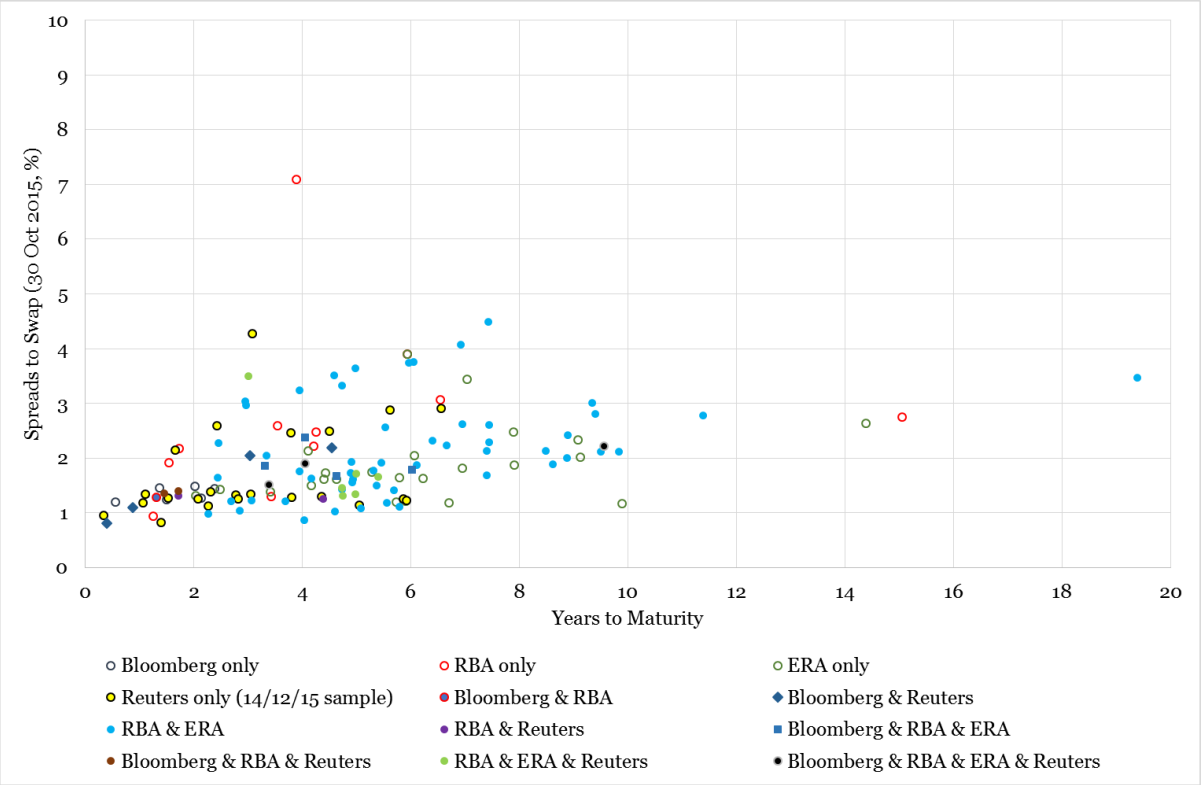


Source: Bloomberg, RBA, ERA, Reuters, CEG analysis

77. In order to focus on bonds with closer to 10 years to maturity we show the same figure with the horizontal axis limited to 20 years maturity.

34 Here, as in all other places in this report unless explicitly stated otherwise, yields for individual bonds are Bloomberg BVAL estimates and are reported on a semi-annual basis.

Figure 16: Various bond samples for 30 October (up to 20 years maturity)



Source: Bloomberg, RBA, ERA, Reuters CEG analysis

78. The smaller size of the Bloomberg and Reuters samples (especially at the long end) exposes estimates from these samples to potential inaccuracies from not giving sufficient or any weight to available information (from the wider sample). In section 4.4 we discuss evidence that this has indeed been the case.

4.4 Criterion (c): Derived from a transparent and robust method

79. It is important for the curve-fitting method that is used to derive the 10-year cost of debt estimate to be a transparent one that allows the curve-fitting procedure to be evaluated and verified by stakeholders. In the absence of such transparency, it may be difficult or simply not possible to be satisfied as to whether use of the data source will promote the ARORO. Transparency also allows the stakeholder to assess how the curve is likely to move in the face of changing market conditions and data, which is particularly important since the formulaic requirement set out in NER cl. 6.5.2(l) and NGR r.87(12) means that no further broad consultation can be undertaken during the regulatory cycle. Sufficient information is therefore

required in order to ensure that the curve will behave appropriately over the regulatory cycle, and as a cross-check during the regulatory cycle itself.

80. The RBA curve fulfils criterion (c) the best. It has transparently described its process for sample selection and how it arrives at estimates from the sample.[35] Specifically, estimates are derived non-parametrically using weights obtained from the Gaussian kernel and issue amounts.[36] [37] This approach is simple and transparent, and can estimated in a formulaic manner. In addition, the use of the Gaussian kernel ensures that individual bonds and outliers will generally not receive excessive weight in any particular estimate; provided that there are sufficient bonds with maturities close to the target tenor.

81. We also note that the ACCC Regulatory Economics Unit (REU) has previously reviewed the RBA's econometric methodology, and although the REU raised a number of concerns regarding issues such as the asymmetry of bond tenors in the sample – which the AER currently addresses through extrapolation to a 10-year effective tenor – the REU was nevertheless able to assess and evaluate the methodology based on the RBA's description.[38] This supports our view that the RBA's estimation methodology is transparent.

82. The ERA estimate is obtained as a simple average of a Gaussian kernel, Nelson-Siegel curve, and Nelson-Siegel-Svensson curve. ATCO's submissions to the ERA include a number of CEG reports highlighting several concerns regarding the estimation of the Nelson-Siegel and Nelson-Siegel-Svensson curves, and we note that the process in which these issues were resolved with the ERA was a fairly

35 RBA, New Measures Of Australian Corporate Credit Spreads.

36 Models estimated via non-parametric estimation do not make assumptions about the functional form of the relationship between the independent and dependent variables. That is, the yield curve is not assumed to conform to a particular shape, and is instead estimated from the observations alone.

37 Non-parametric estimation using the Gaussian kernel estimates the yield for any particular target tenor as a weighted average of the yields of the bond sample, with the weights calculated according to a normal distribution. This is then multiplied by the bond issue amount. Thus, the yields of bonds with higher issue amounts and with maturities closest to the target tenor will have the greatest influence on the estimated yield.

The RBA assumes a standard deviation of 1.5. In the present context, this means that bonds with residual maturities less than 5 years or greater than 15 years will generally have very little weight on the 10-year yield estimate (as long as the sample is fairly populated around the 10-year tenor and no individual bonds have issue amounts that are several multiples greater than the other bonds).

38 ACCC, Regulatory Economic Unit, Return on debt estimation: a review of the alternative third party data series, Report for the AER, pages 37-40.

lengthy one. The ERA published its final methodology in September 2015,[39] and we regard this finalised methodology as transparent.

83. The Bloomberg and Reuters curves do not meet criterion (c), because their estimation methodology is proprietary and the available information about how the underlying bond constituents are selected, as well as how the BVAL curve is derived from the yields of said bonds, are largely unknown aside from some high-level descriptions that are insufficient for replicating their estimates. The high level descriptions of Bloomberg methodology cannot always be relied on as accurate – as noted by the ACCC Regulatory Economics Unit who observe that the descriptions do not appear to match actual practice,[40] and that "[v]ery little non-confidential detail is available on Bloomberg's curve-fitting methodology to enable a comparison with the RBA's curve-fitting methodology".[41]

84. However, it is possible to draw inferences from the past behaviour of the Bloomberg 10 year estimate (along with the behaviour of the bond yields in its sample of constituents), including that of the BFV curve.[42] This is covered in Sections 4.4.1 and 4.4.2.

4.4.1 Bloomberg's 10 year estimate appears to receive high influence from a sample of 1 (one)

85. The average BVAL curve over the 20 trading days to 30 September is shown in Figure 17, along with its bond constituents. The bond with the longest residual maturity is an Asciano bond (EK907291 Corp) with 9.5 years to maturity, followed by a Qantas bond (EK784130 Corp) with 6.5 years residual maturity. Depending on Bloomberg's curve-fitting methodology, the Asciano bond could have a very high influence on the 10-year BVAL estimate. In this regard we note that over the

39 ERA, Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems, September 2015.

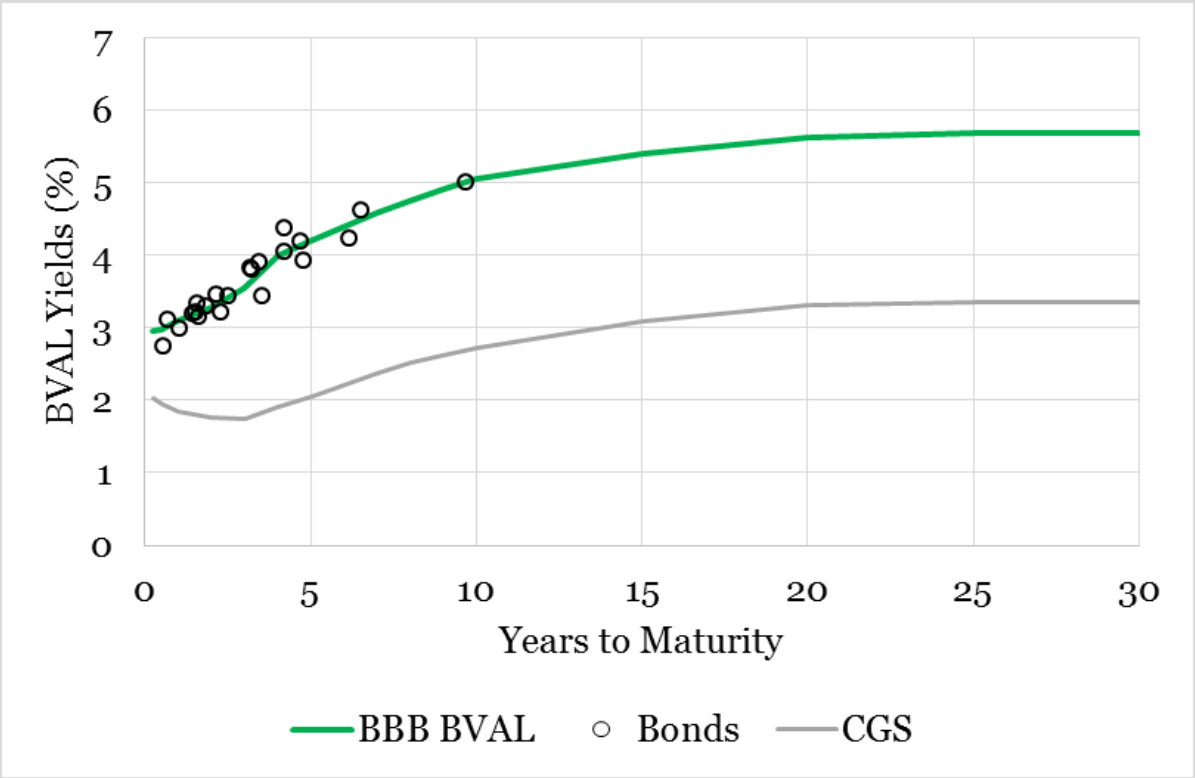
40 ACCC, Regulatory Economic Unit, Return on debt estimation: a review of the alternative third party data series, Report for the AER. See footnote 39 on page 18.

41 ACCC, Regulatory Economic Unit, Return on debt estimation: a review of the alternative third party data series, Report for the AER, page 14. We note that the report also expressed concerns regarding the RBA's conversion of foreign-denominated credit spreads into AUD spreads, but CEG has nevertheless been able to closely replicate the RBA's estimates of spreads to swap.

42 Although the BFV and BVAL estimates arguably come from different curves, both suffer from the same lack of transparency in terms of curve fitting. In the absence of further information to suggest that the curves are fitted using methods that are materially different, and given that both curves are estimated by the same publisher, we consider it appropriate to evaluate the suitability of the BVAL curve by analysing the longer time series from the BFV curve. In any case, if the BVAL curve is to be viewed as a completely separate curve, then this would reduce its assessment in criterion (e), since the BVAL curve only started being published in 2014 (backcast, intermittently both in terms of dates and maturities, to mid-2009).

20 trading days to 30 September the average BVAL 10 year yield was almost identical to the average yield on the Asciano bond (5.06% vs 5.01%).

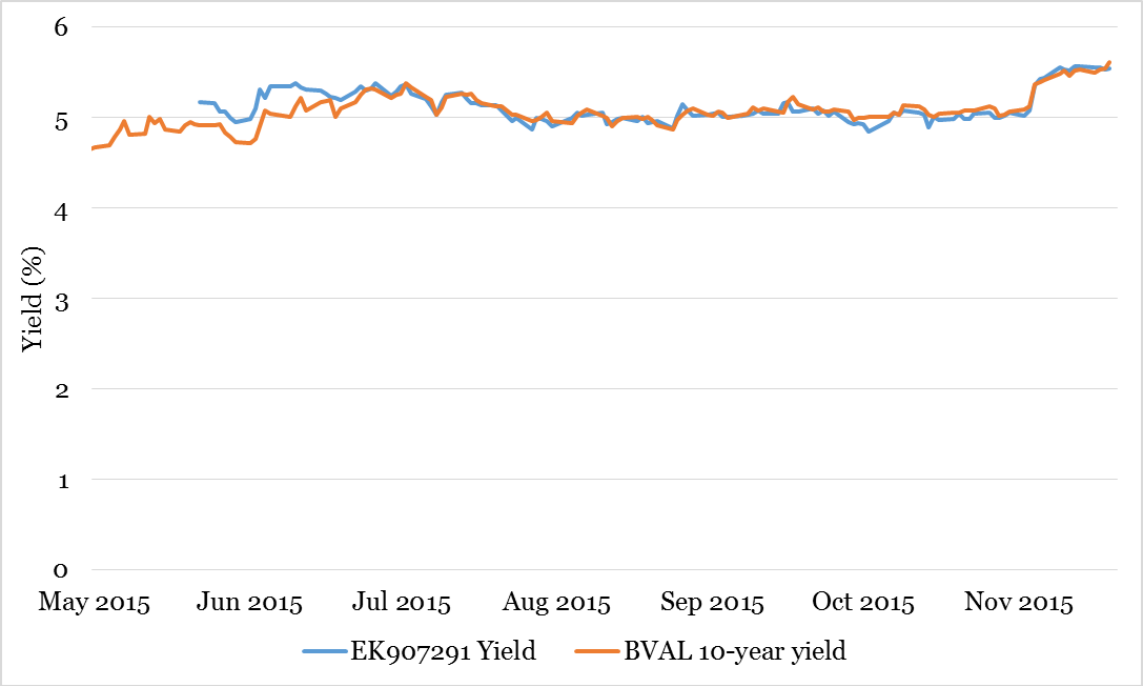
Figure 17: BVAL curve vs constituents 20 trading days to 30 September 2015



Source: Bloomberg, CEG analysis

86. It is also clear from Figure 18 below that the BVAL 10 year yield and the yield of the Asciano bond have moved more or less in 'lock step' since at least July 2015 (with only small and transient departures between the two).

Figure 18: Asciano (EK907291) bond yield vs BVAL 10 year yield



Source: Bloomberg, CEG analysis

87. This suggests that the yield of a single bond is playing a very important role (and most likely, a determinative role) in determining the BVAL yield at 10 years. Of course, we do not know this for certain because the Bloomberg curve-fitting methodology is proprietary and so it is not possible to assess its methodology and how it would produce a curve in these circumstances. It is possible that Bloomberg's methodology gives material weight to a range of other factors which just happen to have caused the BVAL 10 year yield to 'look like' it is being determined based on a single bond yield when in reality a more sophisticated methodology is being deployed. However, in the absence of a transparent description of a replicable methodology it is only possible to infer Bloomberg's methodology from the available facts.

88. In our view, the above analysis is sufficient to conclude that, at least over the period examined, the Asciano bonds played the role of a 'high leverage point' in the Bloomberg regression methodology (whatever that methodology may be). A high leverage point is said to exist where an observation at extreme or outlying values of the independent variables exists such that the lack of neighbouring observations means that the fitted regression model will pass close to that particular observation.[43]

[43] Everitt, B. S. and Skrondal A., (2010). Cambridge Dictionary of Statistics. 4th Edition, Cambridge University Press, p. 247.

89. Of course, given that we do not know the BVAL methodology with certainty we cannot perform standard statistical methods (such as jackknifing)[44] in order to investigate how the curve estimates will change when individual bonds are omitted. Nonetheless, the analysis above suggests that the Asciano bond is a high leverage point given whatever methodology the Bloomberg is applying.

4.4.2 Bloomberg's extrapolation appears to be based on the CGS curve

90. Notably, the residual maturity of the Asciano bond will decrease over time. It is currently 9.5 years and will decrease further in maturity over the remainder of the regulatory period to be less than 6 years to maturity by the last year of the regulatory period. Given that Bloomberg's bond sample selection criteria are unknown, there is no way to predict with any certainty whether a new long-maturity bond will be added in the future.

91. In addition, there is no comprehensive public documentation regarding how Bloomberg extrapolated its BVAL curve estimate to 10 years, other than some brief descriptions regarding the use of reference curves.

92. We have previously made the observation that the yields of the extrapolated tenors appear to have a shape that is almost identical to the Australian CGS curve.[45] This observation was made when the Bloomberg sample's longest dated bond was less than 7 years maturity but Bloomberg was nevertheless publishing a BBB curve out to 30 years. We previously noted:[46]

> *Figure 17 below charts the Bloomberg's BVAL and Government yield curves as well as the option-adjusted yields for BVAL constituent bonds on 14 April 2015. In addition we have also shifted the Bloomberg government bond yield curve upwards so that its shifted value is exactly equal to the Bloomberg BBB BVAL value at 7 years maturity. This allows us to assess whether the shape of the Bloomberg BBB BVAL curve beyond 7 years is determined by the shape of the Bloomberg Government yield curve beyond 7 years.*

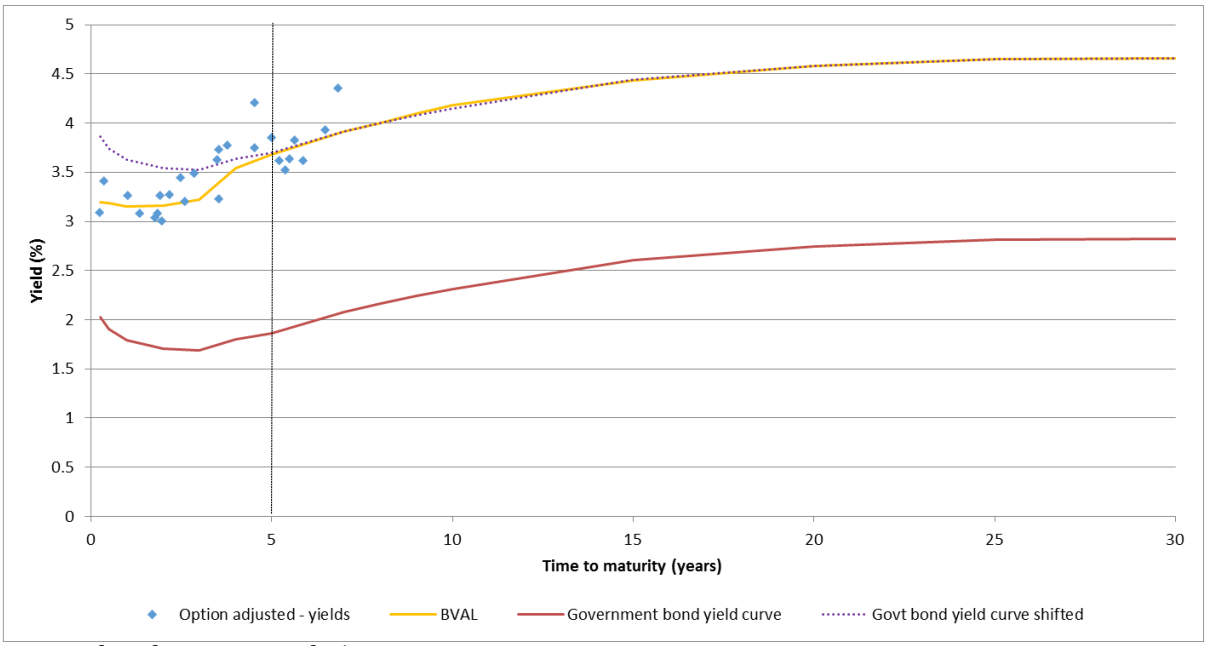
---

44 Jackknifing is a statistical method that repeatedly re-estimates the curve with one observation left out. In this case, we would be interested to find out how the BVAL estimates change when the Asciano bond is left out of the sample, but this cannot be done without detailed knowledge on how the BVAL curve is fitted.

