



**Return on debt: Choice of third party data
service provider**

Issues Paper

April 2014

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Request for submissions

Interested parties are invited to make written submissions to the Australian Energy Regulator (AER) regarding this paper by the close of business, 19 May 2014.

Submissions should be sent electronically to: rateofreturn@aer.gov.au. The AER prefers that all submissions sent in an electronic format are in Microsoft Word or other text readable document form.

Alternatively, submissions can be sent to:

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Canberra ACT 2601

We prefer that all submissions be publicly available to facilitate an informed and transparent consultative process. Submissions will be treated as public documents unless otherwise requested. Parties wishing to submit confidential information are requested to:

- clearly identify the information that is the subject of the confidentiality claim
- provide a non-confidential version of the submission in a form suitable for publication.

All non-confidential submissions will be placed on our website at www.aer.gov.au. For further information regarding our use and disclosure of information provided to us, see the ACCC/AER Information Policy, October 2008 available on our website.

Enquires about this paper, or about lodging submissions, should be directed to our Network Regulation branch on (03) 9290 1444.

Next steps

We will consider and respond to submissions on this issues paper in the context of our upcoming regulatory determinations. The first such determinations are those for the NSW and ACT electricity distribution networks, and the NSW, ACT and Tasmanian electricity transmission networks. Our draft decision is expected in November 2014.

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1 About this issues paper

We, the Australian Energy Regulator (AER), published our rate of return guideline in December 2013.¹ The National Electricity Rules (NER) and National Gas Rules (NGR) (the rules) required us to develop this guideline, and to specify within it:²

- the methodologies we propose to use in estimating the allowed rate of return, including how those methodologies are proposed to result in the determination of a return on equity and a return on debt in a way that is consistent with the allowed rate of return objective
- the estimation methods, financial models, market data and other evidence we propose to take into account in estimating the return on equity, the return on debt and the value of imputation credits.

This paper considers issues relevant to implementing our proposed approach to estimating the return on debt that were not explicitly covered in our guideline. In particular, this paper sets out:

- the features of the third party data series currently available for estimating the return on debt. This includes data series published by the Reserve Bank of Australia (RBA) and Bloomberg.
- the issues that may need to be addressed if the RBA data series is used to estimate the return on debt, including interpolating monthly estimates and selecting an averaging period for return on debt estimates.

In this paper, however, we do not propose to use a specific data series. Instead, such a decision will be undertaken at the time of a regulatory determination. In this context, the discussion in section 5 on addressing issues relevant to the use of the RBA series should not be inferred as a preference for using the RBA series.

Similarly, this paper does not consider the development of an in-house data series to estimate the return on debt. The reasons for using a third party data service provider are outlined in our explanatory statement on the rate of return guideline.³

Where stakeholders comment on the material covered in this issues paper they should explain why they hold particular views and, if possible, set out how their proposal(s) might be implemented.

¹ AER, *Rate of return guideline*, December 2013.

² NER, cl. 6.5.2(n)(1) and 6A.6.2(n); NGR, r. 87(13).

³ AER, *Explanatory statement: Rate of return guideline*, December 2013, pp. 126–130.

2 Questions for stakeholders

In this paper, we seek stakeholder views on how to implement the approach for estimating the return on debt proposed in our rate of return guideline. The relevant background material to these questions is provided in sections 4 and 5.

Third party data service providers

1. Are there any matters, other than criteria set out in section 4, that we should consider when choosing between alternative data series to estimate the return on debt?
2. If we use a particular series in a final decision, should we use this series for the duration of the regulatory period (as discussed in section 4.4.5)?
3. Which third party data service providers, other than the RBA and Bloomberg, could we consider to estimate the return on debt?
 - a. If an alternative data service provider is proposed, what are the advantages of this provider relative to the RBA and Bloomberg series outlined in section 4?
4. Which series provided by the RBA or Bloomberg, other than those outlined in section 4, could we consider to estimate the return on debt?
 - a. If an alternative data series is proposed, what are the advantages of this series relative to the RBA and Bloomberg series outlined in section 4?

Employing the Bloomberg series

5. What are the advantages and disadvantages of the BVAL series for estimating the return on debt for our benchmark efficient entity?

Employing the RBA series

6. What are the advantages and disadvantages of the RBA series for estimating the return on debt for our benchmark efficient entity?
7. The RBA series currently only publishes data on a monthly frequency. If the RBA series is used to estimate the return on debt (and daily estimates remain unavailable), state and explain your view on whether we should:
 - a. interpolate daily estimates from the RBA's month-end data (as discussed in section 5.1)?
 - b. adopt an alternative approach for utilising the RBA series (as discussed in section 5.2)?
8. If we interpolate daily estimates from the RBA's month-end data, state and explain your view on whether we should interpolate daily estimates:
 - a. using the total yield, or the spread to either Commonwealth Government Securities (CGS) or the bank bill swap rate (as discussed in section 5.1.1)?
 - b. using the number of business days or calendar days between corresponding month-end estimates (as discussed in section 5.1.2)?
 - c. using some other technique (for example, non-linear interpolation)?

9. In our rate of return guideline we proposed to estimate the return on debt observed over an averaging period of 10 or more consecutive business days.