45 CEG, The hybrid method for the transition to the trailing average rate of return on debt, a report for AGN, June 20915, section 7.1.

46 CEG, The hybrid method for the transition to the trailing average rate of return on debt, a report for AGN, section 7.1.

Figure 19: Reproduction of Figure 17 from AGN report. BVAL curve, BVAL constituents and Bloomberg government bond yield curve(14 April 2015)



Source Bloomberg, CEG analysis

93. We concluded that: [47]

> *It is clear that Bloomberg has used the shape of the Government yield curve to extrapolate to 30 years. It is clear from this figure that, beyond around 5 years, the Bloomberg BBB BVAL curve has essentially the same shape as the Bloomberg government bond yield curve.*

94. We noted that this was consistent with how Bloomberg, when responding to a request for explanation from CEG, had described its methodology for extrapolation: [48]

> *When queried by CEG on how Bloomberg could construct a BBB yield curve out beyond the available BBB bond data Bloomberg responded as follows:*[49]
>
> > *On April 14, 2015, BVAL curve methodology has introduced enhancements to curve construction to enable curve derivation for*

47 CEG, The hybrid method for the transition to the trailing average rate of return on debt, a report for AGN, section 7.1.

48 CEG, The hybrid method for the transition to the trailing average rate of return on debt, a report for AGN, section 7.1.

49 Bloomberg correspondence with CEG dated 14 May 2015.

> *tenors three months to 30 years. Curve derivation is now using the respective government benchmark as the underlying reference curve to enable curve construction over the full maturity spectrum, in the absence of data constituents. That's the reason why you noticed AUD Corporated BBB BVAL curve has suddenly been extended from 7 to 30 years starting from April 14, 2015.*

This is consistent with Bloomberg's BVAL curve methodology document which states:[50]

> *BVAL utilizes an extensive library of reference curves to help construct term structure shape through to 30-year point for sparsely populated curves*

95. In response, Lally states that:[51]

> *Thirdly, CEG's claim that Bloomberg extends its curve beyond seven years by simply using the CGS curve is rejected by Bloomberg themselves. In particular, on 12 September 2015, Mr Varun Pawar (Head of Bloomberg Evaluated Pricing, New York) confirmed the following statement put to Bloomberg by the AER:*
>
> > *"While the government benchmark (CGS yields) influences the shape of the BVAL curve (as the "underlying reference curve"), the shape of the curve is also influenced* ***at all points along its term structure by the underlying constituent bonds****. Therefore, BVAL curve estimates will, at all points along its term structure, reflect both the underlying risk free/base rate component, and a DRP/margin component. Depending on both* ***the underlying constituent bonds*** *and the term structure of the government benchmark, this extrapolation may be either steep or shallow, but it will incorporate both of those inputs."*

96. However, there is nothing in this statement that is a rejection of our analysis and conclusion that, *beyond the maturity of the constituent bonds*, Bloomberg appears to extrapolating with the effect that, beyond that point, the shape of the BBB corporate bond curve is the same, or very similar to, that of the CGS curve. Mr Pawar has not explicitly stated the weight that each component has on the resulting BBB estimates. As the above analysis has shown, the shape of the CGS curve appears to have a considerably greater influence on the extrapolation as compared to the underlying constituent bonds. Moreover, our view is based on empirical observation. Lally may reasonably read into the above words that

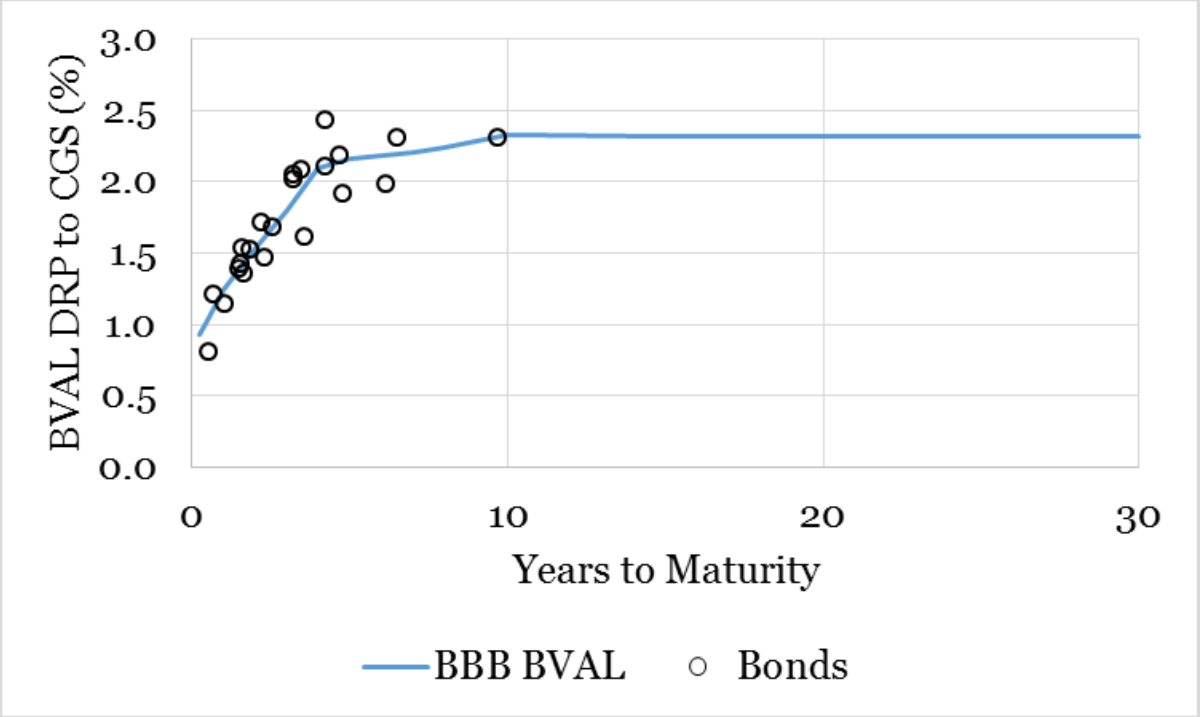
50 Bloomberg, *BVAL curves,* p.3.

51 Lally, Review of Submissions on implementation issues for the cost of debt, October 2015, p. 14.

something else could be true but simple examination of Figure 19 above (reproduced from our June 2015 report for AGN) and Figure 20 below which is an updated version of the same analysis clearly shows that the actual practice is consistent with our description.

97. That is, it is possible to be definitive that the Bloomberg extrapolation tends to be very similar to the shape of the CGS curve (i.e., a zero increase in DRP relative to CGS). This is illustrated in Figure 20 below over the 20 trading days to 30 September 2015, where the spread to CGS is almost flat for a time to maturity exceeding 10 years.

Figure 20: BVAL spread to CGS curve vs constituents 20 trading days to 30 September 2015



Source: Bloomberg, CEG analysis

98. However, it is ultimately correct that it is not known precisely how the extrapolation is carried out, as well as the relative combined influence of the underlying bond constituents compared to that of the CGS curve. Indeed, there is currently no way for stakeholders to replicate the BVAL estimates from the yields of the constituent bonds using the information available.

4.5 Criterion (d): Regularly published by an independent reputable organisation

99. The rules require any annual updating to the allowed cost of debt to be an automatic application of a formula. This is simplest to implement if it is possible to rely on regularly updated published values from a source that has a positive reputation that it can be expected to seek to maintain/build on over the regulatory period by continuing to publish accurate estimates over that period.

100. The alternative is establishing a predetermined formula for how the best source in a given year will be selected from the available sources (or a set of mechanical steps regarding how a bespoke estimate will be arrived at). We consider that this approach is possible and that the ERA has set out such a formula for deriving bespoke estimates (albeit a formula with many steps). However, to the extent that such an approach is eschewed in favour of nominating one, or a set of, independent third party sources then it becomes critical that these sources already have a reputation for accuracy of their estimates and have the incentive to maintain that reputation.

101. We also note that the rules do not preclude an independent organisation from making subjective adjustments to its methodology during the regulatory period. In such circumstances, the resulting cost of debt estimates can still be applied in a mechanical fashion as part of the regulatory process. As was argued previously, the chosen independent organisation should have a positive reputation associated with its publication which it can be assumed to seek to maintain over the regulatory period (which will reduce the risk that any amendments to its method are carried out in a haphazard manner which may lead to increased errors in its published estimates). By contrast, in a predetermined formula (such as the ERAs) all possible changes in circumstances that might give rise to the desire to change the methodology would need to be anticipated in advance and the response written into the predetermined formula.

102. Independence from the regulatory process may also be another advantage. A source that is not independent of the regulatory process may be perceived as allowing the interests of one set of stakeholders to influence their estimate. This would be perceived as being likely to lead to a less accurate estimate of the efficient financing costs of a BEE.

103. For our current purpose, the BVAL, RBA, and Reuters sources are all regularly published by reputable independent organisations, in the sense that all three organisations publish curves at least monthly but not for regulatory determinations, and any subjective adjustments that they make to their estimates

can be deemed to arise out of the specific context for which the curves are produced (which is not a regulatory proceeding).[52]

104. The ERA does not publish its curve regularly and is not independent of the regulatory process. While the ERA is obliged to make decisions that promote the National Electricity Objectives and National Gas Objectives (and, presumably, promote the ARORO in support of the NEO/NGO), nevertheless, the ERA is less independent than other third party sources of estimates and is only required to publish for the decisions it makes (and therefore cannot be relied upon to publish curves at other times).

4.6 Criterion (e): track record of accuracy

105. The final criterion that we propose is that the estimates should have a track record of historical accuracy. There appears to be a general agreement amongst experts that the RBA curve has been more accurate than the Bloomberg published curves.

106. CEG has previously, in numerous reports, argued that the published Bloomberg fair value curve did not behave appropriately during the global financial crisis (GFC). For example, in a June 2009 report for Country Energy focusing on market conditions in May 2009 (in the midst of the GFC) we made the following conclusion – echoing many of the themes in this 2015 report: [53]

> *On the basis of the evidence in this report, I do not consider that sole reliance on the Bloomberg fair value estimates for estimating the benchmark rate (as per the AER methodology) is reasonable. Such a method, when measured against the criteria developed in section 2 would perform poorly.*
>
> *i. It would not reflect a representative yield at the time of issue for 'typical' corporate bonds with a maturity of 10 years and a BBB+ long-term credit rating from Standard & Poor's. Rather, it would in effect rely almost entirely on the Bloomberg estimate of the fair value for a single bond being the Santos bond;*
>
> *ii. It would utilise a methodology that is unnecessarily reliant on a single or small number of observations and/or individual views and would not efficiently use the totality of information available, particularly given that the available information is sparse;*

[52] The fact that the BVAL curve is published by a reputable independent organisation does not ameliorate the fact that its procedure is non-transparent as argued for criterion (c), and neither does it resolve the issues discussed for criteria (a) and (b) regarding bond selection and sample size.

[53] CEG, Estimating the cost of 10 year BBB+ debt, June 2009.

iii. It would give rise to estimates that are inconsistent with standard predictions of finance theory in that it would impose a downward sloping term structure for credit spreads (and inconsistent with a clear upward slope where there is available data);

iv. It would not give rise to estimates that are consistent with current market conditions and would not have captured the impact of clear changes in market conditions in September and October 2008; and

v. It would give rise to yield estimates that are not consistent with other potential proxies for the benchmark rate as described in Section 4 of this report.

....

The CBASpectrum BBB+ 10 year fair value yield performs better against these criteria. It does not rely on a single observation but rather employs a method that uses all the available bond data – a method that will work relatively better than the Bloomberg methodology in the presence of limited data. It gives rise to estimates that are more consistent with other information and it did capture the expected movement in credit spreads following the events of September and October 2008. However, this does not imply that 100% weight should be given to this source for an estimate of the benchmark rate. The CBASpectrum estimate tended to overestimate the only recent observed issue price for a BBB+ Australian bond (the Tabcorp issue) and also was higher than the rates reported by the RBA (although the difference in both cases was less pronounced than for the Bloomberg under-estimates). For these reasons, if one was required to rely on one or the other of the two estimates of fair value as a proxy for the benchmark rate then I would rely on CBASpectrum's 10 year BBB+ estimate.

I note that an alternative approach would be to rely on neither data services estimate of fair value. In theory it may be possible to develop an alternative procedure for estimating the benchmark rate that does not rely on either Bloomberg nor CBASpectrum fair value estimates.

167. A problem with this approach is that it will inevitably require the exercise of significant judgment and this is especially true in the current market conditions with little in the way of observations of actual trades or issue of Australian BBB+ bonds. Ultimately his is likely to score poorly against criteria vi at paragraph:

vi the source of the estimate would be as independent as possible from interested parties to the regulatory proceedings.

107. Of course, that is not to say that the Bloomberg curve would necessarily always be less accurate than the CBASpectrum or other curves. Indeed, our subsequent January 2010 report for Country Energy set out how we considered that curve testing could be appropriately carried out.[54] This report was also submitted by ActewAGL and ultimately relied on by the Tribunal in support of varying the AER's decision to give 100% weight to the CBASpectrum curve over the 20 business days ending 12 March 2010.[55]

108. However, our conclusions in relation to the inaccuracy of the Bloomberg fair value estimates over the GFC have been supported by numerous other sources. The ERA, in its final decision for ATCO, concluded that it would adopt the RBA data series as the sole basis for estimating the trailing average DRP (noting that the ERA implemented the 100% swap hybrid cost of debt benchmark which required an immediate estimate of the historical average DRP).[56] While not explicitly stating that it has not used the Bloomberg curve due to concerns about its accuracy, we consider that the ERA's decision supports CEG's conclusions in relation to the inaccuracy of the Bloomberg fair value curve. Similarly we not that IPART, while not making a decision under the NER/NGR, as determined to have sole regard to the RBA curve rather than the Bloomberg estimate.[57]

109. Chairmont has similarly suggested that between December 2007 and March 2010 the sole use of the RBA curve was appropriate for the purpose of constructing an historical time series.[58]

> *The debate among the AER, industry and various expert submissions reveals there is a variety of data sources for yields on corporate bonds, but especially in the earlier years no agreed data source. Accordingly, a blend of the benchmarks is used to estimate historical DRPs in this section. Analysis of the data series in comparison to one another, swap rates, spreads of swaps to CGS and new issue data led to the combination of the benchmarks as shown in table 4.*

---

54 CEG, Testing the accuracy of Bloomberg vs CBASpectrum Fair Value Estimates A report for Country Energy, January 2010.

55 Australian Competition Tribunal, Application by ActewAGL Distribution [2010] ACompT 4 (17 September 2010).

56 ERA, Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems, September 2015, p. 355.

57 IPART, WACC - IPART's New Approach to Estimating the Cost of Debt, April 2014

58 Chairmont, Cost of debt transitional analysis, April 2015, pp. 40-41.

Date (from)	Date (to)	Data Source
July 1999	November 2001	Swap Rate + (swap-to-CGS spread) x 4
December 2001	December 2004	Bloomberg Fair Value (BFV)
January 2005	November 2007	Average BFV + RBA
December 2007	March 2010	RBA
April 2010	June 2014	Average RBA + Bloomberg BVAL

Table 4: Data Sources

This data mix is a reasonable estimate of which data source was most appropriate for the time, as none were continually and clearly superior. Exact quantification of DRP is outside the scope of this report and precision in that analysis would require much greater data requirements and filtering, given the significant differences between alternatives.

110. The RBA reaches the same conclusion as CEG and Chairmont.[59]

The Bloomberg Australian dollar fair value curve appears to be overly smooth between early 2009 and late 2010. These measures did not increase as much as could be expected in early 2009, given that the global financial crisis was at its most severe at that time, and as was observed in other measures of Australian and foreign corporate bond spreads. Moreover, the Bloomberg spread measures remained elevated for an extended period of time between early 2009 and 2010, while credit spreads globally declined sharply following the introduction of extraordinary policy measures; this was especially true of BBB-rated bond spreads.

111. The AER itself has determined in multiple decisions that Bloomberg's published fair value estimate was not the preferred estimate. Indeed, despite relying on the Bloomberg fair value curve during the GFC, the AER subsequently accepted that it had not performed appropriately in that period and used that as a basis for not relying on it post GFC. As noted by the Tribunal:[60]

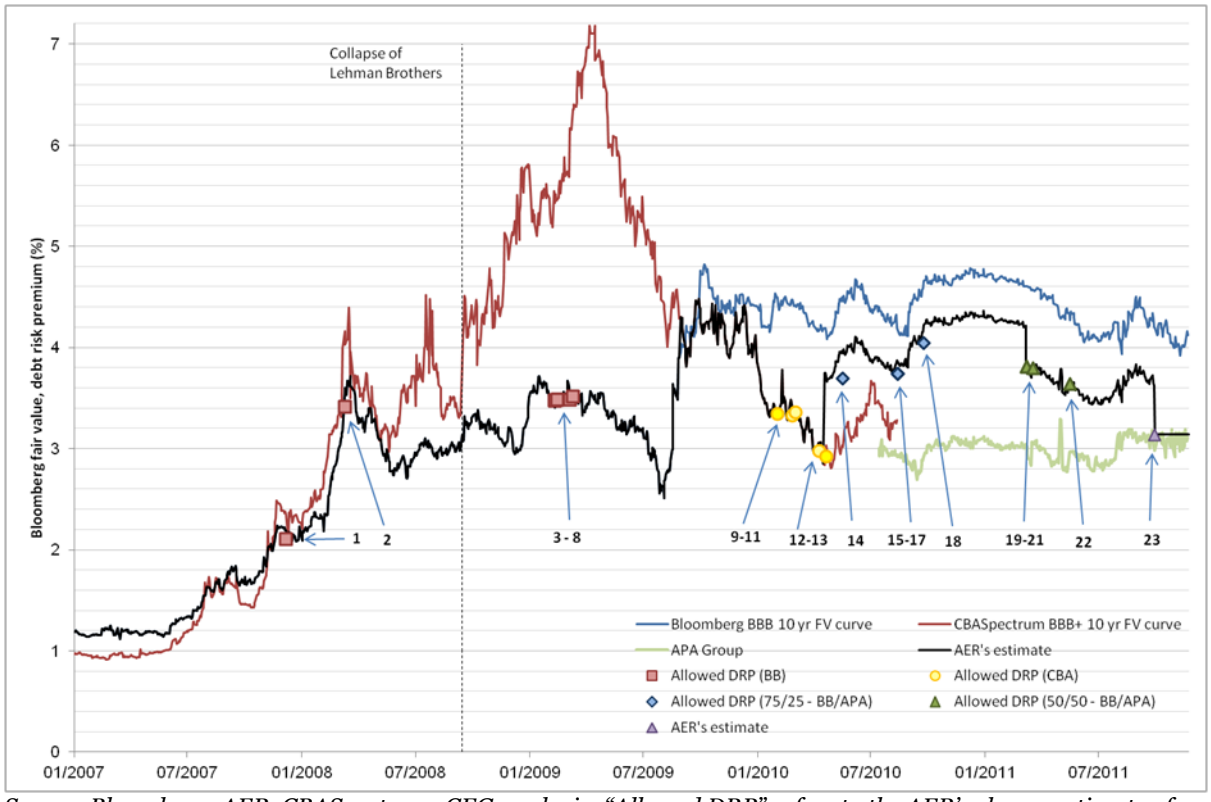
…the AER refers to a report by Dr Tom Hird in September 2009 in support of the view that during the financial crisis, the CBASpectrum data better reflected market conditions than Bloomberg and behaved in a more predictable manner.