As discussed in section 5.2, if we accept the use of the RBA's month-end data, what restrictions (if any) should we impose on the number of data points used?

3 Summary of proposed approach to estimating the return on debt

In our rate of return guideline, we proposed to estimate the allowed return on debt using published yields from an independent third party service provider and using the proposed debt term and credit rating for a benchmark efficient entity.⁴ We considered that our proposed trailing average portfolio approach to estimating the allowed return on debt would contribute to the achievement of the allowed rate of return objective.⁵ Further, our proposed approach recognises the desirability of minimising the difference between the allowed return on debt and the return on debt of a benchmark efficient entity.⁶

In our guideline⁷ we explained that the allowed rate of return objective requires that the AER set a rate of return which reflects the efficient financing costs of a benchmark efficient entity. The benchmark efficient entity is to be subject to a similar degree of risk in providing regulated services as the service provider which is subject to the determination.

Together with the other building block components, the estimate of the overall rate of return is to be set such that:

- it promotes efficient investment in, and efficient operation and use of, electricity and natural gas services for the long term interests of consumers⁸
- a regulated network service provider should be provided with a reasonable opportunity to recover at least the efficient costs the operator incurs in providing regulated services and complying with its regulatory obligations.⁹

In our guideline, we proposed the following:

- Apply a trailing average portfolio approach to estimate the allowed return on debt.
- Update the return on debt annually, using equal weights to each contributing element of the trailing average.
- Implement transitional arrangements to apply the new trailing average portfolio approach.

Each of these proposals are summarised below.

3.1 Characteristics of the benchmark efficient entity

The benchmark efficient entity, as we proposed in our guideline, is a 'pure play', regulated energy network business operating within Australia. We maintain our view that the risks faced by gas and electricity businesses are sufficiently similar to warrant only one benchmark across all businesses. We do not consider that a separate benchmark for electricity or gas businesses is warranted based on the evidence before us. We note that the empirical evidence before us does not show any material difference between the results for gas and electricity businesses. We also consider that the regulatory framework mitigates the risk exposure of the regulated businesses. Furthermore, the similar

⁴ For our considerations on the benchmark efficient entity, see: AER, *Explanatory statement: Rate of return guideline*, December 2013, chapter 3.

⁵ AER, *Explanatory statement: Rate of return guideline*, December 2013, chapter 7, p. 109.

⁶ NER, cl. 6.5.2(k)(1) and 6A.6.2(k)(1); NGR, r. 87(11)(a).

⁷ AER, *Rate of return guideline*, December 2013, p. 8.

⁸ NEL, s. 7; NGL, s. 23.

⁹ NEL, s. 7A; NGL, s. 24.

framework applying between gas and electricity reduces potential divergences between the two sectors.¹⁰

To calculate the allowed return on debt for the benchmark efficient entity, we proposed in our guideline to specify a benchmark debt term. The benchmark debt term:

- establishes the period over which the trailing average is calculated
- determines the period for moving to a trailing average
- is an input to obtaining yields to estimate the return on debt.

We propose to use a 10 year average debt term for the benchmark debt portfolio. In developing our rate of return guideline, we observed that the weighted average debt portfolio term at issuance for Australian regulated energy businesses was 8.7 years.¹¹

We also proposed to estimate the return on debt using a credit rating of BBB+ from Standard and Poor's, or the equivalent rating from other recognised rating agencies. However, if published yields that match the benchmark credit rating of BBB+ or the equivalent from rating agencies are not available, we proposed to apply the published yields that are the closest approximation of the BBB+ credit rating.

3.2 The trailing average portfolio approach

The approach outlined in our guideline for implementing the trailing average estimates the average return that would have been required by debt investors in a benchmark efficient entity if it raised debt over a historical period prior to the commencement of a regulatory year. This approach calculates the return on debt as a simple average of the total return on debt over a defined period up to the start of the regulatory control period (or regulatory year).¹² The relevant period used to calculate the return on debt is 10 years.¹³ We also considered that annual updating of the return on debt would improve the match between the expected return on debt of the benchmark efficient entity (that is, its debt payments) and the allowed return on debt (that is, its regulatory return on debt).¹⁴

We considered that the trailing average portfolio approach reflects an efficient financing practice of a benchmark efficient entity. This is because a benchmark efficient entity may hold a debt portfolio with staggered maturity dates to manage interest rate risk while limiting exposure to refinancing risk.¹⁵ Given this, the benchmark efficient entity's expected return on debt for a regulatory year could be calculated as the weighted average return on debt for debt issued prior to that regulatory year.

We also proposed in our guideline to gradually introduce the trailing average portfolio approach, while phasing out the current 'on the day' approach. Given we proposed a 10 year debt term, we proposed to introduce the trailing average over a 10 year period.¹⁶ An example of this approach is outlined in appendix B of our rate of return guideline.

¹⁰ For our considerations on the benchmark efficient entity, see: AER, *Explanatory statement: Rate of return guideline*, December 2013, chapter 3.

¹¹ AER, *Explanatory statement: Rate of return guideline*, December 2013, p. 136 and pp. 141–6.

¹² were the weighting is determined by the size of the debt issue.

¹³ AER, *Explanatory statement: Rate of return guideline*, December 2013, section 8.3.3.

¹⁴ AER, *Explanatory statement: Rate of return guideline*, December 2013, p. 109; NER, cl. 6.5.2(k)(1) and 6A.6.2(k)(1); NGR, r. 87(11)(a).

¹⁵ AER, *Explanatory statement: Rate of return guideline*, December 2013, pp. 108–10.

¹⁶ AER, *Explanatory statement: Rate of return guideline*, December 2013, pp. 120–5.

3.3 Annual updating of the return on debt

We proposed in our guideline to update the return on debt estimate annually for the following reasons:¹⁷

- This approach minimises the potential mismatches between the benchmark efficient entity's (expected) actual return on debt and the allowed return on debt during the regulatory period. Reflecting market changes during the regulatory control period, therefore, reduces the scope for sub-optimal investment and consumption levels.¹⁸
- This approach is feasible and is relatively low cost. We propose to use a third party data provider to estimate the allowed return on debt. This means that the updating process would be less resource intensive than if we were to use an in-house data set.

On balance, we considered the advantages of annual updating outweigh the associated additional costs (such as resource requirements) and other disadvantages (such as potentially higher volatility of consumer prices within a regulatory control period).

The rules also require that the return on debt calculation be capable of automatic updating.¹⁹ We will set out our proposed approach for automatically updating the return on debt as part of considering a service provider's revenue proposal.²⁰ Stakeholders will have the opportunity to comment on our proposed method at that time. We also recognise that adjustments to the post tax revenue model (PTRM) may be required. We will consult with stakeholders on any proposed changes in the future. As such, the method of updating the return on debt and any amendments to the PTRM are outside the scope of this issues paper.

¹⁷ AER, *Explanatory statement: Rate of return guideline*, December 2013, p. 109 and p. 112.

¹⁸ If, in any year, the expected return on debt raised is different from the allowed return on debt, this difference may distort investment and consumption decisions across time. If the allowed return on debt is below the expected return on debt, this might result in under-investment. In the opposite case, this would lead to over-compensation for the regulated business and customers paying prices that are above efficient levels. See AER, *Explanatory statement: Rate of return guideline*, December 2013, p. 109.

¹⁹ NER, cl. 6.5.2(l) and 6A.6.2(l); NGR, r. 87(12).

²⁰ The first decision where our return on debt approach will be determined is for the NSW, ACT and Tasmanian transmission networks, and the NSW and ACT distribution networks. Our draft decision is expected in November 2014.

4 Third party data service provider

In our rate of return guideline, we proposed to estimate the return on debt using an independent third party data service provider.²¹ We considered that using a third party data service provider has the following advantages:

- Third party data sources are provided for use by market practitioners and developed independently from the regulatory process.
- Third party data sources are constructed by finance experts with access to a comprehensive financial database, where judgements are made in terms of debt selection and any necessary adjustments to yields.
- Using an independent third party reduces the scope for debate on debt instrument selection issues, and curve fitting²² or the use of some form of averaging methods to derive the estimate of the return on debt.²³
- A third party data source can be more readily implemented in the context of automatically updating a trailing average of the return on debt as required by the rules.

In our guideline, however, we did not state which third party data series we propose to use for estimating the return on debt. This section, therefore, discusses the relative features of the available data series that reasonably match the characteristics of our benchmark efficient entity. These series are those published by the RBA and Bloomberg. In discussing the relative features of the RBA and Bloomberg series, we propose to have regard to the assessment criteria outlined in our guideline.²⁴

For clarity, this section does not state a preference for either the RBA or Bloomberg series. Instead, such a decision will be made at the time of a regulatory determination.

4.1 Assessment criteria

In our rate of rate return guideline, we set out criteria that we proposed to use to assess the merits of various sources of information in setting the allowed rate of return.²⁵ In table 1, we outline how these criteria may be relevant to assessing the relative features of the data series published by the RBA and Bloomberg. The relative features of the alternative data series are discussed in greater detail in section 4.4.

²¹ AER, *Rate of return guideline*, December 2013, p. 21.

²² Curve fitting is the process of constructing a curve, or mathematical function, that has the best fit to a series of data points, subject to constraints.

²³ Alternatively, developing an in-house method would likely require detailed criteria for selecting debt instruments with appropriate specification of contingencies to allow automatic updating, and a detailed description of the estimation method (that is, a curve fitting technique or some form of averaging observed yields—for example, Nelson–Siegel, Svensson or spline-based approaches).

²⁴ AER, *Rate of return guideline*, December 2013, p. 6.

²⁵ AER, *Rate of return guideline*, December 2013, p. 6.