112. The Dr Tom Hird report referred to is the 2009 report for Country Energy discussed above. More generally, AER decisions between 2007 and 2010 are summarised in Figure 21 below.

59 RBA, New Measures Of Australian Corporate Credit Spreads, p.24

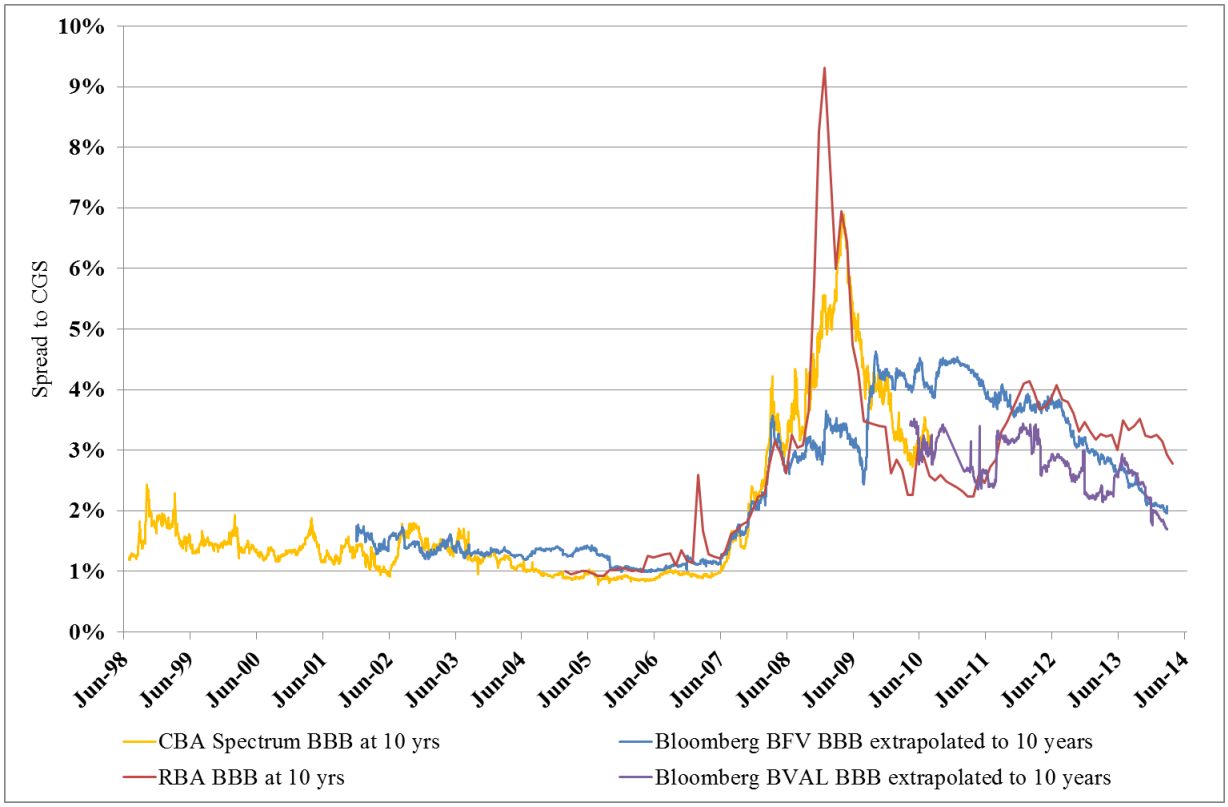
60 Australian Competition Tribunal, Application by Jemena Gas Networks (NSW) Ltd (No 5) [2011] ACompT 10, paragraph 22.

Figure 21: AER regulatory decisions (2007 to 2011) before any amendment on appeal



Source, Bloomberg, AER, CBASpectrum, CEG analysis; "Allowed DRP" refers to the AER's chosen estimate of DRP during a regulatory decision.

Figure 22: Reproduction of Figure 9 from May 2014 report - RBA, CBASpectrum and Bloomberg[61]



Source: RBA, Bloomberg, CBASpectrum and CEG analysis

113. Figure 21 illustrates that:

- The AER methodology chose the Bloomberg source over the CBASpectrum source over the period 2008 to 2009 – the period in which CEG, Chairmont (see paragraph 109 above) and the RBA have advised that the Bloomberg curve was not reliable and that the RBA curve (which behaved in the same manner as the CBASpectrum curve as shown in Figure 22 above) was more reliable;
- The AER changed methodology at some point prior to its first set of 2010 decisions at which point it did determine that the Bloomberg curve was less reliable than the CBASpectrum curve (which, once more, was more consistent with the RBA curve (as shown in Figure 22 above));

61 The Bloomberg BBB fair value estimate shown in the chart is, where necessary, extrapolated to 10 years consistent with regulatory precedent as follows: until 22 June 2010, the BBB curve is extrapolated to 10 years based on the slope of the fair value curve closest to BBB in rating (ie, A, AA and AAA in order of preference); between 23 June 2010 and 31 October 2013, the BBB curve is extrapolated from 7 years to 10 years assuming an increase in DRP calculated as the average increase in DRP between 7 and 10 years for the Bloomberg AAA fair value curve over the 20 days to 22 June 2010; and since 1 November 2013, the BBB curve is extrapolated from 7 years to 10 years assuming no increase in DRP.

- The AER's methodology was then overturned by the Tribunal which varied the AER's decision in ActewAGL such that the AER should give 50% weight to the higher Bloomberg curve and then, in JGN, 100% weight to the Bloomberg curve.
- The AER responded to the Tribunal determinations in subsequent decisions by:
  - giving 75% weight to the Bloomberg curve and 25% weight to the APA bond (which had lower DRP than CBASpectrum during the period they overlapped);
  - giving 50% weight to the Bloomberg curve and 50% weight to the APA bond;
  - giving 0% weight to the Bloomberg curve and 100% weight to the average of a newly formed AER sample (which gave an only 0.11% higher DRP than giving 100% weight to the APA bond).

80. As a matter of fact, the AER's original methodology chose the lowest fair value curve (be that CBASpectrum or Bloomberg). Following the ActewAGL and JGN appeals, the AER has changed methodology three times – in most cases reducing the weight given to the (only available) Bloomberg fair value curve and lowering the estimated DRP in the process.

Table 4: Regulatory decisions underpinning Figure 21

#	Determination relating to:	Middle of averaging period:	AER's DRP*	AER DRP based on:*
1	SPAusnet	7 December 2007	2.11	Bloomberg
2	ElectraNet	10 March 2008	3.42	Bloomberg
3	CountryEnergy	10 February 2009	3.48	Bloomberg
4	EnergyAustralia	10 February 2009	3.48	Bloomberg
5	Transgrid	13 February 2009	3.49	Bloomberg
6	ActewAGL	13 February 2009	3.49	Bloomberg
7	Transend	6 March 2009	3.49	Bloomberg
8	Integral Energy	11 March 2009	3.52	Bloomberg
9	ActewAGL	1 February 2010	3.35	CBASpectrum
10	Energex/Ergon Energy	26 February 2010	3.33	CBASpectrum
11	CountryEnergy	3 March 2010	3.36	CBASpectrum
12	ETSA Utilities	9 April 2010	2.98	CBASpectrum

#	Determination relating to:	Middle of averaging period:	AER's DRP*	AER DRP based on:*
13	JGN	21 April 2010	2.93	CBASpectrum
14	JEN	17 May 2010	3.7	75/25 – BB/APA
15	CitiPower	13 August 2010	3.74	75/25 – BB/APA
16	Powercor	13 August 2010	3.74	75/25 – BB/APA
17	United Energy	13 August 2010	3.74	75/25 – BB/APA
18	SPAusnet	24 Sept. 2010	4.05	75/25 – BB/APA
19	Envestra	8 March 2011	3.81	50/50 – BB/APA
20	Envestra	8 March 2011	3.81	50/50 – BB/APA
21	Amadeus	18 March 2011	3.8	50/50 – BB/APA
22	APT Allgas	17 May 2011	3.64	50/50 – BB/APA
23	Aurora	30 Sept. 2011	3.14	AER estimate

* *Prior to any amendment by the Tribunal*

114. From 2012 onwards the AER ceased to apply a correction to the Bloomberg fair value curve (formalised in the AER's final decision for Powerlink in April 2012).

115. In summary, the AER relied solely on the Bloomberg published source during the period that other experts, including its own, consider that it was inaccurate or not providing good estimates of the cost of debt. Moreover, throughout calendar years 2010 and 2011 the AER was of the view that the Bloomberg fair value curve was sufficiently inaccurate that it was appropriate to develop the AER's own bespoke estimate – first by giving some weight to a single bond (issued by APA) and last (in its Aurora decision) giving zero weight to the Bloomberg published source. However, in 2012 the AER reverted back to giving 100% weight to the Bloomberg published estimate.

116. More recently, Bloomberg has introduced a new fair value estimate that it has labelled as BVAL (the previous Bloomberg source was labelled as BFV (or Bloomberg fair value curve)). However, the methodology for neither publication is transparent so it is not possible to provide a meaningful discussion of any differences in methodology that might cause the BVAL estimates to be more reliable than the BFV estimates.

117. The Bloomberg BVAL curve was only introduced in 2013 and has since been extended backwards in time by Bloomberg to mid-2010. As such, it does not extend sufficiently to include the 2008/09 crisis. The BVAL curve is the most

erratic of the three curves published over the same time period – with large single day changes in estimated yields. For example, from 1 August 2011 to 3 August 2011 the extrapolated[62] BVAL spread rose from 2.47% to 3.18% (as can be seen in Figure 22).

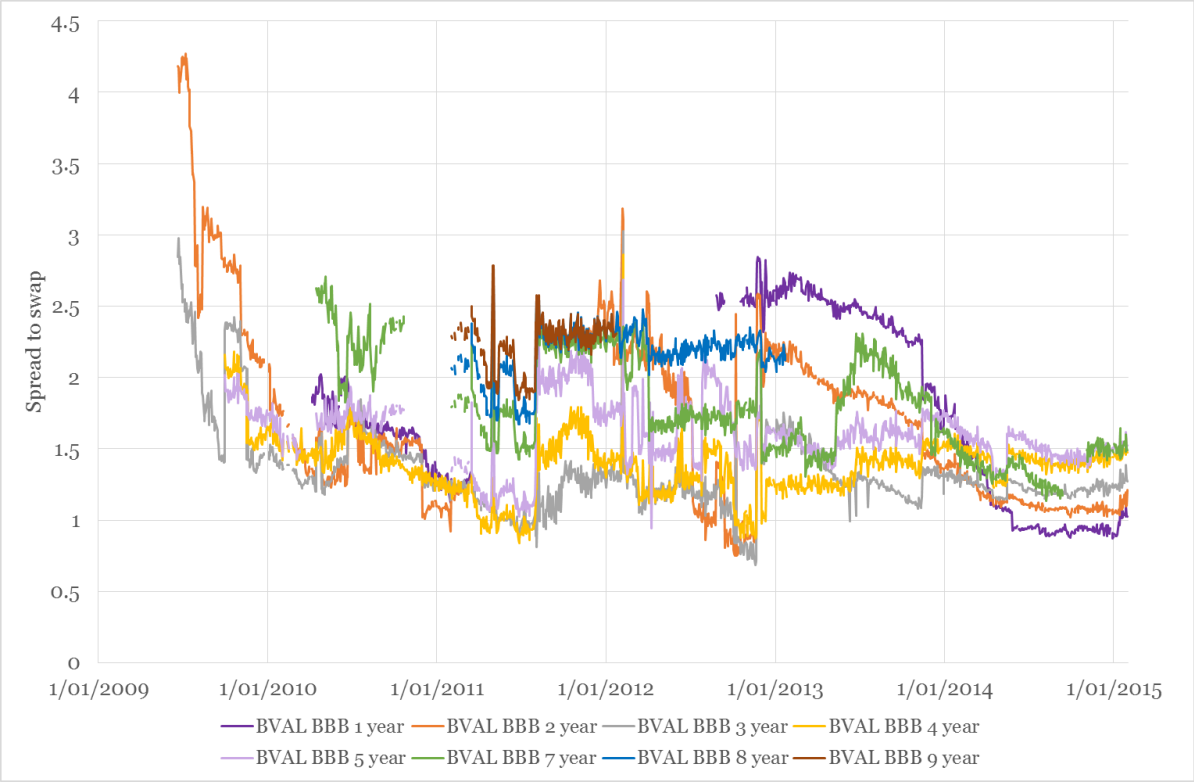
118. The extrapolated BVAL curve reached a peak of 3.44% in December 2011 and then fell materially to an average of 2.98% in June/July 2012 (where that period is generally regarded as the peak of the European Sovereign debt crisis – a period when risk premiums should be elevated relative other surrounding periods). The behaviour of the BVAL curve is inconsistent with expectations of how the risk premium on BBB debt would have behaved over 2012. Specifically, we would have expected any measured BBB risk premium to rise from December 2011 to June/July 2012 – not fall.[63]

119. The BVAL information from before the 1 May 2014 is also intermittent, as is illustrated in Figure 23. In addition, prior to that date the BVAL curve provides results that are inconsistent with standard finance theory and the empirical regularity that the risk premium on bonds tend to increase with the maturity of the bonds – especially between one and seven years. However, the BVAL one year spread to swap is substantially higher than the 7 year spread to swap from late 2012 until late 2013. In fact, the one and two year curves are only below curves of longer maturities from the beginning of May 2014, which is the time at which Bloomberg first introduced the BVAL curve and discontinued the BFV curve.

62 I have extrapolated the BVAL curve from 7 to 10 years in the same manner as the BFV curve.

63 It is unclear to what extent Bloomberg regards its backdating of this curve should be relied on (i.e., whether backdated yields are as reliable as yields published on dates after the first date the BVAL curve was regularly published).

Figure 23: BVAL curves at different maturities



Source: Bloomberg, CEG analysis

120. Figure 23 clearly indicates that, prior to May 2014, the BVAL curve was not behaving in a manner that is consistent with reasonable expectations. Beyond 2014 the problem with the term structure appears to have been rectified.

121. It is also the case that, since May 2014, the BVAL 10 year estimate has exhibited a pattern such that it is generally below the RBA 10 year estimate but does periodically 'jump up' to be more or less equal with the RBA estimate before either dropping or drifting below the RBA estimate.

Figure 24: BVAL vs RBA from May 2014 onwards

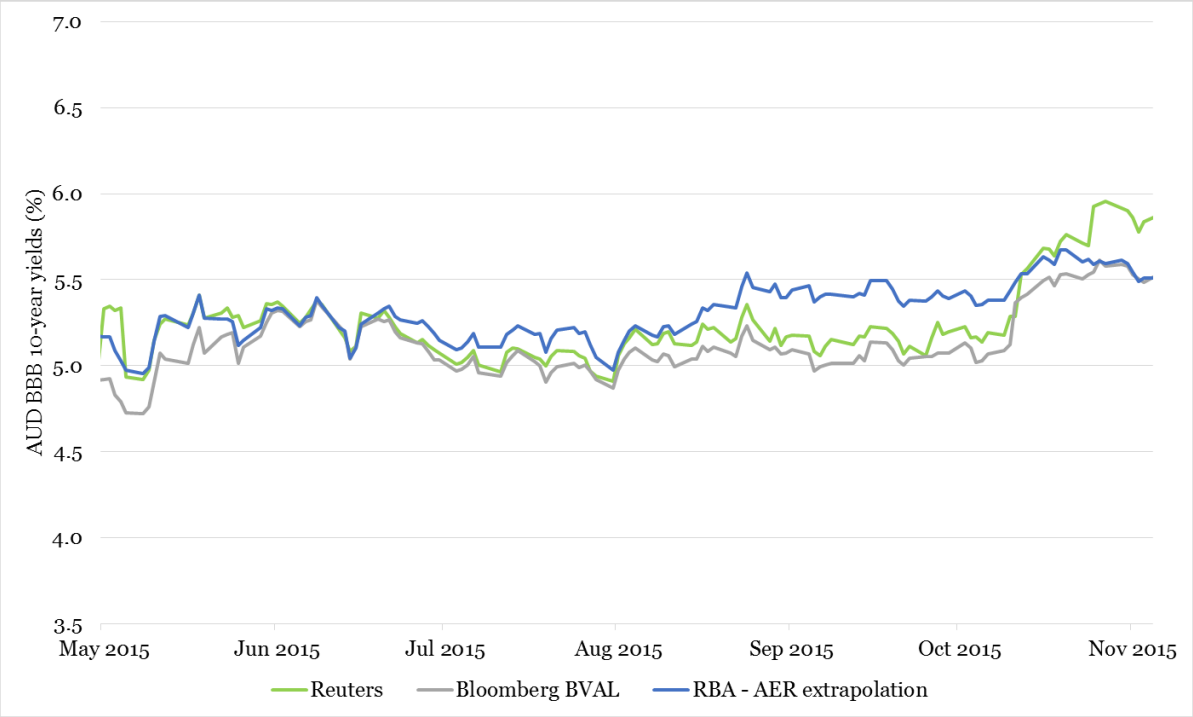
Source: Bloomberg and RBA. Both the Bloomberg and BVAL curves are, where necessary, extrapolated to 10 years using the AER methodology. The RBA curve is interpolated between month ends using the AER methodology.

122. The reason for the sharp movements in the Bloomberg curve are unclear. However, it seems possible that they are due to the relatively small sample used by Bloomberg - which may expose the BVAL curve to heightened sensitivity to the movements in estimated yields for a small number (or even single) bond. However, without transparency in relation to the Bloomberg methodology it is only possible to speculate on this issue.