Table 1 Criteria for assessing the relative features of a third party data series

Assessment criteria	Relative features of a third party data series
<p>Where applicable, reflective of economic and finance principles and market information:</p> <ul style="list-style-type: none"> ▪ estimation methods and financial models are consistent with well accepted economic and finance principles and informed by sound empirical analysis and robust data. 	<p>This may be relevant when assessing the curve fitting method of a given data series. For example, any assumptions inherent in a series should reflect well accepted economic and finance principles. The data series should also be robust to these assumptions.</p>
<p>Fit for purpose:</p> <ul style="list-style-type: none"> ▪ the use of estimation methods, financial models, market data and other evidence should be consistent with the original purpose for which it was compiled and have regard to the limitations of that purpose; ▪ promote simple over complex approaches where appropriate. 	<p>This may be relevant when assessing the construction of the data sample used to estimate a data series. For example, a data series that closely matches the characteristics of our benchmark efficient entity may be preferable to a series that uses a broader, but less representative, sample.</p>
<p>Implemented in accordance with good practice:</p> <ul style="list-style-type: none"> ▪ supported by robust, transparent and replicable analysis that is derived from available, credible datasets. 	<p>This may be relevant when assessing the curve fitting method of a third party data series. For example, a more transparent series may better enable the underlying analysis to be assessed.</p> <p>The transparency and availability of the underlying data sample may also facilitate an assessment of how well a data series fits a sample that matches the characteristics of our benchmark efficient entity.</p>
<p>Where models of the return on equity and debt are used these are:</p> <ul style="list-style-type: none"> ▪ based on quantitative modelling that is sufficiently robust as to not be unduly sensitive to errors in inputs estimation ▪ based on quantitative modelling which avoids arbitrary filtering or adjustment of data which does not have a sound rationale. 	<p>This may be relevant when assessing the curve fitting method of a third party data series. For example, a series that is robust to its input assumptions may be preferable to a series that is sensitive to errors in its inputs.</p> <p>Similarly, using a sample which does not require adjustments to the underlying data may be preferable to a sample that does (for example, to remove the yield impact of embedded options).</p>
<p>Where market data and other information is used, this information is:</p> <ul style="list-style-type: none"> ▪ credible and verifiable ▪ comparable and timely ▪ clearly sourced. 	<p>This may be relevant when considering the frequency of alternative data series. For example, daily yields may be more timely than estimates that are available less frequently.</p> <p>The extent to which data is clearly sourced may also facilitate a more detailed assessment of the credibility and robustness of the underlying sample.</p>
<p>Sufficiently flexible as to allow changing market conditions and new information to be reflected in regulatory outcomes, as appropriate.</p>	<p>This may be relevant when considering the frequency of alternative data series. For example, daily yields may be more reflective of new information and changing market conditions than estimates that are available less frequently.</p>

Source: AER analysis.

4.2 Overview of RBA series

The RBA, in its December 2013 Bulletin, published an article titled '*New measures of Australian corporate credit spreads*'.²⁶ This article presented a method for estimating the aggregate credit spreads of A-rated and BBB-rated bonds issued by Australian non-financial corporations across a range of maturities.

The RBA method estimates credit spreads for given maturities (three, five, seven and ten years) as a weighted average of Australian dollar credit spreads over the swap rate.²⁷ The relative weights of credit spreads are determined by a method that assigns a weight to every observation based on the distance of an observed bond's term to maturity relative to the given (target) tenor.²⁸ That is, bonds with terms to maturity close to the target tenor are given greater weight than bonds further from the target tenor.

The RBA will commence publishing monthly credit spreads estimates from December 2013.

Further detail on the RBA series is provided throughout section 4.4.

4.3 Overview of Bloomberg series

Bloomberg currently publishes two alternative data series which may be used to estimate the return on debt for our benchmark efficient entity. These series are the Bloomberg valuation service (BVAL) curve and the Bloomberg fair value (BFV) curve. The longest published term to maturity for these curves is currently seven years.

We have previously used the BFV curve (subject to extrapolation) to estimate the return on debt, including for all our recent decisions. We understand, however, that Bloomberg intends to cease publishing this curve. Accordingly, we do not substantively consider the BFV curve in this paper. The corresponding BVAL curve was first published in November 2013 and has not previously been considered by us or stakeholders in the context of a regulatory determination.

Our understanding of the BVAL curve is that it is a par yield curve.²⁹ Moreover, the BVAL curve adopts a number of constraints for selecting input data. For example, the BVAL curve is derived from a sample of bonds that have a minimum BVAL score of six. BVAL scores are numerical ratings that provide an indication of the relative strength of the quantity and quality of market inputs used in calculating the BVAL price.

Further detail on the BVAL series is provided throughout section 4.4.

²⁶ RBA, *Bulletin: New measures of Australian corporate credit spreads*, December Quarter 2013.

²⁷ The RBA method also uses credit spreads for foreign currency denominated Australian bonds that are converted into their Australian dollar equivalent.

²⁸ RBA, *Bulletin: New measures of Australian corporate credit spreads*, December 2013, p. 20. Tenor measures the time left until a bond's maturity date.

²⁹ A par yield curve is a graph of the yields on hypothetical securities with prices set at par (that is, securities with a coupon rate set equal to their yield to maturity (YTM)). YTM is the rate of return anticipated on a bond if held until the end of its lifetime. It is considered a long-term bond yield expressed as an annual rate. It assumes all coupon payments are reinvested at the same rate as the bond's current yield. YTM is an estimate of a bond's return that helps investors compare bonds with different maturities and coupon rates. (See <http://www.investopedia.com/terms/y/yieldtomaturity.asp>)

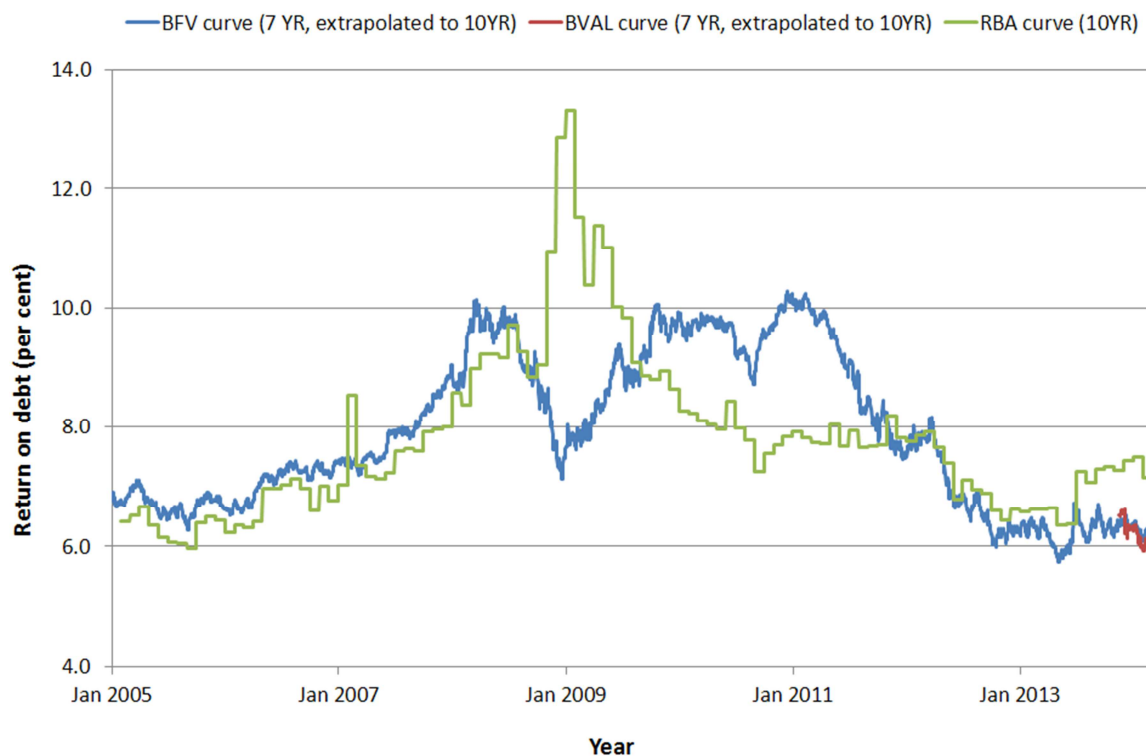
4.4 Relative comparison of the alternative series

This section provides a relative comparison of the features of the RBA series and the BVAL curve published by Bloomberg.³⁰ In particular, in assessing which series (or combination of these series) we should use to estimate the return on debt, we may consider the following features:

- characteristics of the benchmark efficient entity
- transparency
- sample data construction
- curve fitting approach
- empirical analysis relative to our benchmark
- data frequency.

A comparison of the RBA and two Bloomberg series is also shown in figure 1.

Figure 1 Comparison of return on debt estimates



Source: AER analysis.

Note: The Bloomberg data has been extrapolated from an underlying seven-year curve to a ten-year term by adding a fixed term spread of 30 basis points. The addition of a fixed spread represents a simplification for illustrative purposes, but the magnitude of this spread reflects that applied in recent AER decisions.

4.4.1 Characteristics of the benchmark efficient entity

In our rate of return guideline, we proposed to estimate the return on debt based on a BBB+ credit rating and term to maturity of 10 years.³¹ We also stated that if published yields do not reflect a BBB+

³⁰ The BFV curve is not considered given Bloomberg's intention to cease publishing this data series.

credit rating, we will use the closest approximation available.³² In previous decisions, this has included using estimates from a broad BBB rating band.

The RBA estimates credit spreads for a range of maturities, including a 10 year term. Further, the RBA estimates reflect a broad BBB rating band. The characteristics of the RBA series, therefore, are reasonably consistent with the term and credit rating for the return on debt proposed in our rate of return guideline.

Similar to the RBA series, Bloomberg's estimates reflect a broad BBB rating band. The longest published term for the BVAL curve, however, is currently seven years. To better match the term of the benchmark efficient entity, therefore, we may need to extrapolate the BVAL curve to a 10 year term. In contrast, the RBA currently publishes a series with a 10 year term which would not require extrapolation.³³

4.4.2 Transparency

The transparency of a given approach is important for providing confidence that the construction of a given series is consistent with well accepted economic and finance principles.³⁴ In this context, the construction of a given series includes both the composition of the respective samples, as well as any curve fitting methods.

The RBA's method for deriving its estimates of corporate credit spreads was set out in its Bulletin article.³⁵ This included an outline of its curve fitting method, as well as an assessment of the performance of the curve over time. The transparency of the RBA series is expected to facilitate a detailed assessment of the assumptions underpinning its curve fitting method. As discussed in section 4.4.3, however, the composition of the bond sample used in the RBA series is less clear.