123. The Reuters par yield curve has a much shorter time period of publication. 10 year estimates are available on a daily basis since 25 May 2015 (but intermittently published prior to that – such as in May and June 2013 and for 2 days in January 2008). (From 20 December 2013 to 25 May 2015 the longest dated estimate that was available was at seven years maturity.[64])

64 With the exception of a single day (13 February 2015) when an 8 year estimate was available.

Figure 25: RBA, Bloomberg and Reuters



Source: Bloomberg, RBA, Reuters

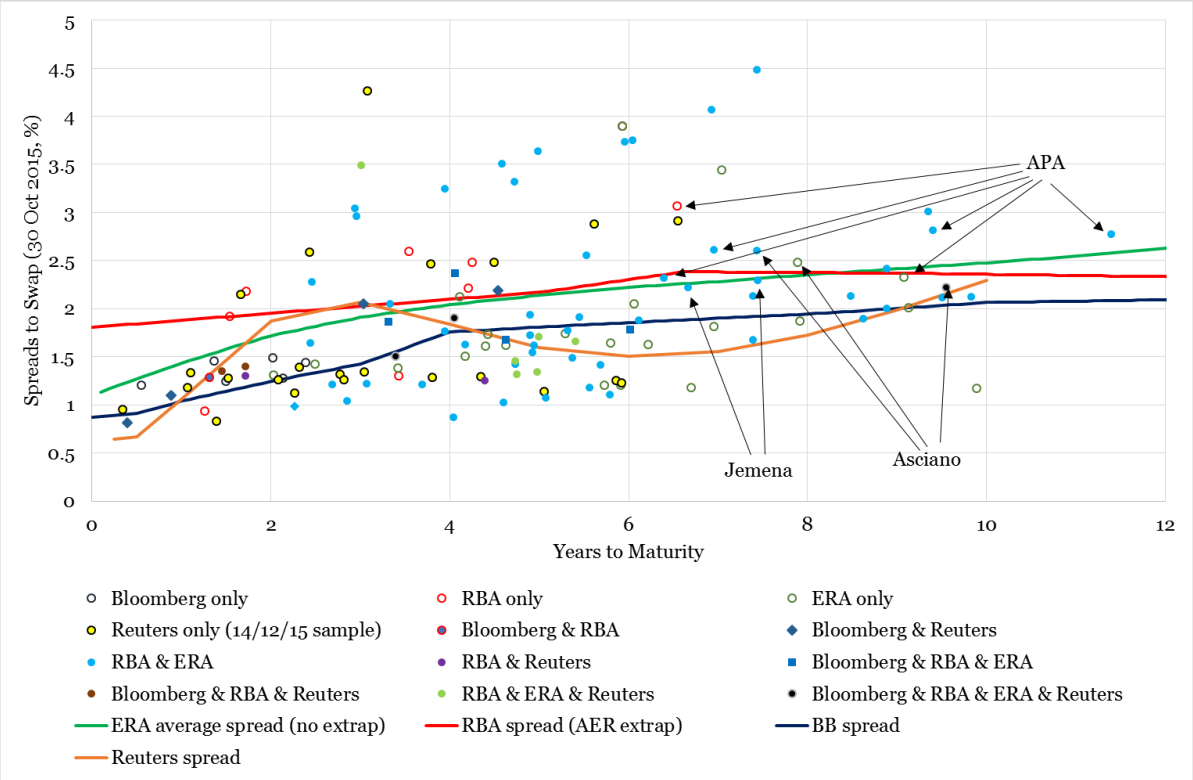
124. It can be seen that the Reuters 10 year estimate has been consistently above the Bloomberg 10 year estimate. The Reuters estimate has mostly been below the RBA estimate from June 2015 to October 2015, but shifted materially above the RBA estimate in November 2015.

125. We have examined each of the (RBA/ERA[65]/Bloomberg/Reuters) curves on 30 September 2015 against the various samples of constituent bonds (RBA/ERA/Bloomberg/Reuters). The results are shown in Figure 26 below.[66]

65 We have estimated this following the ERA estimation procedure as set out in ERA, Final Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems, September 2015.

66 The spreads to swap shown in the figure are based on the RBA's methodology for hedging foreign currency yields to AUD fixed equivalents.

Figure 26: Curves and spreads as at 30 October 2015



Source: Bloomberg, RBA, Reuters, CEG analysis

126. We have marked Bloomberg's longest dated (Asciano) bond in the chart as well as bonds issued by regulated energy transport businesses with maturity above 7 years (plus, for comparison, any other bonds issued by the same entity with maturity above 6 years). These bonds are issued by APA and Jemena. These bonds sit above and below the RBA curve but sit wholly above the Bloomberg curve. In addition, but not separately marked are the following bonds with maturity above 8 years:

- Coca-cola bond which is only in the ERA sample (dot with green outline and no colour fill) and is lowest yielding bond at 9.9 years maturity;
- Two Transurban bonds which sit very close to, but slightly below, the Bloomberg curve at 9.8 and 8.9 years maturity;
- Sydney airport bonds at 9.5 and 8.5 years maturity which sits just below/above the Bloomberg curve (respectively);
- Woodside bond at 9.4 years maturity which sits above the RBA curve;
- Sun Group bond at 9.1 years which sits below the RBA curve; and
- Brambles bond at 8.6 years which sits below the Bloomberg curve.

127. We note that on 30 September 2015 the Reuters spread to swap curve had a peculiar shape – with estimated DRP falling between 3 and 6 years and then rising between 6 and 10 years.

4.6.1 Assessment

128. In our view, the Bloomberg published estimates have been the least reliable historically and the RBA estimates the most reliable in terms of correctly estimating the cost of debt faced by a BEE, especially during the GFC. This view is consistent with the views of the RBA, Chairmont and the ERA as discussed above. The Reuters source has been available for a relatively short period and so it is more difficult to assess its track record for accuracy. As seen in Figure 25, however, the Reuters curve broadly tracked the RBA and Bloomberg curves, and was in between the other two curves from June 2015 to early October 2015, after which it shifted to be above them from mid-October 2015 onwards.

129. In this regard, the Reuters and ERA curves are both too new to possess a long track record since they have only been published fairly recently. We also note that the Reuters swap curve had an unusual shape on 30 September 2015.

4.7 Summary

130. Table 5 below summarises the performance of each data source against the five criteria.

Table 5: Assessment against criteria

Criteria	RBA	Bloomberg	ERA	Reuters
Dataset matches benchmark	Yes	No	Yes	No
Large dataset	Yes	No	Yes	No
Transparent methodology	Yes	No	Yes	No
Reputable and independent publisher	Yes	Yes	Not independent	Yes
Track record of accuracy	Yes	No	No	No

131. The Bloomberg and Reuters sources perform poorly against four of the five criteria. Neither the Bloomberg nor Reuters source include foreign currency issues in their datasets despite the 'industry norm' clearly being that foreign currency issues dominate long term bond issues by regulated utilities and the wider set of Australian businesses with credit rated debt. Consistent with this, the Bloomberg and Reuters curves perform poorly against the second criteria because their sample compositions mean that they do not capture many long term bonds. Similarly, neither the Bloomberg nor Reuters sources have transparent methodologies. By contrast, on all of these criteria the RBA and ERA perform well.

132. On the fourth criterion, the RBA, Bloomberg and Reuters are all organisations with a strong reputation in financial markets and an incentive to maintain that reputation. All three are independent of the regulatory process[67] and regularly publish estimates. By contrast, the ERA has a reputation as a regulator rather than a financial market analyst and also does not regularly publish the results of its methodology (although it is open for others to do so – which we have done in this report for select dates). The ERA is not independent of the regulatory process. Only the RBA and Bloomberg have a long track record and only the RBA's track record can be regarded as generally accurate.

133. For these reasons we consider that the RBA is clearly the best performer against the five criteria. Therefore, if one were to limit oneself to choosing one, or a set of predetermined, sources with predetermined weights we consider that the RBA source should be selected with 100% weight.

134. However, if detailed examination of the performance of each curve during a specific averaging period was feasible this could be used to perform a 'real time' assessment of the relative accuracy of the curves. Such analysis could include applying goodness-of-fit tests on the curves against a broad sample of bonds[68] and other bespoke analysis relevant to the dataset available and available given any restrictions applied under the NER/NGR relating to the requirement for automatic updating of cost of debt estimates.

135. In the alternative it may be argued that, it is not practicable to 'second guess' the methodological decisions of independent and reputable third party publishers of the yield on a benchmark 10 year BBB corporate debt issue. That is, it may be argued that each methodology has 'strengths and weaknesses' and that one should give weight to each. This is not our view for the reasons set out above and in the body of the report. However, if one did take this view then some weight should be given to all three curves. Specifically, there is no reason to give equal weight to the RBA and Bloomberg and zero weight to Reuters. Reuters' performance against the relevant criteria is at least as good as Bloomberg's performance.

67 Although a small fraction of Bloomberg and Reuters revenues will be derived from parties to the regulatory process.

68 We have previously set out such an approach in CEG (2015) for the January 2015 averaging period. CEG, Critique of the AER's JGN draft decision on the cost of debt, March 2015, p. 41-55; Our analysis showed that the RBA curve provided the best fit for the January 2015 averaging period.

5 Option (c): Method for determining the best estimate at any given period

136. Option (c) is an extension of option (b), except instead of predetermining a (some) source(s) as best and applying predetermined weight(s) to that (those) source(s), option (c) sets out to determine the best source(s) at a given time. Option (b) does not require continual testing within the regulatory period, and simply applies the same weights to the same chosen sources throughout the regulatory period, while option (c) involves continual testing within the regulatory period to select the weights to be applied to each source.

137. A methodology for option (c) can be defined in a manner that allows for automatic updating, such that no further judgement is required within the regulatory cycle itself. We have set out a methodology for making this selection in our report for Australian Gas Networks (AGN) [69] and this, or similar, methods have been proposed by United Energy and JEN.[70] These other methods include: comparing the cost of debt estimate from each source against the 10-year estimate of a Nelson-Siegel curve applied to the broad sample of bonds; and conducting a linear regression to compute the slope of the spreads to swap of bond pairs identified from the broad sample.[71]

138. As is the case for the ERA methodology, this approach requires carefully defining the procedure to be used for collecting the data and then testing which source is most consistent with that data. This is necessary because the requirement that the selected procedure must be applied automatically in the period within the regulatory cycle, which means that the exercise of 'judgement' must be performed upfront before the regulatory cycle begins. Although selecting between the curves at each period does require data collection and data processing, each step in the process can be defined in a flowchart-like manner that ensures that the process can be implemented mechanically without requiring further judgement.

139. The approach as set out for AGN performs well against most criteria established in section 4.

69 CEG, The hybrid method for the transition to the trailing average rate of return on debt. Assessment and calculations for AGN: A report for AGN, June 2015, Section 5.

70 CEG, Critique of the AER's JGN draft decision on the cost of debt, March 2015, Section 5.

71 See: CEG, Critique of the AER's JGN draft decision on the cost of debt, March 2015, Sections 5.6 and 5.7.

Table 6: Assessment against criteria

Criteria	AGN testing
Dataset matches benchmark	Yes
Large dataset	Yes
Transparent methodology	Yes
Regularly published by an independent publisher*	Yes
Track record of accuracy	No

**The individual curves are all regularly published*

140. The AGN testing methodology selects a source based on a large dataset that includes the types of bonds issued by the benchmark entity (as judged against industry norms). The methodology is transparent and only selects a source if it has been deemed reputable and independent (and therefore included in the test). However, the method has only been applied periodically and, therefore, we cannot claim that it has a track record of accuracy. However, it does grow out of the application of a method that the Australian Competition Tribunal has both suggested and found useful in past decisions (as discussed in sections 3.3 and 6.3 above).

6 Issues raised by Lally and the AER

141. The AER justified its choice of approach on the following bases:[72]

    i. That neither of the BVAL and RBA bond selection criteria is clearly superior to the other;

    ii. That neither of the curve fitting approaches employed by the BVAL and RBA curves is clearly superior to the other;

    iii. That both curves require adjustments to obtain the 10-year estimate, and neither is more reliable than the other;

    iv. That a simple average of the two curves results in an estimate that minimises Lally's lowest mean squared error criterion;

    v. That even though the two curves sometimes produced materially different results, neither approach is clearly superior to the other;

    vi. That applying a simple average accords with the Tribunal's decision concerning circumstances in which the published curves cannot be distinguished; and

    vii. That taking the simple average of two curves reduces the magnitude of price shocks arising from missing or erroneous estimates.

142. As seen above, five of the seven reasons (i, ii, iii, v, and vi) put forward by the AER pertain to a supposed lack of conclusive evidence regarding the superiority of one curve over the other. As was set out above in Section 4, however, we consider the estimates of the RBA curve to be superior to that of the BVAL curve (and Reuters curve) since the former uses a bond sample that is larger and matches more closely with the debt characteristics of a BEE, while also using a more transparent curve-fitting methodology and having a better track record of accuracy.

143. If our view is accepted, then reason (vii) also becomes a moot point because taking the simple average of two curves will not reduce the magnitude of price shocks from missing or erroneous estimates if one of the curves already suffers from such erroneous estimates. In that case taking an average would actually increase the magnitude of error compared to an approach where the erroneous curve is omitted. This is consistent with the Tribunal reasoning in JGN (2010) where the Tribunal found:

> *An average is a blunt instrument unless careful thought is given to the individual components and whether each should be given the same consideration, or weight, in the calculation of the average. A simple*

[72] AER, Preliminary decision for Jemena, p. 3-224 to 3-225.

> *unweighted average gives each component the same weight. This will not always be appropriate, especially where (as here) the two fair value curves differ considerably over the relevant periods to maturity. [Para 62]*

And:

> *The upshot of this is that use of the CBASpectrum curve, either by itself or in an average, could produce a commercially significant downward-biased estimate of the debt risk premium that should be allowed to JGN. This finding is reinforced when we look at the positions occupied by the two curves on the various figures and graphs that have been presented to the Tribunal. [Para 67]*

144. Finally, as will be explained in Section 6.1, we also disagree with reason (iv) on the basis that it does not place adequate weight on the bias of the estimate relative to its volatility.

6.1 Lally's MSE estimator in the face of biased estimates

145. Lally's lowest MSE estimator is based on Ferguson's (1967) derivation:

$$w = \frac{MSE_2 - Cov(\hat{T}_1, \hat{T}_2)}{MSE_1 + MSE_2 - 2Cov(\hat{T}_1, \hat{T}_2)}$$

146. The derivation of the optimal weight assumes that both underlying series are unbiased, such that their estimates will be equal to the true value on average.[73] Over a sufficiently long period of time, both sets of estimates should each have an average error that is close to zero.

147. Applying the optimal weights w and (1 - w) to the two series would result in estimates that are also unbiased, yet have an MSE that is at least as small as that of the curve with lower MSE.

148. When one of the two series under consideration is biased, the optimal weight w will still result in a series with an MSE that is no higher than that of the curves. However, if any weight is assigned to the biased series, then the resulting weighted series will also be biased, such that its estimates will not have zero error on average compared to the true values.

149. Lally downplayed this negative aspect of the MSE by couching his findings in terms of differences in the weight w as opposed to the magnitude of bias:[74]

---

73 No other assumptions are required for this result, except that the error distributions must each have a finite variance and a finite covariance.

74 Lally, Review of Submissions on implementation issues for the cost of debt, October 2015, pp.21.

> *For example, suppose the bias in that estimator was considered to be as much as its standard deviation. At this upper limit, and continuing to assume a correlation of zero, the optimal weight on the biased estimator would now be 0.33 following equation (3), and the MSE would then be 34% less than that from sole use of the unbiased estimator.*

150. The unpresented flipside of the above example is that using a w of 0.33 would result in a series with a bias of magnitude equal to 33% of the standard deviation, which will need to be adjusted for in some way because the resulting series will incorporate a systematic bias that cannot be reduced even in a long time series.

151. Lally conceded that there are grounds to suggest that the BVAL curve would be biased in the short term, but argued that the bias would not be systematic in the long run:[75]

> *Whilst there are good grounds to believe that the cost of local currency bonds does vary from that of otherwise identical foreign currency bonds, after the currency swap to convert the foreign currency bonds to AUD, there are no grounds to believe that there is a systematically higher rate on one or the other. Thus, the omission of foreign currency bonds from the BVAL index should not lead to it systematically over or understating the cost of debt of the efficient benchmark entity. In addition, even if the AER used only the RBA index, the weights on local and foreign currency bonds within that index may be significantly different to that of bonds in general and these in turn to the currently optimal weights, and this too would introduce bias but again the effect would not be systematic over time.*

152. In this passage Lally is adopting a view that it is not the MSE at each estimation that is being minimised but the MSE over a long run of many applications. Consider the current situation where the cost of issuing long term debt in foreign currency (which is the dominant practice of Australian businesses as set out in section 4.2 above) is higher than the Bloomberg estimate of the 10 year cost of debt (derived from a very small sample of AUD issues). Lally is assuming that this must be going to reverse at a future time: "*there are no grounds to believe that there is a systematically higher rate on one or the other*".

153. On this basis Lally can take the view that a known underestimate of the BEE's cost of debt in one period can be assumed to be offset by an overestimate in a future period and, therefore, the underestimate/overestimate in a given period does not constitute bias – just error. Even if this future offset was guaranteed it is not obvious that Lally is correct, under the rules, to treat a known error today as 'noise' to be offset by future 'noise'. Furthermore, such an offset may not occur in NPV terms. That is, assuming a constant RAB, any future offset in yield terms would

75 Lally, Review of Submissions on implementation issues for the cost of debt, October 2015, pp. 27-28.

need to be greater than the current bias in order to ensure an NPV of zero. The further into the future such an offset occurs, the greater the magnitude of the offset will need to be in yield terms, and the more unlikely it would be for an adequate offset to occur.

154. In any event, contrary to Lally's arguments, we consider that there are indeed sufficient grounds to conclude that the BVAL curve is likely to be biased in the long run. As stated in Section 4.4, the longest maturity of the BVAL constituents has never exceeded 10 years, and was as short as 6.35 years as at 3 November 2014. This reflects the exclusion of foreign currency bonds – which are the dominant source of long term debt finance by Australian firms. This creates a systematic difference between the BVAL estimate and other estimates, such as that of the RBA, that include foreign currency bonds and, therefore, have a more reliable source of long term bond yields. This systematic difference can lead to systematic bias.

155. This is true irrespective of the extrapolation technique used by Bloomberg and even if there is no extrapolation technique used (i.e., even if there is a single long term bond (say at 10 years) in the Bloomberg sample and it is given 100% weight). However, as discussed in section 4.4.2 we also believe that Bloomberg's extrapolation method is likely to be biased (due to its apparent reliance on the CGS yield curve).

156. In summary, we consider any reliance on Lally's MSE logic is an inappropriate basis to support the use of a simple average of the BVAL and RBA curves due to concerns in relation to both bias and inaccuracy in the BVAL curve.

6.2 Automatic estimation of the cost of debt

157. The AER questioned the suitability of an approach in which the published estimates are analysed periodically in order to determine the best estimate, especially in light of the NGR (and NER) requirement that the cost of debt estimate must be derived automatically:[76]

> *Fourthly, we are not satisfied that CEG's approach can be formulaically applied as required by the NGR.[681] Within JGN's proposed access arrangement, this approach includes the following clauses:*
>
> > *The set of Independent Data Sources with relevant data available during the nominated averaging period is to be identified as comprising all sources of published yield information for corporate bonds which are well recognised and used by market practitioners, and*

[76] AER, final decision for JGN, p.3-206 onward. See also AER, Preliminary decision for Jemena, p. 3-22 onward.