In contrast, the proprietary nature of Bloomberg's series has previously been criticised. For example, we have previously stated that the proprietary nature of Bloomberg's modelling limits our ability to assess the factors driving the BFV curve.³⁶ Service providers have also previously expressed concerns with the limited transparency of Bloomberg's curves.³⁷ That said, on a given day it is possible to view the underlying bond sample and corresponding yield data that informs the BVAL series.

4.4.3 Sample data construction

The construction of the sample used to inform the RBA and Bloomberg series varies (from one another, and over time). For example, the RBA sample includes fixed rate bonds issued by non-financial corporations that are incorporated in Australia.³⁸ This includes bonds issued in both Australian and foreign currencies, and with embedded options³⁹. Further, the RBA uses BVAL pricing data where available, but has supplemented this with Bloomberg generic prices and UBS data for the purpose of back-casting its series. The RBA, however, does not provide a list of the specific bonds used in its sample.

³¹ AER, *Rate of return guideline*, December 2013, p. 21.

³² AER, *Rate of return guideline*, December 2013, p. 21.

³³ For clarity, alternative extrapolation approaches are not discussed in this issues paper. Instead, if an extrapolation approach is required to be developed, this will be undertaken at the time of a determination.

³⁴ AER, *Rate of return guideline*, December 2013, p. 6.

³⁵ RBA, *Bulletin: New measures of Australian corporate credit spreads*, December 2013.

³⁶ AER, *Final decision, APT Allgas, Access arrangement proposal for the Qld gas network*, June 2011.

³⁷ See, for example: CEG, *Estimating the cost of 10 year BBB+ debt, A report for Country Energy*, June 2009.

³⁸ RBA, *Bulletin: New measures of Australian corporate credit spreads*, December 2013, p. 17.

³⁹ such as callable bonds (or bonds that can be redeemed by the issuer prior to their maturity), convertible and puttable bonds

In contrast, the sample Bloomberg used to derive the BVAL curve is set out below:

- excludes bonds that breach certain yield to maturity thresholds
- only uses bonds with a BVAL score of 6 or higher
- only publishes curves (for a given maturity) when at least 15 bonds across the term structure⁴⁰ are available
- only includes bonds with a minimum of two months to maturity
- excludes the following bond structures:
 - retail medium term notes—bonds with an embedded survivor put options
 - embedded structures—bonds with call or put options⁴¹, convertibles and sinking funds
 - coupon types—inflation linked, floating rate and structured notes.

In addition, it is possible to view the specific bonds (and their corresponding yields) used in Bloomberg's sample on a given day.

All else equal, a larger sample may lead to more robust statistical outcomes. However, a trade off exists between increasing the sample size with data for firms that represent a lesser match to the characteristics of our benchmark efficient entity. That is, an unrepresentative sample may lead to unrepresentative results.

Similarly, the extent to which yield data may need to be adjusted to facilitate comparisons may be relevant. For example, using a sample of bonds that exclude those with options (the Bloomberg data series) may be preferable to using a sample of bonds that include those with options and then making adjustments to remove the impact of the option on yields. As previously stated by Professor John Handley, any such adjustments may introduce 'a second layer of uncertainty'.⁴²

4.4.4 Curve fitting approach

It is possible to estimate yield curves or credit spreads using a number of alternative approaches. The alternative approaches adopted by Bloomberg and the RBA, therefore, may be a factor that we consider when assessing proposals to use a particular curve.

The RBA approach to estimating credit spreads is outlined in their Bulletin article. The RBA explains its approach as follows:⁴³

[A]ggregate credit spreads of A-rated and BBB-rated Australian NFCs [non-financial corporations] are estimated for a given (target) tenor as the weighted average of the Australian dollar equivalent credit spreads over the swap rate. The method is applied to the cross-section of bonds in the sample that have the desired credit rating. The weights are determined by a Gaussian kernel that assigns a weight to every

⁴⁰ At any given time, the market-determined interest rate on a bond will depend on the features of that bond. Two features that are usually particularly important to market participants are the term of the security and the risk of the borrower defaulting on the promised payments. The connection between term and interest rates is called the *term structure of interest rates*. See G. Peirson, R. Brown, S. Easton, P. Howard, *Business Finance*, McGraw-Hill Australia, Eighth Edition, 2002, p. 103.

⁴¹ Callable bonds give the issuer the right to redeem the bonds prior to their maturity, while put bonds allow the bond holder to force the issuer to repurchase the security before maturity.

⁴² John Handley, *Comments of the CEG Report: Estimating the 10 year BBB+ cost of debt*, 10 February 2011, p. 5.

⁴³ RBA, *Bulletin: New measures of Australian corporate credit spreads*, December 2013, p. 20.

observation in the cross-section depending on the distance of the observation's residual maturity and the target tenor according to a Gaussian (normal) distribution centred at the target tenor.

The specific curve fitting approach adopted by Bloomberg is less clear, due to the proprietary nature of its modelling. Our understanding, however, is that the BVAL curve is a par yield curve. A par yield curve is a way of normalising bond yields to represent the term structure of a sample of bonds. It also represents the yield to maturity that would need to be offered to raise funds equal to the face value of the bond at issuance.

4.4.5 Empirical analysis relative to our benchmark

The extent to which the RBA and Bloomberg estimates match observed yield data on bonds with characteristics similar to our benchmark efficient entity is a factor we may consider when comparing the alternative series. This is consistent with the assumption underpinning the approach set out in our guideline—that the yield should approximate the efficient cost of debt of the benchmark efficient entity.

Notably, we have previously compared the performance of the BFV curve with a series developed by CBA Spectrum (which has since ceased publication).⁴⁴ In the case of ActewAGL, and separately for Jemena Gas Networks, our analysis was subject to review by the Australian Competition Tribunal. The Tribunal's decision, therefore, may be informative.

For example, in ActewAGL, the Tribunal stated one approach for distinguishing between competing curves is to compare relevant observed yields against the published fair value curves and an average of these curves. The Tribunal considered that such analysis should undertake the following process:⁴⁵

- Assemble a representative population of observed yields of sufficient number and term to maturity.
- Only exclude bonds where there are sufficient qualitative reasons to consider that they are not correctly classed as being part of the relevant population.
- 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
- 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.
- 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.

Further, the Tribunal stated that if we cannot find a basis upon which to distinguish between published curves, it is appropriate to average the yields provided by each curve (so long as the published curves are widely used and market respected).⁴⁶

⁴⁴ See, for example: AER, *Final decision, Australian Capital Territory distribution determination 2009–10 to 2013–14*, 28 April 2009.

⁴⁵ Australian Competition Tribunal, *Application by ActewAGL Distribution [2010] ACompT 4*, 17 September 2010, paragraph 77.

⁴⁶ Australian Competition Tribunal, *Application by ActewAGL Distribution [2010] ACompT 4*, 17 September 2010, paragraph 78.

In the subsequent review for JGN, the Tribunal relied heavily on analysis provided by CEG.⁴⁷ This analysis used absolute and squared error tests to suggest that the BFV curve was the best fit to the observed yield data.

For the following reasons, however, it may be preferable to have greater regard to the curve fitting methods and sample data of the alternative series (instead of assessing the output of alternative curves):

- A key reason for using a third party data service provider is the relative expertise of the provider. That is, these series are constructed by finance experts with access to a comprehensive financial database, where judgements are made in terms of debt selection and any necessary adjustments to yields. Developing our own sample of bonds, including the consideration of any requisite adjustments to the yields of these bonds, may be contrary to this rationale.
- Considerations other than absolute and squared errors tests may be relevant. For example, as stated by the RBA, there is a trade-off between the goodness of fit of a curve (as measured as the sum of squared residuals between observed and estimated spreads) and the smoothness of the resulting credit curve.⁴⁸
- The need to adjust yield data (for example, to remove the impact of embedded options, as discussed in section 4.4.3) may limit the reliability of any relative assessments. That is, the capacity to make adjustments to the underlying data to ensure the corresponding sample is presented on a consistent basis may be limited.
- Whether a particular curve best fits the available data may vary over time. That is, the BVAL curve may better 'fit' a sample of bonds (which match the characteristics of our benchmark efficient entity) relative to the RBA curve during some years of a regulatory period, but not others (and vice versa). Notwithstanding this, the consideration of alternative curves during a regulatory period may limit the ability for the return on debt to be updated automatically (as required by the rules).⁴⁹ It may be preferable, therefore, to select a particular curve in a final decision, and apply this curve for the duration of the regulatory period. This approach may also provide greater predictability for stakeholders throughout the regulatory period.

4.4.6 Data frequency

Consistent with the requirements outlined in our rate of return guideline for selecting an averaging period, data for estimating the return on debt should be available over a minimum of 10 consecutive business days.⁵⁰ This approach aims to smooth out short term market fluctuations.

The RBA currently publishes estimates of credit spreads for only the last day of a given month.⁵¹ Dependent on the length of the proposed averaging period, therefore, this may lead to an estimate of the return on debt that reflects short term market fluctuations.

Bloomberg, however, publishes BVAL estimates daily. Accordingly, the availability of frequent data may lead to a preference for the Bloomberg data series over the RBA's estimates.

⁴⁷ See, for example: Australian Competition Tribunal, *Application by Jemena Gas Networks (NSW) Ltd (No 5) [2011] ACompT 10*, 9 June 2011, paragraph 89.

⁴⁸ For example, see: RBA, *Bulletin: New measures of Australian corporate credit spreads*, December 2013, p. 21.

⁴⁹ NER, cl. 6.5.2(l), and 6A.6.2(l); NGR, r. 87(12).

⁵⁰ AER, *Rate of return guideline*, December 2013, p. 21.

⁵¹ The RBA have indicated their intention to eventually publish daily estimates. However, the timeframe for when daily estimates may become available is not yet clear.

5 Implementing the RBA series

In our rate of return guideline we proposed to estimate the prevailing rate of return on debt, for each regulatory year in the regulatory control period, as a simple average of the prevailing rates observed over a period of 10 or more consecutive business days up to a maximum of 12 months. Moreover, we proposed that such an averaging period should satisfy the following conditions:

- it should be specified prior to the commencement of the regulatory control period
- at the time it is nominated, all dates in the averaging period must take place in the future
- it should be as close as practical to the commencement of each regulatory year in a regulatory control period
- an averaging period needs to be specified for each regulatory year within a regulatory control period
- the proposed averaging periods for different regulatory years are not required to be identical but should not overlap
- the nominal return on debt is to be updated annually using the agreed averaging period for the relevant regulatory year
- each agreed averaging period is to be confidential.