> *which publish information on estimated yields for corporate bonds in the BBB credit rating band up to at least a seven year term to maturity for at least one Business Day during the nominated averaging period.*[682]

JGN also included:

> *For bonds issued in United States dollars, Euros or British pounds, yields are to be converted to Australian dollar equivalents by use of interest rate swaps and cross-currency basis swaps in a methodology that is well accepted within the finance industry;*[683]

Both of these steps require extensive use of judgement, as there is no objective standard for wide use, recognition or acceptance of a method within the finance industry. For example, in relation to:

- *The identification of relevant yield curves—How would the AER determine if a yield curve was 'well recognised' and 'used' by market practitioners? Would the AER be required to conduct a survey of market practitioners each year to determine which yield curves were 'well recognised' and 'used' by market practitioners in that particular year? Which market practitioners would the AER need to survey to construct a representative sample? What proportion of that sample would need to use the yield curve for it to be considered 'well recognised'? And 'used' for what purpose or purposes by market practitioners?*

- *The selection of the cross-currency conversion methodology—How would the AER determine if a cross currency conversion formula was 'well accepted' within the finance industry? Would the AER be required to conduct a survey of the finance industry each year to determine which conversion methodologies were 'well accepted' that year? Who in the finance industry would the AER need to approach? What proportion of that sample would need to use the cross-currency conversion methodology for it to be considered 'well accepted'? What if no particular methodology had wide acceptance? What if multiple methodologies had wide acceptance?*

JGN's proposed methodology leaves many questions unanswered. Answering these questions would involve, each year, considerable amounts of analysis, judgement and possibly consultation. We are not satisfied JGN's proposed formula can be 'automatically applied', as required by the NGR.[684]

Further, JGN's test requires the assembly of a sample of data based on criteria that allow bonds with different features (ie fixed/floating, any

> *coupon type etc), then the application of econometric tests based on this data. Our experience is that this sort of analysis is subjective and contentious. In support of this observation, APIA has warned about uncritically accepting the results of such tests.*[685] *We are therefore not persuaded that it can be repeatedly applied without debate or disagreement. This is problematic because there is no scope for wide consultation or analysis within the annual debt update process.*

158. The above concerns are misplaced and appear to be predicated on a misinterpretation of the proposed methodology. Under the proposed approach, the relevant sources of yield data (including the bond selection criteria) and cross-currency conversion methods would be selected during consultations at the beginning of the regulatory cycle. Once defined, the sources and conversion methods would remain unchanged for the remainder of the cycle.

159. That is, during the updating process, current yield data will be periodically collected from the defined sources based on the search criteria that was agreed upon at the beginning of the regulatory cycle. These would be mechanically converted into AUD fixed equivalents using the agreed conversion method before being used to select between the RBA and Bloomberg curves according to the method that is also agreed upon at the beginning of the regulatory cycle. The proposed methodology therefore does not need additional wide consultation or analysis during the annual debt updating process, except possibly to correct minor issues such as spreadsheeting errors (which is the general practice for current annual tariff and price updates in any case).

6.3 Use of a wide sample as a validation tool

160. Lally and the AER disputed the validity of CEG's broad sample on the basis that it "treats the JGN criteria as the best":[77]

> *Furthermore, the effect of using the JGN criteria to choose between the RBA and BVAL curves, and between the AER and SAPN extrapolation methods, is to essentially choose a ten-year DRP that best fits the data arising from the JGN criteria, and this in effect treats the JGN criteria as the best despite not being used by both the RBA and Bloomberg.*
> ...
> *CEG (2015b, page 48) defend the JGN criteria on the grounds that they maximize the data set subject to the bonds being comparable to the benchmark bond (which is BBB). However, the RBA and Bloomberg are engaged in exactly the same process and their selection criteria are much less liberal. Thus, the RBA and Bloomberg implicitly disagree with the JGN criteria. Furthermore, as noted above, the AER has elected to choose*

77 Lally, Review of Submissions on implementation issues for the cost of debt, October 2015, pp. 9-11.

between independent providers of DRP estimates, and JGN and CEG clearly do not satisfy that test. Even if they did, their expansion of the data set to include subordinated bonds and bonds of low liquidity suggests that their criteria are inferior.

161. The purpose of the JGN criteria is to serve as a broad comparison to the costs of debt faced by a BEE. This is because the RBA and Bloomberg curves are designed and estimated for general use, and were not created specifically to match the cost of debt of a BEE in the energy sector, whose characteristics have been broadly defined by the AER. It was on this basis that our bond selection criteria was chosen, as a method to determine whether the RBA and BVAL estimates are in line with the AER's general description of a BEE.

162. We do not cast any aspersions on the status of Bloomberg and the RBA as independent and reputable institutions. Instead, our analysis is centred on the suitability of their methodologies for producing yield curve estimates, specifically in the context of regulation and the characteristics of a BEE.

163. Lally further questions the logic of using a third dataset to choose between two competing methods:[78]

If the JGN selection criteria are considered to be the best, one should simply fit a curve to the resulting data rather than using these criteria to select bonds, and hence DRPs, in order to choose between existing curves and possible extrapolation methods. Alternatively, if the JGN criteria are considered to be inferior, one should not use them to choose between existing curves and possible extrapolation methods.

164. Lally also described an analogy to illustrate his point:[79]

By way of analogy, if polling company A selects a sample of voters in accordance with criteria X (leading to a prediction for an election of AX) and polling company B selects a sample of voters in accordance with criteria Y (leading to an election prediction of BY), it would not be sensible to choose between these two polling companies by hiring a third one (C), who selects a sample of voters in accordance with criteria Z (leading to an election prediction of CZ), and then determining which of predictions AX and BY is closer to CZ. If C is considered the best polling company, one should simply use them. If they are considered inferior to A and B, they should not be used to choose between A and B.

165. We disagree with this argument because if a third source corroborates with one of the two existing sources, then this adds some credence to the source whose

78 Lally, Review of Submissions on implementation issues for the cost of debt, October 2015, pp.9.

79 Lally, Review of Submissions on implementation issues for the cost of debt, October 2015, pp.9.

findings are similar to the third source, even if the third source is not presented as a candidate. We note that the AER's past practice has been to do precisely this and the Australian Competition Tribunal has explicitly set out a method for doing so in its ActewAGL (2010) judgment (and effectively implemented it in its JGN (2011) judgement. IN ActewAGL (2010) the Tribunal states:[80]

> *We have identified three ways the AER is able to distinguish between the competing curves, although this is not intended to be an exhaustive list: (1) If there is sufficient available information, the AER could examine and compare the merits of the publishers' methodologies and data sources, as it has in the past.*
>
> *(2) The AER could determine which curve has performed better in the past. This approach may not, however, be appropriate if there has been a material change in the bond market or in the methodologies or data sources used by the publishers.*
>
> *(3) The AER could, as it has done here, compare relevant observed yields against the published fair value curves and an average of these curves. This will require the AER to undertake the following process:*
>
> *(a) assemble a representative population of observed yields of sufficient number and term to maturity. It is difficult for the Tribunal to provide any hard and fast rule for determining whether a population is "representative". A representative population would contain many bonds after the point at which the curves diverge. It should contain bonds with a term to maturity close to 10 years. The AER should include floating rate bonds and/or bonds with observations available from one or two sources in the population unless there is good reason to exclude them. The inclusion of these bonds may raise questions which the AER will need to address in the future, such as the weighting that should be given to them;*
>
> *(b) only exclude bonds where there are sufficient qualitative reasons to consider that they are not correctly classed as being part of the relevant population;*
>
> *(c) once a representative set of bonds has been chosen and refined in this way, select the fair value curve that most closely corresponds to the relevant set;*
>
> *(d) use any other available information, such as observed yields on other rated bonds, to check that the selected fair value curve remains likely to provide the best estimate.*

80 Australian Competition Tribunal, Application by ActewAGL Distribution [2010] ACompT 4 (17 September 2010), para 77.

> *If a representative set of bonds sufficient to determine a fair value curve cannot be ascertained, or if later checks throw doubt on the chosen fair value curve, then this method of distinguishing between the curves cannot be used.*

166. Moreover, a published estimate by a stakeholder to the proceedings would not be independent and, consequently, there are advantages from relying on selecting between published third party estimates. To use Lally's analogy, suppose that the first two samples were part of an outsourced large-scale study, but there was insufficient budget to conduct a third large-scale survey to reconcile the results of the first two. It would in fact be sensible to carry out a smaller third survey C solely to validate the results of A and B, without using C as an eventual candidate.

167. Similar practices are often seen in regulation, such as regulators using regulatory precedence from other industries or jurisdictions to establish the superiority of their estimates compared to those proposed by the regulated business. The AER itself has also used various cross-checks when estimating return on equity – it could have used those cross-checks to determine the cost of equity directly, but opted to use them as a form of validation instead.[81] In all these instances, a third source that is arguably inferior – in the sense that their associated estimates are not taken from the companies of interest – is nevertheless used for validation purposes.

6.4 Low sampling duration and poor quality of data

168. Lally also criticised the data quality of the JGN sample of bonds:

> *Low value bonds are likely to experience lower liquidity, and data from such bonds is therefore of lower quality. Furthermore, as discussed in Lally (2013, section 6.5), subordinated bonds are also relatively illiquid and the general practice of assigning a credit rating to these bonds that is one class below that of senior debt of the same company suggests that these ratings for subordinated bonds are not the product of very careful consideration. Thus, data from subordinated bonds is also lower quality.[4] The effect of this point is that the extrapolation method for the RBA's or BVAL's BBB curve that yielded the best fit to a set of bonds with a substantial proportion of lower quality bonds would tend to be the method that best fitted the lower quality data, which is rejected by both the RBA and Bloomberg, and this would tell us nothing about the best extrapolation method for the RBA's or BVAL's BBB curve.*

169. In this passage Lally criticises our failure to apply a bond value threshold to the sample on the basis that this allows the inclusion of small value bonds that Lally

[81] We note that there is some debate regarding whether the AER has done this correctly.

believes will be illiquid. Lally is also critical of the inclusion of subordinated debt on the basis that the DRP on subordinated debt of a given credit rating will be higher than the DRP on unsubordinated debt of the same credit rating. It is not clear on what basis these views are held.

170. Nonetheless, we are open to an amendment of the sample selection to exclude low value bonds and/or subordinated bonds. Doing so would have very little, if any impact on the test that we propose. This is because there simply are not any, and are not likely to be any, 'low value' bonds with maturities close to 10 years (the only bonds that receive material weight in our test). Long term debt is typically only issued in large tranche sizes – in part because it tends to be issued in foreign currency and it does not make sense to raise small amounts of debt in foreign currency. Similarly, subordinated debt is not typically a large proportion of our proposed bond sample.

171. Over the 20 trading days to 30 September there were 189 bonds in the sample. Of these, there were:

- 20 bonds with issue amounts less than the RBA threshold for inclusion (minimum A$100 million);
- 16 subordinated bonds with maturity between 7 and 13 years; and
- Zero bonds with both issuing amounts below A$100 million and residual maturity between 7 and 13 years

172. The total weight that subordinated bonds with issuing amounts below A$100 million would have received in our proposed test would have been 0.002% when weighted by the Gaussian kernel alone, and 0.00005% when weighted by both the kernel and issue amount. This is contrary to Lally's claim that:[82]

> *The effect of this point is that the extrapolation method for the RBA's or BVAL's BBB curve that yielded the best fit to a set of bonds with a substantial proportion of lower quality bonds would tend to be the method that best fitted the lower quality data.*

173. In reality, low value and subordinated bonds would have received negligible weight in such a test.

6.5 SAPN vs AER extrapolation

174. The AER and Lally both favour the use of the AER extrapolation method over the SAPN extrapolation.

[82] Lally, Review of Submissions on implementation issues for the cost of debt, October 2015, p. 10.

175. The AER's primary criticism of SAPN extrapolation is as follows:[83]

> *In particular, we are not satisfied that there is a compelling conceptual or practical basis to assume that yield curves should conform to a straight line along their entire length. In contrast, our approach relies only on the shape of the yield curve from 7 to 10 years as published by the RBA. We are satisfied that this is likely to be informative about the appropriate shape for the yield curve from 7 to 10 years.*

176. This is not a correct description of the methodology – the SAPN method takes the shape of the swap curve to 10 years and only applies a 'straight line' for the DRP component between the maximum tenor and 10 years. In any event, it is not that one or the other method has a conceptual compelling or practical basis,[84] the point of testing multiple extrapolations is to find the best extrapolation in the circumstances.

177. CEG previously carried out analysis using the approach described in Section 5 above and concluded that SAPN extrapolation showed a better fit compared to the AER extrapolation in the period analysed. In rejecting this conclusion, Lally raised the issues discussed in Sections 6.2 to 6.4, but further took issue with the sample period:[85]

> *Thirdly, if CEG's conclusion (that the best results are obtained using the SAPN extrapolation of the RBA curve) is intended to be applied to subsequent periods, then the conclusion rests upon a relatively small sample period (one month), this period has a highly unusual feature, and therefore conclusions from it cannot be applied more generally. In particular, during this period, the RBA DRP curve slopes downward from 7e to 10e years despite sloping upwards until that point (CEG, 2015b, Figure 8); this is highly unusual (by examination of the RBA data reported by the RBA since January 2005) and may have contributed to the inferior performance of the AER's extrapolation method at this particular time. Also consistent with this point is the fact that the AER method outperforms the SAPN method applied to the RBA curve over the subsequent period 14 April to 29 May 2015 (CEG, 2015b, Table 11)*

178. Taken together, however, the criticisms levied by the AER and Lally against the SAPN extrapolation method actually highlight some of the key weaknesses of the AER extrapolation approach.

---

83 AER, Preliminary decision for Jemena, p. 3-242.

84 There is no compelling or practical basis for the AER extrapolation – especially when it applies the shape of the RBA curve beyond some point to the Bloomberg curve and when the Bloomberg curve has a different level at that point.

85 Lally, Review of Submissions on implementation issues for the cost of debt, October 2015, p. 12.

179. The AER considers the shape of the RBA yield curve from 7 to 10 years to be informative about the shape of the BVAL curve over those same tenors. At the same time, Lally cites an example in which the RBA DRP curve slopes downward between the 7- and 10-year tenors, and labels this as "a highly unusual feature". If this is accepted and if the SAPN extrapolation better fits the data in that period then this is a reason to test for the best extrapolation (as opposed to a reason not to test).

180. Furthermore, the fact that the AER and SAPN approaches do not consistently outperform each other highlights the potential value in periodically assessing the performances of the extrapolation methods throughout the regulatory period. The same argument also lends support to an approach that periodically assesses the choice of curves rather than predetermining weights and not revisiting these. Although Lally subsequently claimed that continual assessment would not fulfil the formulaic requirement set out in the NGR (or NER), the methodology that we had previously proposed can be mechanically applied, and thus affords the advantages of reducing the occurrence of unusual features while also meeting NGR (or NER) requirements.

181. Should the methodology involving continual testing as set out in Section 5 be rejected in favour of selecting a single extrapolation method to be applied for the entire regulatory cycle, we argue that the extrapolation method that has lower likelihood of exhibiting unusual features should be selected, and therefore support the use of the SAPN methodology.

Appendix A Charts on currency of issue and optionality of issuance

A.1 Utilities Sector (BICS definition)

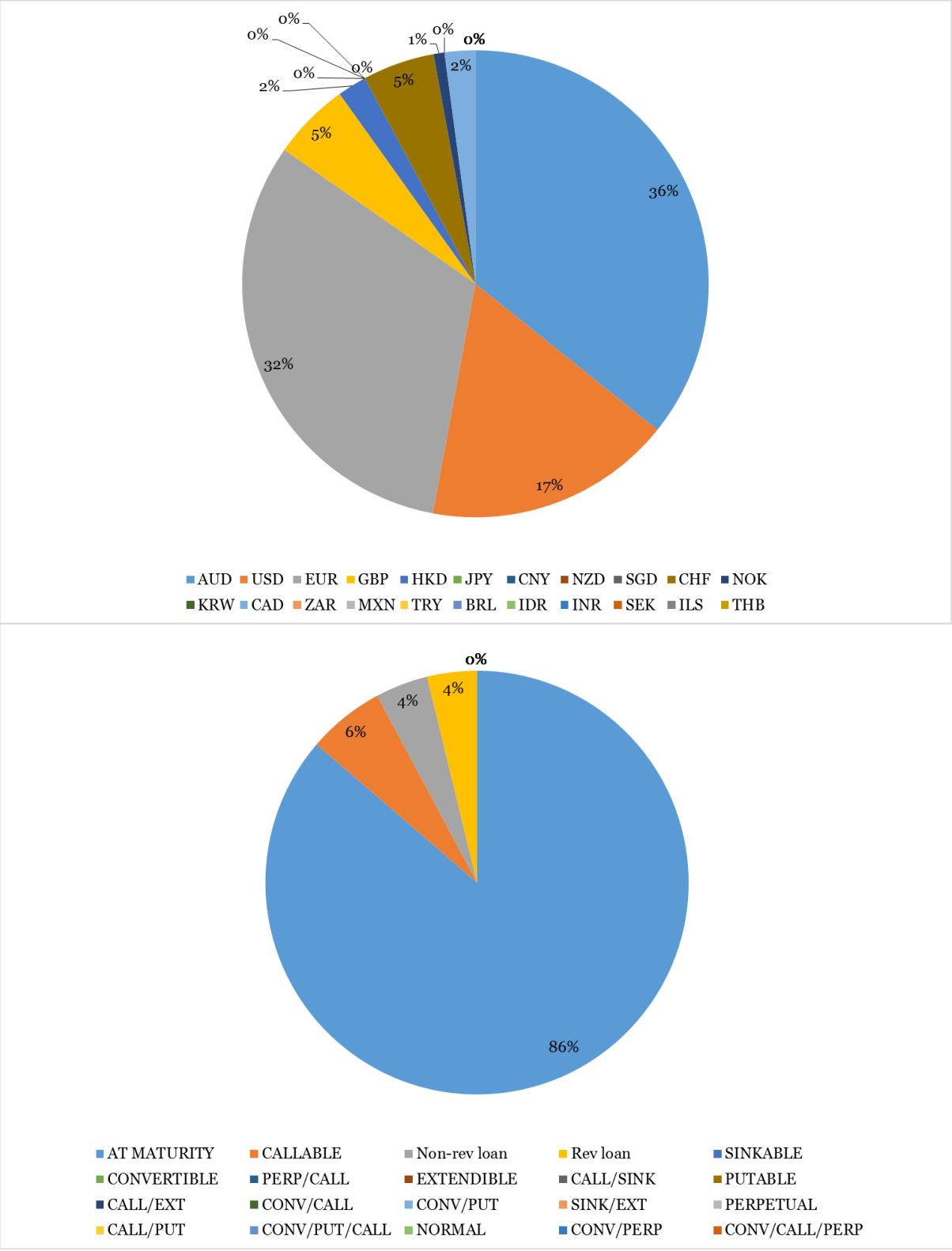
182. Note: The sector includes two industries – utilities and power generation.

183. Restricting the sample to those issued by companies classified under BICS as being part of the utilities sector results in a smaller sample of 53 bonds and loans issued by 13 unique issuers.[86]

184. Further restricting the sample to those with debt terms between 8 and 12 years at issuance results in a sample of 18 bonds.