As outlined in section 4.4.6, the RBA series currently includes yield estimates for only the last day of a given month. Following the averaging period requirements in our rate of return guideline, therefore, may preclude the RBA series from being used to estimate the return on debt.

In this section, we discuss alternative approaches for interpolating the RBA monthly estimates to derive daily data. Additionally, we discuss whether the averaging period requirements set out in our rate of return guideline should be relaxed to accommodate the potential use of the current RBA series (without interpolation).

This discussion of alternative approaches for using the RBA series to estimate the return on debt, however, should not be inferred as preference for using the RBA series. Instead, a decision on which series will be used to estimate the return on debt will be made at the time of a determination.

It is also important to recognise that the approaches outlined below are specific to the current RBA series. That is, they would not apply if a Bloomberg series (with daily estimates) is used. Similarly, they would not apply if the RBA commenced publishing daily estimates.

5.1 Interpolating monthly estimates

One possible approach to implementing our proposed method for estimating the return on debt using the RBA series may be to interpolate daily estimates from the RBA's monthly data. Such an approach is demonstrated in attachment A, whereby daily estimates could be interpolated as follows:

1. Extract from the RBA's BBB-rated data series the two month-end estimates of the spread to Commonwealth Government Securities (CGS) that immediately straddle the target date.

2. Calculate the number of business days between the two corresponding month-end estimates. Divide the spread between the two month-end estimates by the number of business days to determine the daily spread increment (or decrement).
3. Estimate the daily risk free rate for each day within the proposed averaging period, consistent with our approach to estimating risk free rates adopted in previous decisions.⁵²
4. Calculate the daily estimate of the spread to CGS for each day of the averaging period as the sum of the daily risk free rate and the interpolated daily incremental spread determined in steps (2) and (3) respectively.
5. Estimate the return on debt as the annualised average of the daily spreads and risk free rates calculated in step (4).

The following subsections discuss variations to the above example.

5.1.1 Interpolate yields or spreads

Instead of interpolating the spread to CGS between two corresponding estimates, it may be preferable to simply interpolate between the corresponding month-end yields. That is, use the total yield estimates published by the RBA, as opposed to the spread to CGS estimates published by the RBA.

An advantage of using the spread to CGS is that this may allow service providers to better hedge their exposure to variations in interest rates. Alternatively, using the total spread may be simpler, and better reflect the limited precision that estimates of the return on debt represent.

5.1.2 Interpolate using business days or calendar days

In the example above, the monthly RBA estimates are interpolated based on the number of business days between two corresponding estimates. This approach assumes that the variability in the RBA's month-end estimates only occur during business days. For example, the increase in daily yields between a Friday and the subsequent Monday is assumed to equal the daily increase from a Monday to Tuesday.

Alternatively, it may be preferable to use the number of calendar days between RBA estimates to interpolate daily estimates. This may better smooth any variability in bond yields (used as inputs to the RBA approach).

Increasing the number of days used to interpolate between two monthly estimates would decrease the magnitude of the daily increment. The impact of either assumption, however, may diminish as the number of days in the averaging period increases. Notwithstanding this, we seek stakeholder views on whether the number of business days, or calendar days between monthly RBA estimates should be used if we interpolate the RBA series to derive daily estimates.

5.1.3 Extrapolate a single estimate

In some circumstances, however, it may not be possible to interpolate daily estimates. For example, this may occur if an averaging period ends in the middle of a given month, but prices are required to be published before the end of that month. Therefore, only a single estimate would be available. In these circumstances, it may be preferable to consider the following alternatives:

⁵² See, for example: AER, *Final decision: SPI Networks (Gas) access arrangement*, March 2013.

- Add the spread on the most recently available month-end estimate to the risk free rates observed during the averaging period.
- Adopt the yield on the most recently available month-end estimate as the estimate of the allowed return on debt for the benchmark efficient entity.

The consideration of the options outlined above (and/or alternative proposals) should also be considered with reference to the issues raised in section 5.2.

5.2 Averaging period requirements

An alternative to interpolating the RBA series to estimate the return on debt may be to average only the available yield estimates published by the RBA. That is, the return on debt may be set as a single month-end estimate from the RBA, or as a simple average (or weighted average) of multiple month-end estimates.

Using only the available yield data from the RBA, however, may necessitate departing from the averaging period requirements set out in our rate of return guideline. For example, this may include:

- removing the requirement for prevailing rates to be observed over consecutive business days
- removing the requirement for prevailing rates to be observed over a minimum of 10 business days.

Departing from either, or both, of the above requirements would allow service providers to propose an average of up to 12 month-end estimates from the RBA series. The strength of this approach is that it is relatively simple to implement and understand. Moreover, it may represent a pragmatic approach to utilising an alternative data source that may meet the characteristics of the benchmark efficient entity.

The limitations of this approach, however, include that it may lead to an estimate that misrepresents the return on debt during the relevant averaging period. For example, using few data points may result in the estimate of the return on debt being dominated by any errors in the small data sample.

A Interpolating daily estimates: an example

See attached spreadsheet.