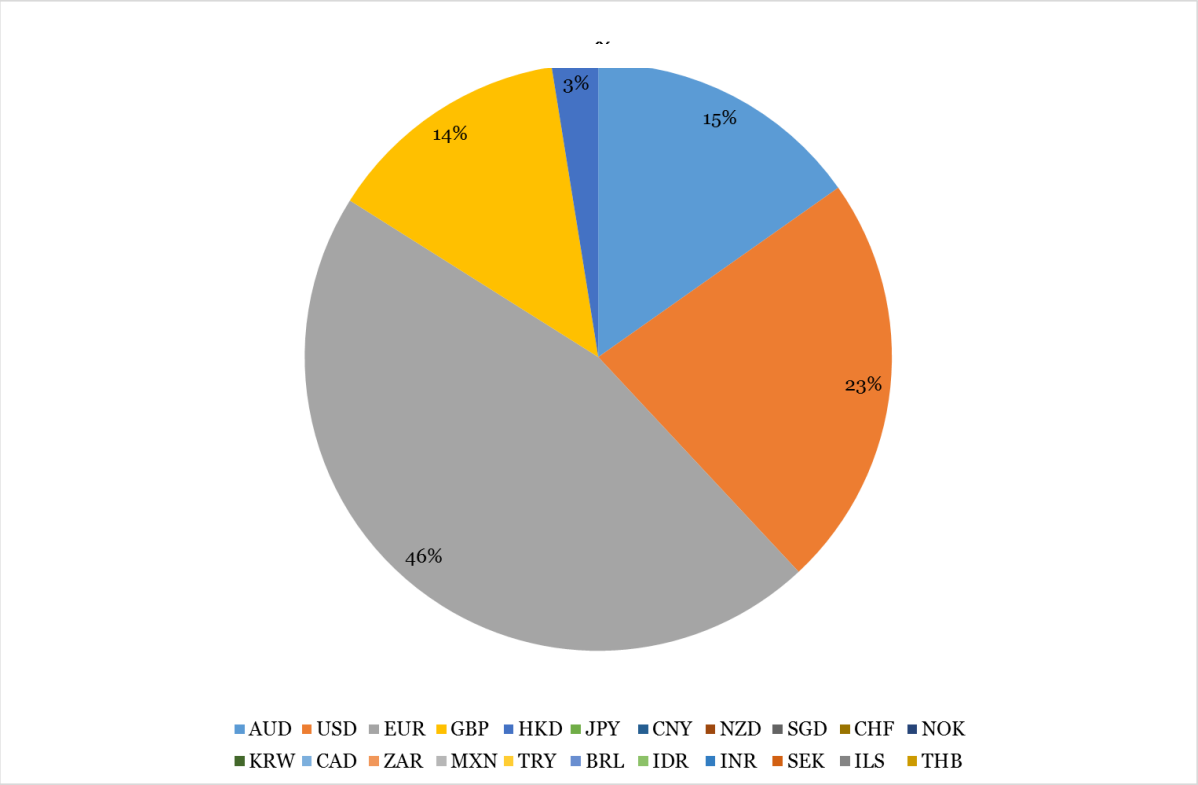
[86] AGL Energy, ATCO Gas Australia, AusNet Electricity Services, AusNet Holdings Partner, AusNet Services Holdings, Brookfield Infrastructure, DBNGP Finance, Envestra Victoria, ETSA Utilities Finance, Origin Energy Finance, SGSP Australia Assets, SPI Electricity, United Energy Distribution.

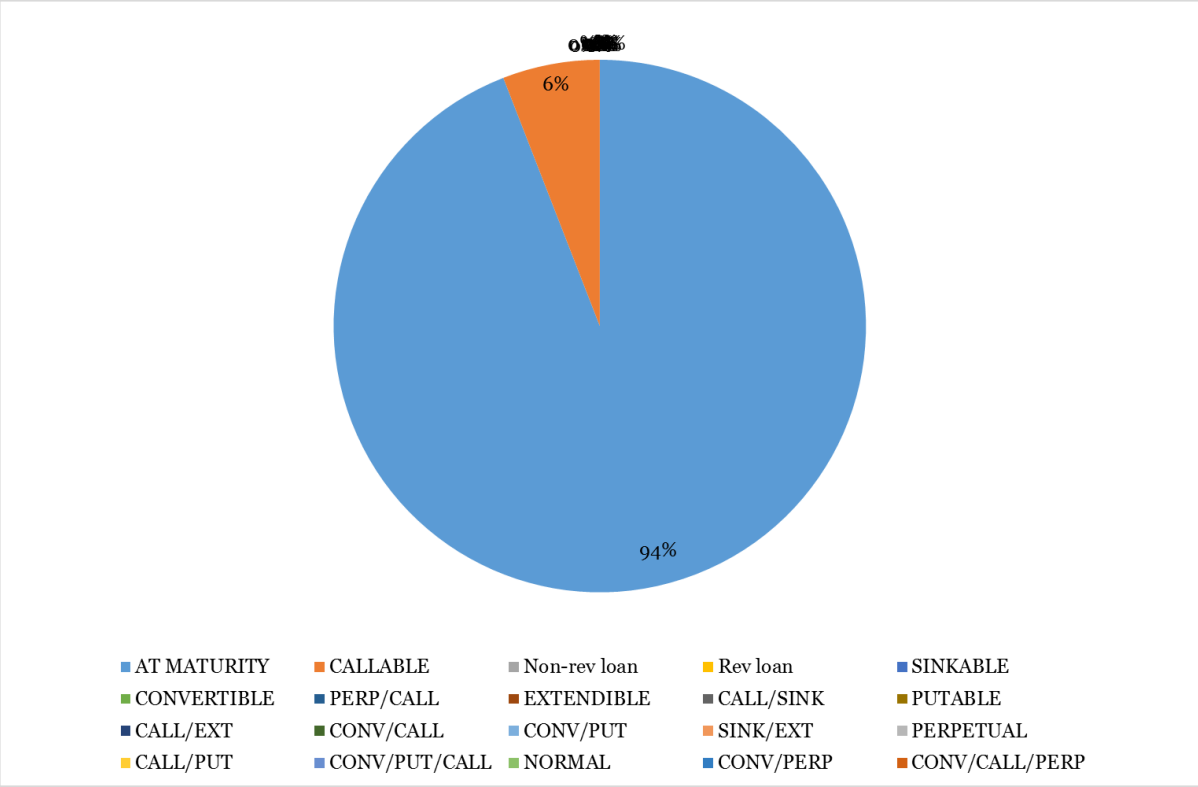
Figure 27: BICS utilities firms (no limits on time to maturity)



Source: Bloomberg, CEG analysis

Figure 28: BICS Utilities firms (debt terms at issuance between 8 and 12 years)





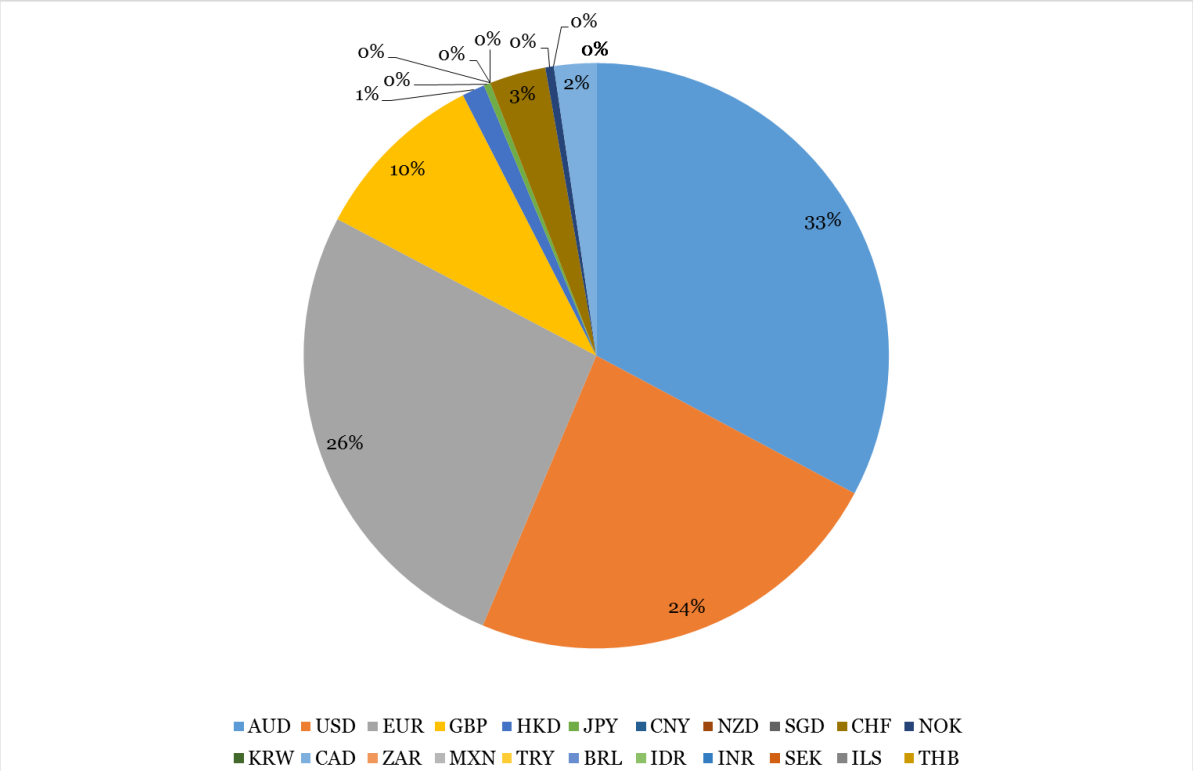
Source: Bloomberg, CEG analysis

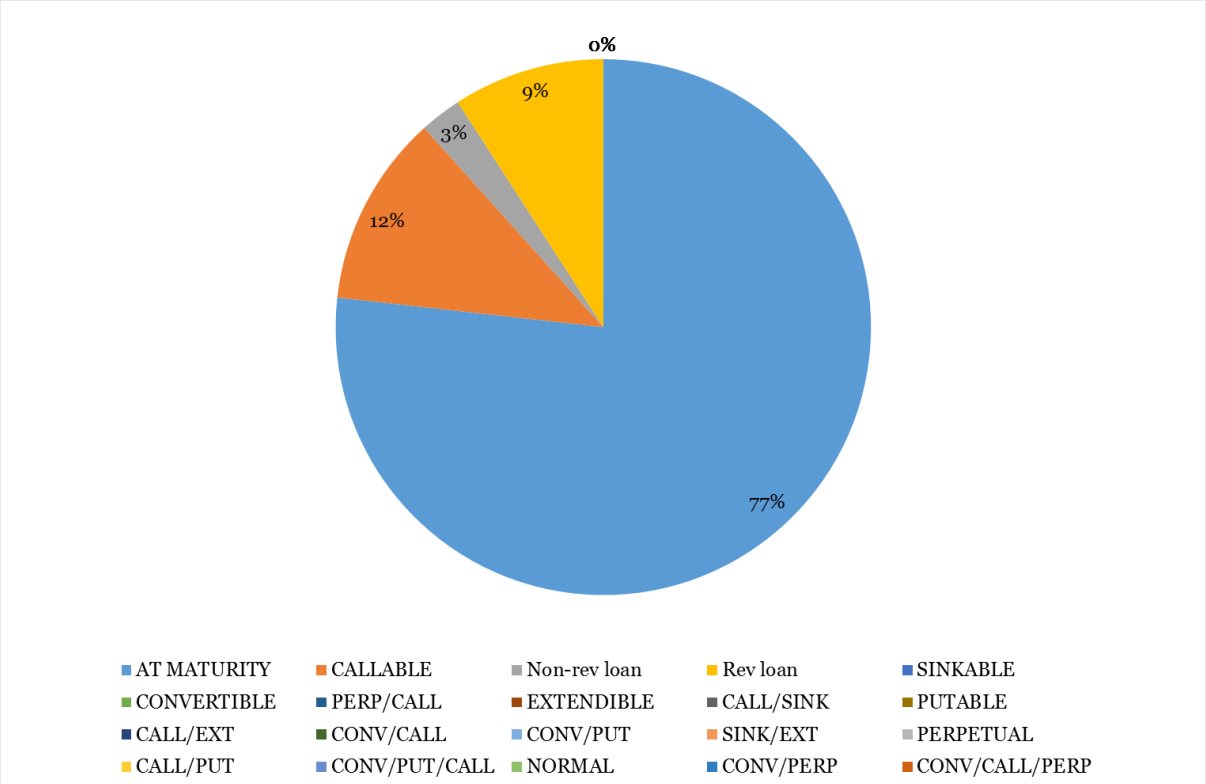
A.2 Utilities (BICS definition + regulated entities)

185. BICS classifies the following regulated firms as part of the Energy sector: APT Pipelines Ltd (ultimate parent company APA Group), Jemena Ltd (ultimate parent company People's Republic of China (60%), Government of Singapore (40%)). These firms were added to the ones identified by BICS as utilities firms. This increased the number of bonds and loans from 53 to 89. When the sample was restricted to those with terms between 8 and 12 years at issuance, the resulting sample contained 28 debt instruments.[87]

[87] The 35 APT and 1 Jemena debt instrument all had debt terms between 8 and 12 years, so none of the debt instruments were removed by this restriction.

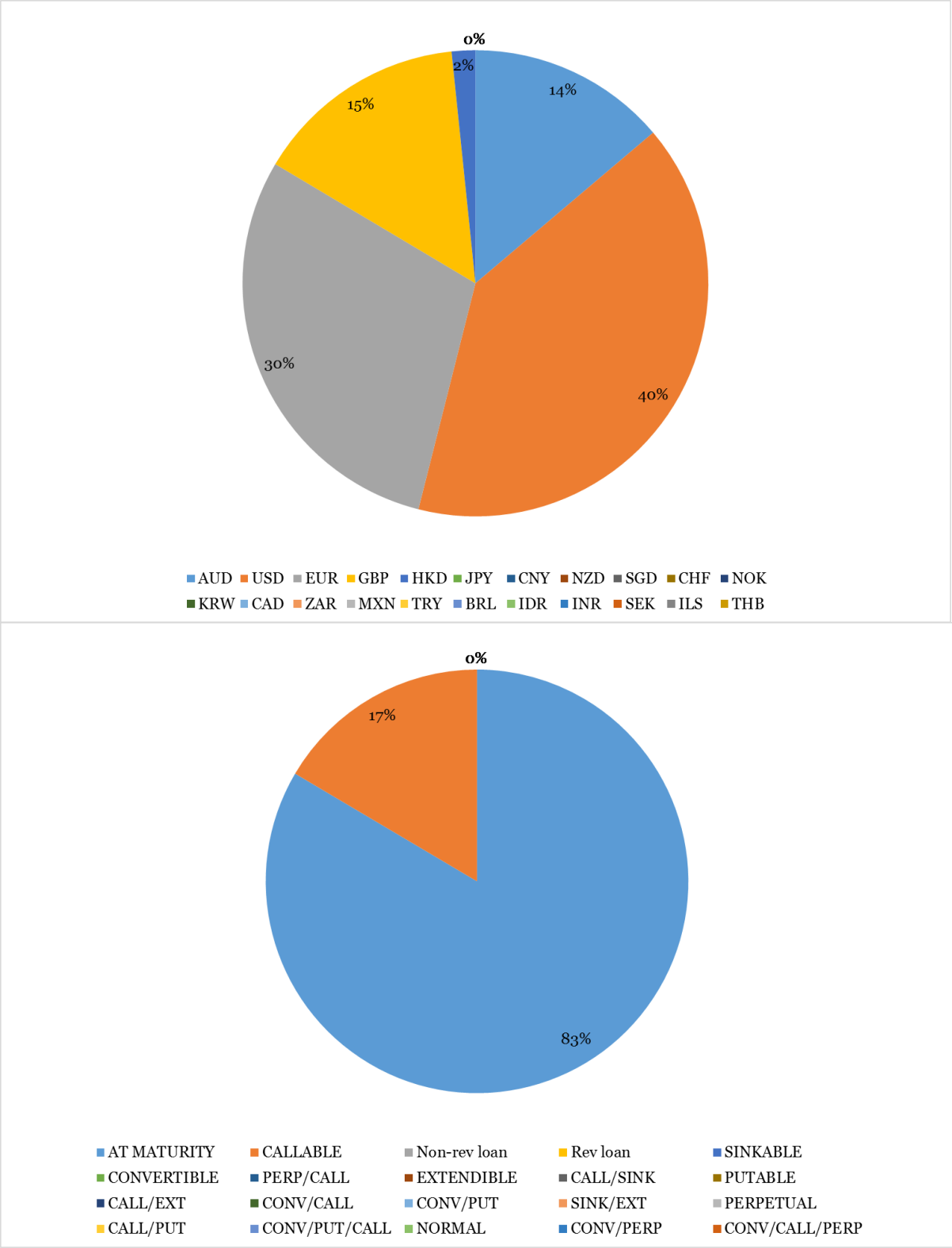
Figure 29: BICS utilities firms + other regulated entities (no limits on maturity)





Source: Bloomberg, CEG analysis

Figure 30: BICS utilities firms + other regulated entities (debt terms at issuance between 8 and 12 years)



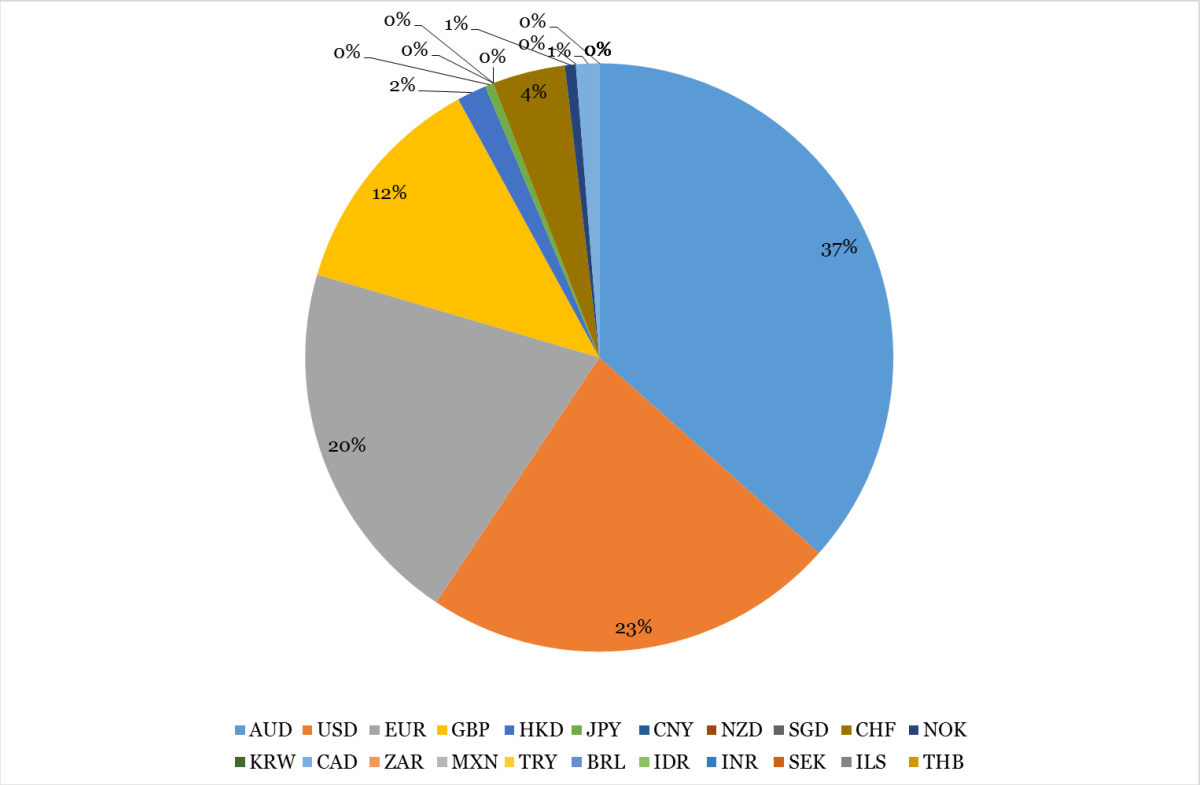
Source: Bloomberg, CEG analysis

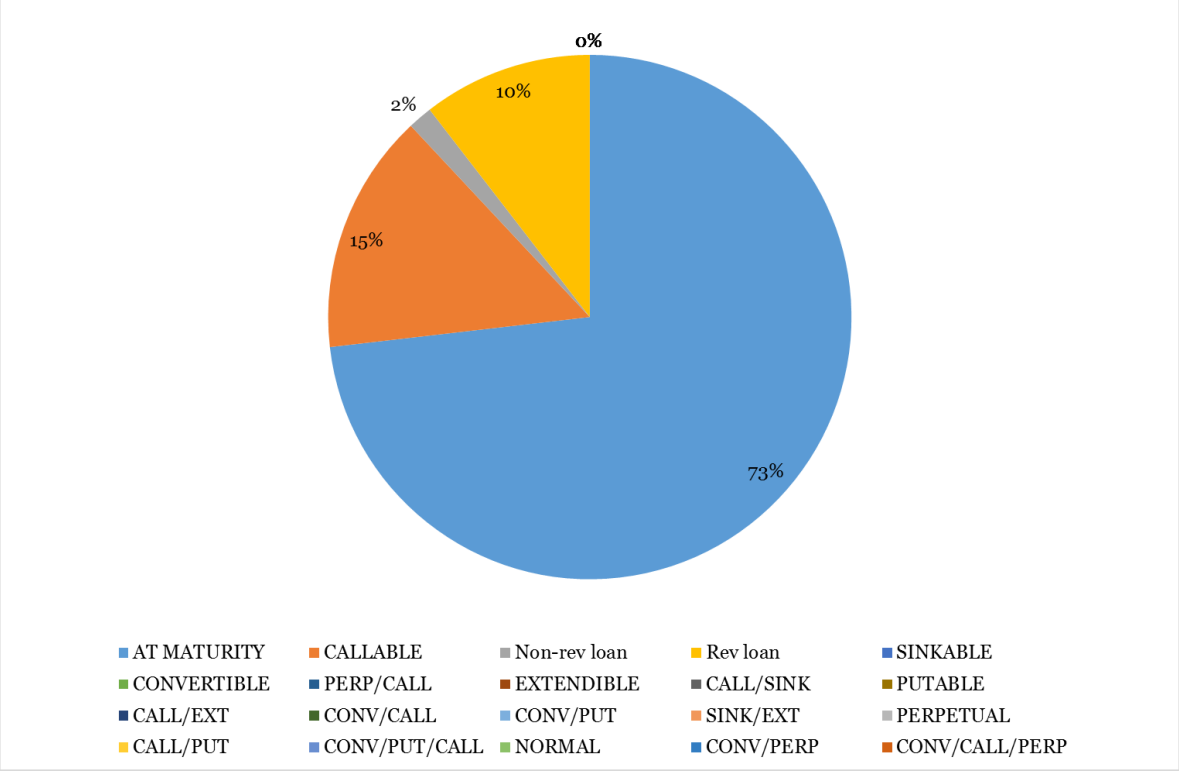
A.3 Utilities (BICS definition + regulated entities – AGL Energy, Brookfield Infrastructure, and Origin Energy)

186. AGL Energy, Brookfield Infrastructure, and Origin Energy are listed under BICS as part of the utilities sector. Since all three firms are unregulated entities, their debt instruments are removed from the sample, leaving 79 debt instruments issued by 12 unique issuers. When the sample is further restricted to instruments with debt terms between 8 and 12 years, the number of debt instruments reduced to 25, issued by 4 different issuers.[88]

[88] APT Pipelines, AusNet Services Holdings, Jemena Ltd, DBNGP Finance, SGSP Australia Assets.

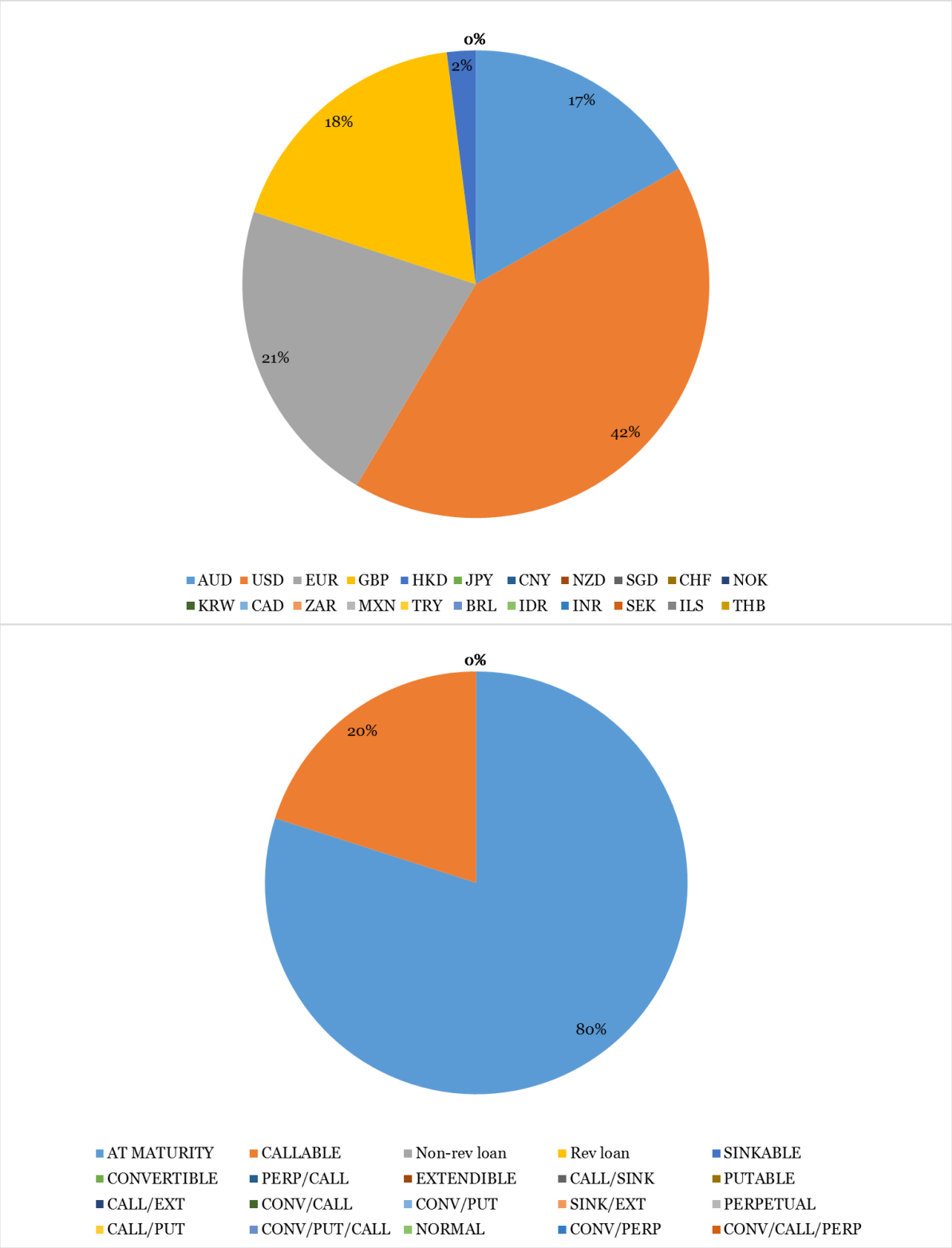
Figure 31: BICS utilities firms + other regulated entities – non-regulated entities (no limits on debt term)





Source: Bloomberg, CEG analysis

Figure 32: BICS utilities firms + other regulated entities – non-regulated entities (debt term between 8 and 12 years)

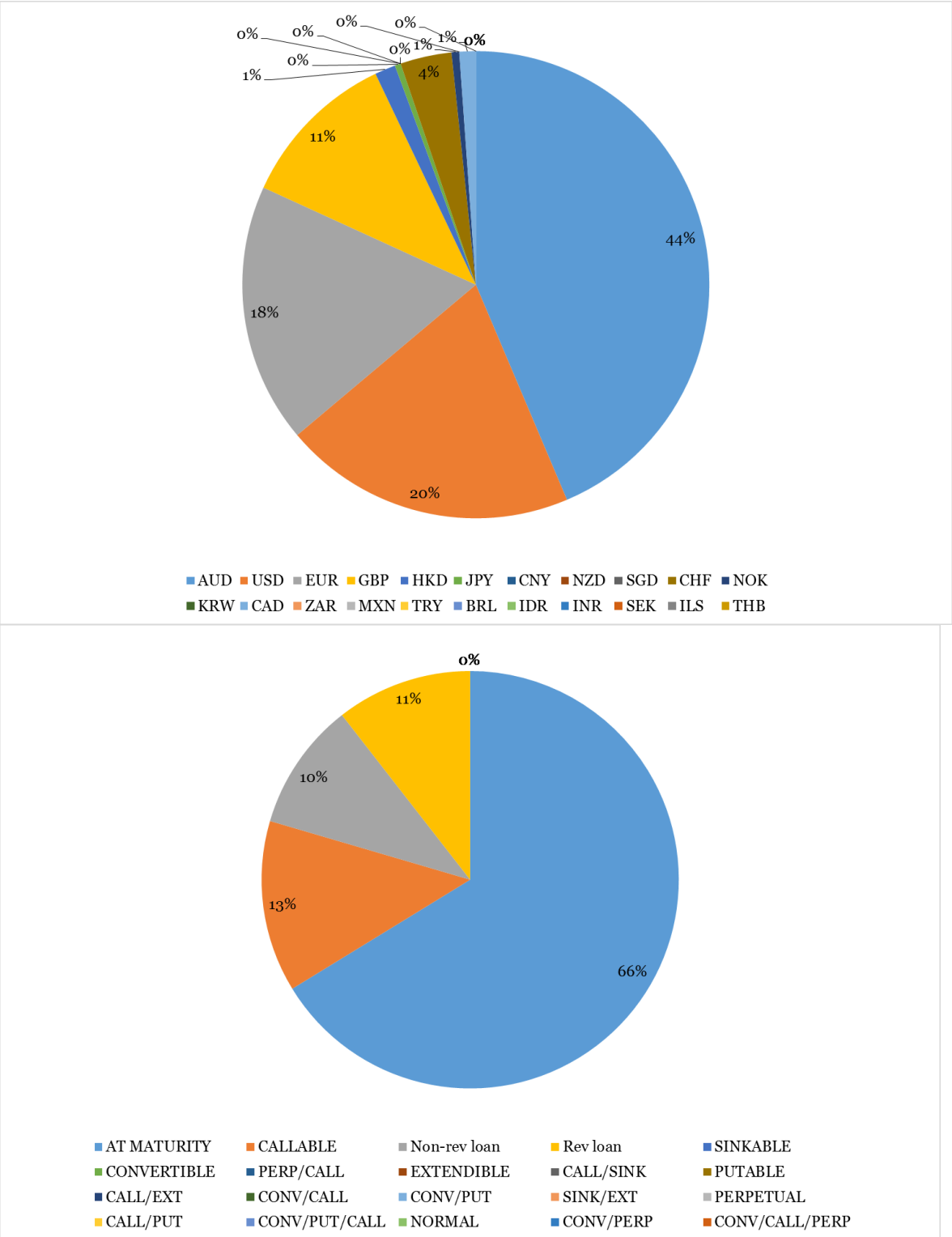


Source: Bloomberg, CEG analysis

A.4 Utilities (BICS definition + regulated entities – AGL Energy, Brookfield Infrastructure, and Origin Energy + unrated bonds issued by utilities firms)

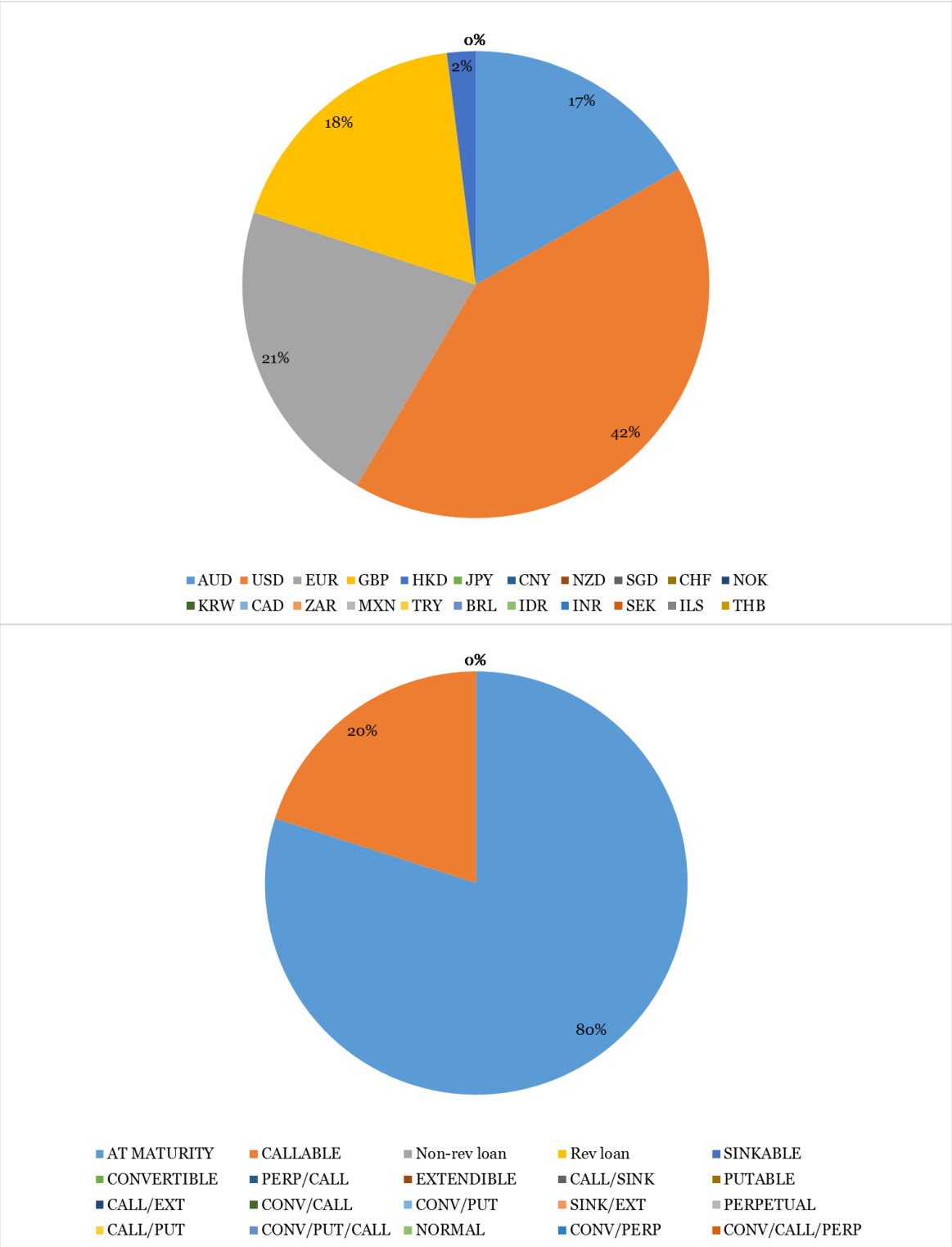
187. Further including the unrated bonds issued by utilities firms (Australia Gas Networks Victoria, Citipower, DBNGP Finance, Powercor Australia, Spark Infrastructure Victoria, and United Energy Distribution) results in a sample of 96 debt instruments, of which 25 have debt terms at issue between 8 and 12 years.

Figure 33: BICS utilities firms + regulated entities – AGL Energy, Brookfield Infrastructure, and Origin Energy + unrated bonds issued by utilities firms (no limits on debt term)



Source: Bloomberg, CEG analysis

Figure 34: BICS utilities firms + regulated entities – AGL Energy, Brookfield Infrastructure, and Origin Energy + unrated bonds issued by utilities firms (debt terms between 8 and 12 years)



Source: Bloomberg, CEG analysis

COMPETITION ECONOMISTS GROUP

Appendix B Reuters sample (14 December 2015)

BOND CONSTITUENTS

«« First | « Prev | Next»

Name	Coupon	Maturity	Bid	Ask	Bid Yield	Ask Yield	Benchmark Spread	Swap Spread	Asset Swap Spread	ISIN
MORGAN STANLY	7.63	03-Mar-2016	100.908	100.984	3.286	2.940	126.6	107.6	100.4	XS0598237013
WOOLWORTH 03/16	6.75	22-Mar-2016	100.955	100.968	3.059	3.009	103.5	84.9	71.6	AU3CB0172039
MIRVAC GR 09/16	8.00	16-Sep-2016	103.327	103.365	3.440	3.390	141.6	123.0	120.6	AU3CB0160687
GOLDMAN S 11/16	7.75	23-Nov-2016	103.898	103.968	3.469	3.394	143.7	128.6	125.9	AU3CB0175800
DAIWA SEC GROUP	3.80	05-Dec-2016	99.883	99.930	3.923	3.873	188.8	174.0	167.5	XS0857206782
MORGAN STANLY	9.00	22-Mar-2017	107.082	107.146	3.241	3.191	118.1	105.1	107.7	XS0757803621
UED 04/17	6.25	11-Apr-2017	103.336	103.401	3.628	3.578	157.3	142.2	144.2	AU3CB0192599
MORGAN STANLY	8.00	09-May-2017	105.927	106.093	3.611	3.493	154.7	142.0	145.5	XS0780192802
VW FIN AU 06/17	5.00	27-Jun-2017	100.745	100.819	4.489	4.439	242.6	228.0	227.8	AU3CB0195964
HOLCIM FI 07/17	6.00	18-Jul-2017	103.543	103.682	3.679	3.590	161.7	148.6	149.9	AU3CB0196699
CROWN GRP 07/17	5.75	18-Jul-2017	103.192	103.270	3.659	3.609	159.6	145.0	147.6	AU3CB0196848
GOLDMAN S 11/17	5.25	29-Nov-2017	103.317	103.489	3.475	3.385	141.1	130.3	127.1	AU3CB0202414
CITIGROUP 02/18	4.75	05-Feb-2018	102.700	102.852	3.426	3.353	136.4	121.6	120.7	AU3CB0204808
MORGAN STANLY	7.38	22-Feb-2018	107.385	107.657	3.782	3.658	168.3	156.6	160.6	XS0819243097
VW FIN AU 04/18	4.25	04-Apr-2018	99.364	99.917	4.542	4.286	241.6	232.1	228.9	AU3CB0220028
GOLDMAN S 08/18	5.00	08-Aug-2018	103.392	103.568	3.641	3.572	151.5	139.7	141.9	AU3CB0211944
BOFA 08/18	4.50	23-Aug-2018	102.385	102.581	3.559	3.483	143.3	133.7	132.5	AU3CB0208775
AAPT 11/18	5.75	01-Nov-2018	99.893	100.023	5.788	5.738	366.1	355.2	350.7	AU3CB0215457
LEND LEAS 11/18	5.50	13-Nov-2018	102.988	103.217	4.392	4.309	226.6	213.0	215.3	AU3CB0208494
MORGAN STANLY	4.75	16-Nov-2018	102.822	103.101	3.719	3.619	156.3	145.4	146.8	XS0932235194
ANGLO AME 11/18	5.75	27-Nov-2018	89.415	89.532	9.984	9.934	785.8	771.9	718.1	AU0000AQMHA7
FORD MOTOR CRED	4.05	10-Dec-2018	99.790	100.193	4.125	3.980	199.8	185.3	183.7	XS1331888609
WOOLWORTH 03/19	6.00	21-Mar-2019	106.318	106.476	3.915	3.865	178.9	158.9	165.0	AU3CB0191815
EMIRATES 05/19	5.75	08-May-2019	104.264	104.643	4.382	4.264	218.1	202.8	208.1	AU3CB0220861
VW FIN AU 08/20	3.25	13-Aug-2019	95.097	95.677	4.724	4.545	252.3	231.2	224.1	AU3CB0231868
GOLDMAN S 08/19	5.00	21-Aug-2019	103.909	104.201	3.849	3.765	164.8	143.3	146.9	AU3CB0218709
CROWN GRP 11/19	4.50	18-Nov-2019	100.071	100.249	4.479	4.429	227.8	201.0	201.3	AU3CB0225324
BOFA 03/20	4.25	05-Mar-2020	101.270	101.991	3.919	3.734	171.8	141.0	142.2	AU3CB0223675

COMPETITION ECONOMISTS GROUP

BOND CONSTITUENTS

«« First | « Prev | Next»

Name	Coupon	Maturity	Bid	Ask	Bid Yield	Ask Yield	Benchmark Spread	Swap Spread	Asset Swap Spread	ISIN
HOLCIM FI 03/20	3.75	19-Mar-2020	99.146	99.343	3.969	3.918	176.8	145.6	144.7	AU3CB0228286
QANTAS AI 04/20	6.50	27-Apr-2020	104.566	105.512	5.311	5.073	311.0	278.7	285.7	AU3CB0208122
LEND LEAS 05/20	6.00	13-May-2020	104.836	105.111	4.769	4.701	244.4	224.0	230.3	AU3CB0208502
APT PIPEL 07/20	7.75	22-Jul-2020	115.288	115.515	4.069	4.019	174.4	152.0	166.7	AU3CB0155133
QPH FINAN 07/20	5.75	29-Jul-2020	107.695	107.914	3.911	3.861	158.6	136.0	142.6	AU3CB0211647
CONNECTEA 09/20	5.75	02-Sep-2020	107.437	107.659	4.000	3.950	167.5	143.9	150.4	AU3CB0212967
BRIS AIRP 10/20	6.00	21-Oct-2020	109.022	109.252	3.935	3.885	161.0	136.0	143.9	AU3CB0214823
AURIZON N 10/20	5.75	28-Oct-2020	106.080	106.305	4.348	4.298	202.3	177.1	183.7	AU3CB0215119
WESFARMER 11/20	3.66	18-Nov-2020	99.332	99.531	3.810	3.765	148.5	122.7	122.0	AU3CB0229565
PERTH AIR 03/21	5.50	25-Mar-2021	105.234	105.474	4.376	4.326	199.1	176.0	182.2	AU3CB0219681
QANTAS AI 06/21	7.50	11-Jun-2021	108.746	109.614	5.624	5.448	323.9	298.8	314.6	AU3CB0221141
GOLDMAN S 09/21	4.70	08-Sep-2021	103.369	103.529	4.034	4.003	164.9	137.7	140.9	AU3CB0223741
MORGAN STANLY	5.00	30-Sep-2021	104.421	104.905	4.132	4.040	174.7	147.0	151.4	XS1115524016
AUSTRALIA 12/21	4.50	17-Dec-2021	102.018	102.285	4.121	4.071	157.1	143.9	145.9	AU3CB0226264
EMIRATES 02/22	4.75	18-Feb-2022	100.621	101.000	4.632	4.561	208.2	193.3	194.1	AU3CB0227411
QANTAS AI 05/22	7.75	19-May-2022	110.208	111.163	5.821	5.652	327.1	310.2	329.5	AU3CB0220929
ASCIANO F 05/25	5.25	19-May-2025	97.759	98.118	5.558	5.508	271.2	260.0	255.0	AU3CB0229680

Appendix C Terms of reference

1 Background

Jemena Electricity Networks (**JEN**) is an electricity distribution network service provider in Victoria. JEN supplies electricity to approximately 300,000 homes and businesses through its 10,285 kilometres of distribution system. JEN's electricity distribution system services 950 square kilometres of northwest greater Melbourne. JEN's electricity network is maintained by infrastructure management and services company, Jemena Asset Management (**JAM**).

JEN submitted its initial regulatory proposal with supporting information for the consideration of the Australian Energy Regulator (**AER**) on 30 April 2015. This proposal covers the period 2016-2020 (calendar years). The AER published its preliminary determination on 29 October 2015. JEN is currently preparing its submission in response to the preliminary decision, to be submitted to the AER by 6 January 2016.

As with all of its economic regulatory functions and powers, when making the distribution determination to apply to JEN under the National Electricity Rules and National Electricity Law, the AER is required to do so in a manner that will or is likely to contribute to the achievement of the National Electricity Objective, which is:

> *to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:*
>
> *(a) price, quality, safety, reliability and security of supply of electricity; and*
>
> *(b) the reliability, safety and security of the national electricity system.*

The equivalent National Gas Objective is set out in section 23 of the National Gas Law.

Where the AER is making a distribution determination and there are two or more possible decisions that will or are likely to contribute to the achievement of the National Electricity Objective, the AER is required to make the decision that the AER is satisfied will or is likely to contribute to the achievement of the National Electricity Objective to the greatest degree.

The AER must also take into account the revenue and pricing principles in section 7A of the National Electricity Law when exercising its discretion in making those parts of a distribution determination relating to direct control network services. The revenue and pricing principles include the following:

> *A regulated network service provider should be provided with a reasonable opportunity to recover at least the efficient costs the operator incurs in:*
>
> *(a) providing direct control network services; and*
>
> *(b) complying with a regulatory obligation or requirement or making a regulatory payment.*

The equivalent revenue and pricing principles for gas network regulation are set out in section 24 of the National Gas Law.

Some of the key rules governing the making of a distribution determination are set out below.

Clause 6.4.3(a) of the National Electricity Rules provides that revenue for a regulated service provider is to be calculated adopting a "building block approach". It provides:

> *The annual revenue requirement for a Distribution Network Service Provider for each regulatory year of a regulatory control period must be determined using a building block approach, under which the building blocks are:*
>
> *(1) indexation of the regulatory asset base – see paragraph (b)(1);*
>
> *(2) a return on capital for that year – see paragraph (b)(2);*
>
> *(3) the depreciation for that year – see paragraph (b)(3);*
>
> *(4) the estimated cost of corporate income tax of the Distribution Network Service Provider for that year – see paragraph (b)(4);*
>
> *(5) the revenue increments or decrements (if any) for that year arising from the application of any efficiency benefit sharing scheme, capital expenditure sharing scheme, service target performance incentive scheme, demand management and embedded generation connection incentive scheme or small-scale incentive scheme – see subparagraph (b)(5);*
>
> *(6) the other revenue increments or decrements (if any) for that year arising from the application of a control mechanism in the previous regulatory control period – see paragraph (b)(6);*
>
> *(6A) the revenue decrements (if any) for that year arising from the use of assets that provide standard control services to provide certain other services – see subparagraph (b)(6A); and*
>
> *(7) the forecast operating expenditure for that year – see paragraph (b)(7).*

Clause 6.5.2 of the National Electricity Rules, relating to the allowed rate of return, states:

> *Calculation of return on capital*
>
> *(a) The return on capital for each regulatory year must be calculated by applying a rate of return for the relevant Distribution Network Service Provider for that regulatory year that is determined in accordance with this clause 6.5.2 (the allowed rate of return) to the value of the regulatory asset base for the relevant distribution system as at the beginning of that regulatory year (as established in accordance with clause 6.5.1 and schedule 6.2).*
>
> *Allowed rate of return*

(b) The allowed rate of return is to be determined such that it achieves the allowed rate of return objective.

(c) The allowed rate of return objective is that the rate of return for a Distribution Network 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 Distribution Network Service Provider in respect of the provision of standard control services (the allowed rate of return objective).

(d) Subject to paragraph (b), the allowed rate of return for a regulatory year must be:

(1) a weighted average of the return on equity for the regulatory control period in which that regulatory year occurs (as estimated under paragraph (f)) and the return on debt for that regulatory year (as estimated under paragraph (h)); and

(2) determined on a nominal vanilla basis that is consistent with the estimate of the value of imputation credits referred to in clause 6.5.3.

(e) In determining the allowed rate of return, regard must be had to:

(1) relevant estimation methods, financial models, market data and other evidence;

(2) the desirability of using an approach that leads to the consistent application of any estimates of financial parameters that are relevant to the estimates of, and that are common to, the return on equity and the return on debt; and

(3) any interrelationships between estimates of financial parameters that are relevant to the estimates of the return on equity and the return on debt.

Return on equity

(f) The return on equity for a regulatory control period must be estimated such that it contributes to the achievement of the allowed rate of return objective.

(g) In estimating the return on equity under paragraph (f), regard must be had to the prevailing conditions in the market for equity funds.

Return on debt

(h) The return on debt for a regulatory year must be estimated such that it contributes to the achievement of the allowed rate of return objective.

(i) The return on debt may be estimated using a methodology which results in either:

(1) the return on debt for each regulatory year in the regulatory control period being the same; or

(2) the return on debt (and consequently the allowed rate of return) being, or potentially being, different for different regulatory years in the regulatory control period.

(j) Subject to paragraph (h), the methodology adopted to estimate the return on debt may, without limitation, be designed to result in the return on debt reflecting:

(1) 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 making of the distribution determination for the regulatory control period;

(2) 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 regulatory control period; or

(3) some combination of the returns referred to in subparagraphs (1) and (2).

(k) In estimating the return on debt under paragraph (h), regard must be had to the following factors:

(1) the desirability of minimising any difference between the return on debt and the return on debt of a benchmark efficient entity referred to in the allowed rate of return objective;

(2) the interrelationship between the return on equity and the return on debt;

(3) the incentives that the return on debt may provide in relation to capital expenditure over the regulatory control period, including as to the timing of any capital expenditure; and

(4) any impacts (including in relation to the costs of servicing debt across regulatory control periods) on a benchmark efficient entity referred to in the allowed rate of return objective that could arise as a result of changing the methodology that is used to estimate the return on debt from one regulatory control period to the next.

(l) If the return on debt is to be estimated using a methodology of the type referred to in paragraph (i)(2) then a resulting change to the Distribution Network Service Provider's annual revenue requirement must be effected through the automatic application of a formula that is specified in the distribution determination."

[Subclauses (m)–(q) omitted].

The equivalent National Gas Rules are set out in rule 87.

Clause 6.5.3 of the National Electricity Rules, relating to the estimated cost of corporate income tax, states:

The estimated cost of corporate income tax of a Distribution Network Service Provider for each regulatory year (ETCt) must be estimated in accordance with the following formula:

ETCt = (ETIt × rt) (1 – γ)

where:

ETIt is an estimate of the taxable income for that regulatory year that would be earned by a benchmark efficient entity as a result of the provision of standard control services if such an entity, rather than the Distribution Network Service Provider, operated the business of the Distribution Network Service Provider, such estimate being determined in accordance with the post-tax revenue model;

rt is the expected statutory income tax rate for that regulatory year as determined by the AER; and

γ is the value of imputation credits.

The equivalent National Gas Rule is in rule 87A.

In its initial proposal, JEN submitted expert reports from CEG, SFG and UBS (the **Earlier Reports**) on the appropriate approach to be adopted in estimating the return on debt for the benchmark efficient entity.[89] The AER preliminary decision considered these reports.

In this context, JEN seeks a report from CEG, as a suitable qualified independent expert (**Expert**), that reviews and, where appropriate, responds to matters raised in the preliminary decision on what data sources to use when estimating the return on debt. JEN seeks this report on behalf of itself, ActewAGL Distribution, Ausnet Services, Australian Gas Networks, Citipower, Powercor, and United Energy.

2 Scope of Work

In its preliminary decision, the AER estimated a return on debt of 5.16% for the benchmark efficient entity (**BEE**), (a) assuming the transition to the trailing average approach set out in the rate of return guideline and (b) using a simple average of yield curves published by Bloomberg and the Reserve Bank of Australia (**RBA**). The AER also estimated this return assuming a BBB+ credit rating and a 10 year term of debt.

89 CEG, *Critique of the AER's JGN draft decision on the cost of debt*, April 2015; SFG, *Return on debt transition arrangements under the NGR and NER*, February 2015; and UBS, *Transaction Costs and the AER Return on Debt Draft Determination*, March 2015.

The AER relied on separate expert reports from Dr Lally and Chairmont to support its approach to estimating this return, and defined the BEE as:

a pure play, regulated energy network business operating within Australia.

The Expert will provide an opinion report that:

1. Reviews and critiques the AER's preliminary decision, and the report of Dr Lally, on the appropriate approach to determining the data source or sources to be used to estimate the return on debt.

2. Identifies criteria that may be used to assess the merits of fair value curves published by third party providers (including by Bloomberg, Reuters and the RBA) for use in estimating the return on debt, considering:

   (a) the samples used by these providers to derive their respective yield curves;

   (b) previous decisions of the Australian Competition Tribunal; and

   (c) any other matter that the Expert considers relevant.

3. In light of the above:

   (a) determines the most appropriate yield curve or combination of curves for estimating the return on debt for the BEE once assessed against the criteria in (2); and

   (b) describes an approach to selecting the most appropriate yield curve or combination of curves to be used in estimating the return on debt for the BEE at a given point in time.

In preparing the report the Expert will:

A. consider any relevant comments raised by the AER and other regulators, and experts engaged by those regulators;

B. use robust methods and data in producing any statistical estimates.

3 Information to be Considered

The Expert is also expected to consider the following information:

- such information that, in Expert's opinion, should be taken into account to address the questions outlined above;

- relevant literature on estimating the return on debt;

- the AER's Rate of Return Guideline, including explanatory statements and supporting expert material;

- material submitted to the AER as part of its consultation on the Rate of Return Guidelines; and
- previous decisions of the AER, other relevant regulators and the Australian Competition Tribunal on the return on debt and any supporting expert material, including the recent final decisions for Jemena Gas Networks and electricity networks in ACT, NSW, Queensland, South Australia and Tasmania.

4 Deliverables

At the completion of its review the Expert will provide an independent expert report which:

- is of a professional standard capable of being submitted to the AER;
- is prepared in accordance with the Federal Court Practice Note on Expert Witnesses in Proceedings in the Federal Court of Australia (CM 7) set out in Attachment 1, and includes an acknowledgement that the Expert has read the guidelines [90];
- contains a section summarising the Expert's experience and qualifications, and attaches the Expert's curriculum vitae (preferably in a schedule or annexure);
- identifies any person and their qualifications, who assists the Expert in preparing the report or in carrying out any research or test for the purposes of the report;
- summarises JEN's instructions and attaches these term of reference;
- includes an executive summary which highlights key aspects of the Expert's work and conclusions; and
- (without limiting the points above) carefully sets out the facts that the Expert has assumed in putting together his or her report, as well as identifying any other assumptions made, and the basis for those assumptions.

The Expert's report will include the findings for each of the three parts defined in the scope of works (Section 2).

5 Timetable

The Expert will deliver the final report to Jemena Regulation by **6 January 2016**.

[90] Available at: http://www.federalcourt.gov.au/law-and-practice/practice-documents/practice-notes/cm7.

6 Terms of Engagement

The terms on which the Expert will be engaged to provide the requested advice shall be:

- as provided in accordance with the Jemena Regulatory Consultancy Services Panel arrangements applicable to the Expert.

ATTACHMENT 1: FEDERAL COURT PRACTICE NOTE

Practice Note CM 7

EXPERT WITNESSES IN PROCEEDINGS IN THE FEDERAL COURT OF AUSTRALIA

Commencement

1. This Practice Note commences on 4 June 2013.

Introduction

2. Rule 23.12 of the Federal Court Rules 2011 requires a party to give a copy of the following guidelines to any witness they propose to retain for the purpose of preparing a report or giving evidence in a proceeding as to an opinion held by the witness that is wholly or substantially based on the specialised knowledge of the witness (see **Part 3.3 - Opinion** of the *Evidence Act 1995* (Cth)).

3. The guidelines are not intended to address all aspects of an expert witness's duties, but are intended to facilitate the admission of opinion evidence[91], and to assist experts to understand in general terms what the Court expects of them. Additionally, it is hoped that the guidelines will assist individual expert witnesses to avoid the criticism that is sometimes made (whether rightly or wrongly) that expert witnesses lack objectivity, or have coloured their evidence in favour of the party calling them.

Guidelines

1. General Duty to the Court[92]

1.1 An expert witness has an overriding duty to assist the Court on matters relevant to the expert's area of expertise.

1.2 An expert witness is not an advocate for a party even when giving testimony that is necessarily evaluative rather than inferential.

1.3 An expert witness's paramount duty is to the Court and not to the person retaining the expert.

2. The Form of the Expert's Report[93]

2.1 An expert's written report must comply with Rule 23.13 and therefore must

(a) be signed by the expert who prepared the report; and

(b) contain an acknowledgement at the beginning of the report that the expert has read, understood and complied with the Practice Note; and

(c) contain particulars of the training, study or experience by which the expert has acquired specialised knowledge; and

(d) identify the questions that the expert was asked to address; and

---

91 As to the distinction between expert opinion evidence and expert assistance see *Evans Deakin Pty Ltd v Sebel Furniture Ltd* [2003] FCA 171 per Allsop J at [676].

92 The "*Ikarian Reefer*" (1993) 20 FSR 563 at 565-566.

93 Rule 23.13.

(e) set out separately each of the factual findings or assumptions on which the expert's opinion is based; and

(f) set out separately from the factual findings or assumptions each of the expert's opinions; and

(g) set out the reasons for each of the expert's opinions; and

(ga) contain an acknowledgment that the expert's opinions are based wholly or substantially on the specialised knowledge mentioned in paragraph (c) above[94]; and

(h) comply with the Practice Note.

2.2 At the end of the report the expert should declare 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 Court*."

2.3 There should be included in or attached to the report the documents and other materials that the expert has been instructed to consider.

2.4 If, after exchange of reports or at any other stage, an expert witness changes the expert's opinion, having read another expert's report or for any other reason, the change should be communicated as soon as practicable (through the party's lawyers) to each party to whom the expert witness's report has been provided and, when appropriate, to the Court[95].

2.5 If an expert's opinion is not fully researched because the expert considers that insufficient data are available, or for any other reason, this must be stated with an indication that the opinion is no more than a provisional one. Where an expert witness who has prepared a report believes that it may be incomplete or inaccurate without some qualification, that qualification must be stated in the report.

2.6 The expert should make it clear if a particular question or issue falls outside the relevant field of expertise.

2.7 Where an expert's report refers to photographs, plans, calculations, analyses, measurements, survey reports or other extrinsic matter, these must be provided to the opposite party at the same time as the exchange of reports[96].

3. Experts' Conference

3.1 If experts retained by the parties meet at the direction of the Court, it would be improper for an expert to be given, or to accept, instructions not to reach agreement. If, at a meeting directed by the Court, the experts cannot reach agreement about matters of expert opinion, they should specify their reasons for being unable to do so.

J L B ALLSOP
Chief Justice
4 June 2013

---

94 See also *Dasreef Pty Limited v Nawaf Hawchar* [2011] HCA 21.

95 The *"Ikarian Reefer"* [1993] 20 FSR 563 at 565

96 The *"Ikarian Reefer"* [1993] 20 FSR 563 at 565-566. See also Ormrod *"Scientific Evidence in Court"* [1968] Crim LR 240